1. Transcripts in K.C.

2. Homer Lewis
   Well, Y. H. Chang — 25,000
   Big Thompson Ditch Co. 
   Limbs, weight 10,000 500,000
   760,000

2. River cut.
   1. Three car bodies removed & replaced.
   2. Cable was their
   3. Don't know if cable was cut and spliced or removed.

4. No rip rap.

5. Car bodies put back in original.

3. Ray Burns —
   Sheep — Moliu Ron —

4. Channel changes
   1. Corps of Engineers — did after 76 Flood.
   7 to 10 channel.

5. Look before 76 Flood channel. In area.
   Ed Simpson — just upstream
   76 Flood Northside.
5. Greeley Loveland Div. Ed Simco

- 76 Flood washed out
- 80 ...it didn't wash out.

Big Thompson in active river.

Water near flowed over to land

8:30 pm 30th

Peak 7:00

9:00 pm

12:00 midnight

Cross section of channel before flood

7. Questions to ask YH Chen —

Before 1st of year.

8. Hydrographs

9. River prior to 76 when it stranded for 76 flood

Before 1976

After 84

76 Flood deposited

in the area he moved!

76 Flood deposited

in the area he moved!

Placed 27 bodies after 65 Flood:

Inclined corner post at upper end — Stritch Bros.
Letter Mr. 1980.
Eisman price -
$15,000/lot.

11. pursue difference in crossing design.
Pipe cul.
Top sheet piling - look at location.
Qualifications:

1. Siemens 8 and 8 Ass.
   Mon. Eng. Design Division
   Received Ass Prof.
   Acting 4 1/2 yrs.

2. Lie No. 1096 Co.
   Received 1977.
   No other Lie.

3. Bank Stability
   Drop Structure

4. 20 Mile Cr. Study - Mississippi
   Mobil Oil Co. Corps of Eng.

5. Pima County, Ariz.
   Drop Structure

6. Course
   Who was your Professor?
   DB Simon
   EW I.
   HW Shen
   Kalesius

7. Authors -
   Geom. Study of 1000 River ASCE, 1979

8. Resume, Exhibit -
   [584, T.W. 1975 with]

9. [848, 1975 with]
Tents to go in a straight line
Momentum!
Accelerate and make the turn
(Banks)

Bed forms-
Big Thompson is not a Mature River?
Small slope
More stable bank
Channel more U shaped

Big Thompson is a Active River!
Banks in constant rate of change
Source - Estes Park?
Rainfall & Snow melt.

La Salle = dams in .5 miles

80-100 miles from Source to Loomis
In canyon area, Banks on gravel and sand

Loomis - Cobble 2' to feet,
Bank
Bed - Armor 2' - 1st
below Armor gravel sand

Period of peak
flow
1 day to 10 days

Orondo Dr.

Ave - not flowing - 9600 c.f.s. without
going over-bank - Loomis computer

1st studied
July 1980 -
June 1982

Collected sand K-d Nile 700' U.S. Loomis property

Compacted Critical 5:1 floor would move

Size Dist. - Quantity 5 Photos - Pebble count 700
700' U.S. of Loomis Property
7/9/70
Page 3
Exhibits

1. A. Bank - Right side of river
   1' to 3' above bed
   3' above bed

2. A. Bank
   3' above bed
   2' above

3. A. Bank
   100' long channel in bank
   near 1980 floods
   700' U.S. Div. Structured

Photos during 2nd trip Jan 1982

Exhibit 5 - O.S.
Curved condition,
Nearing,
Determin How flow went O.S.
How has conf. changed
Moved river North
100' U.S. of Loomis hour

Exhibit 6
200' O.S. of Loomis hour

Exhibit 7
Old River Bed - Shows Armor layer
Prior to 1980 floods similar

Exhibit 8
O.S. 2000' O.S. Loomis bridge looking U.S.
Material on dyke
No Idea when Dyke

Exhibit 9
Old 0.5 Bank

Exhibit 10
2 Between Bridge & Loomis

Exhibit 12
700' U.S. Loomis same as Exhibit 14

Exhibit 13
O.S. Central Bridge Exhibit 12 looks U.S.
100' U.S.

Exhibit 15
Corroded looking O.S. Loomis prop.
Bank after flood
Corroded Loomis Exhibit 1 - Same as Exhibit 15
As far as I know anything about
C. B. 1980

1. Calculation
2. Modeling

- Computer analysis of 1976
- Manning's n, V = 1.5
- Shield disp., in current motion

Slope X Sectional
- Given k, determine A & R from X sectional
- USGS, Big Thompson Flood 1976
- 100 yr. slope - from report
- k = 0.30 - from Graphical Sizes

Area - where pipe line crossing

D. Did not do anything U.S. of D.I.C.

Calculation

A. USGS reading get discharge.

B. Compute

1979 USGS 3 miles D.S.
USGS mouth 
11/11 - 0.5734

USGS 41

C. Flow of grade Below River Bed
- const = 1 (standing specific)

D. Velocity of peak flow
- Stage Velocity relation
Velocity 1980 flood.

U.S. of Div. structure. \( V = Q/A \)

Scour crossing only place seen on chart.

Velocity:

Apr 30
Midnight Apr 29 500 cfs - 4' 1/2
Midnight Apr 30 1600 cfs - 10' 3/4

Before 1980 - Bank carry 6600 cfs

Armory of bank

Armoring size range from about 30 mm to 200 mm.

Banks held 7000 cfs.

[Bohannon Eq 1, Eq 3, Bohannon Eq 6 
North Bank 8, 9, 10, 11, 12, 13] Chart 5945

How does Armorer Form?

[Eq 7 shows some Bank 03 B 10 31]

[Only deep for crossing is Disturbed Armored]

2 removed 2 put back.

Disturbed area 40'

Used angle of repose 15', eased, turned.

Note: Copy 1st. 20' wide 21 tons.

[How do you know that the material in Exhibit 7 was removed for 40'? Could not the material in Eq 7, be placed on top of original material]
May flow broke could vary after scour line was crossed. Type shield, using traction force theory, car bodies not determin.

How does an armor layer form?

Would you explain the formation of an Armor layer?

Armor

Const. 1978

1979 1700 cfs formed Armor that

1980

1976 flood -

Periods:

Push flow 2500 cfs at Loomis Bridge
7000 cfs

Table 3.3

Site 24 27,000 cfs. Scour Geneva Est.

We may want to make calculation of velocity next

in 1976 flood

in 1980 flood

Duration (in minutes) - evening July 31 11:11:00

6:00 p.m. July 31 5000 cfs from Drake station

1900 cfs 10 min.

1980 flood reach close 4,000 cfs for 12 hours:

6,000 cfs 5 hours

6,900 cfs 23 hours.

Took into account over-bank flow.

Chemeketa Main channel 10,000 cfs. at Loomis Bridge.

Estimate hot opinion.
Sewer 2500 - 3000 cs started physically in problem.

1. Armor loger did provide visitation on the car body.
   Nature of Armor loger tends to be strong.

2. Any physical evidence with erosion
   1. Mark told him started
   2. Armor loger from computation started but on each side of pipeline.

Apr 30 7:00 pm L1 Ne

[Based on computation it started some close to pipe line basis on decayed armor theory!]

1974 conditions 1980 flood duration 3 hr 600 = would not signify corrosion!

Armor
Car bodies
Visitation
Below standard of head
no problem with structure
But didn't put back in original state!
Specifications required to put back in original state.
Put back in original
Didn't specify rip rap, II!

Specifications put
Ft. = 7 to .8 of pipe line
\[ F = \frac{9/5}{\sqrt[3]{9.5}} \]
5 = Hydro. O.-pt.

Ft. of Div. structures, no collision
no calculations, didn't have X section

1. Pipe line
2. General direction of course

3. Low Flow
4. Sheer flow at d.s. of c.t.
5. Standing wave during 1980 flood yes
   at McGee's property 9 to 11 ft.
High flow

River stable in Area 4 to 1920!

Upstream change 1976-1980
Didn't have on information!

Change 1976 Flow
Look at design of regain!

Computer analysis of what in future

Tool
No.
No purpose to use computer.

Gravel mining, U.S.

Not occurring, didn't consider it

Scour under diversion structure

General Scour

Local Scour D.S. of structure

0.5 of Div. S.r.e. close to S. Bank

Rip rap 5162 at Div. Struct.

500 c.f.s. d = 20 to 23 mm nr P.L. Crossing

Any other factor that caused "than P.L.

Details of Div. Structure

May make some use.

Gate open or closed—don't remember, but small factor, on flow.

How figure velocity of flow? Flow would go over Div. at Critic
6,900 cfs. May = 2 miles P.S. 1982

Could calculate velocity.

Never designed a stream crossing!

Designed bank protection means.

What kind of armor existed for Div. 51 to 56 prior to 1980 flood?

1. Any photos showing car bodies to Div. 51 prior 1980 flood.

2. Worked area in bank of O.L. Div. Structure—Common sense?

Let's think a long time. Then it is removed.

Any work 1976 that would disturb armor layer.
Computer Model

X Sect.
Bed & Bank material
vel. lb dist.

Don't have much question about the size of
bed & Bank material
1" to 8"

Chans prefer
Specification didn't call out some key size
no.

So Design
Active Size - Specify some kind of Armory
Material
[Competition did satisfy that need.
[Armory layer was thick but not in question]

No damage to be sure. Properties of Arm.
Would build thinner [Then yes]

What calculate on...
1. P.M. upstream
2. P.M. V.L. some

3. Critical Shear Stress

4. What flow condition ceased partial

Mound
Port. before 8" 3"
Port. after 16"

Assume. Port. size of Div. Street. was Armored
May 1980

hole

Shen - Secheni

Addition flood conditions prior to 1960
B.H. been there since 1920～

Historical floodssame as 1980, from his theory

need to calculate

1. Velocity

2. Size Dist. of Bank material !!

Wear action.

Separation zone but force not to travel past 0.3.

Armored plate.

Lift & Drag force =

Shen stated that B.H. wouldn't cond. N-Bank

erosion U.S. of Div. 0.5 m.
B.M. & Bank M 1980

represented
B.M. & Bank M at Loonis Property

Any evidence of damage

Logs of the river material to show that material varies

Assume material is homogeneous in the area!!

His knowledge of river materials the material won't change much!

Dr. Shen - If you assume the material is the similar in the flood plain area?

1. The contractor put the same material in the French
2. Berm willows out fire leaves core
3. Armored willows out fire leaves core

Why then didn't the bank armor?

Car bodies won't do the Corps of Eng.

1. Assume nothing done to Bank between 1977-1980?
2. If you find that they moved the material and put it back it destroyed from fire change.
Armoring Layer - very thin -

Rang 1 to 2 ft. thick. 1' max.

"to 1'" die material!

Review Alaska Report Monday

Mixture of

Was

backfill

what material was placed at the 9.1.1.

Put back the material they excavated back in

the trench.

At the interface of water and the back

it was not the natural materials.

Used in Troed for samples from 3 d. down

tow of the river!!

How do you know that the Homer logs even

not replaced!
December 22, 1981

Mr. David M. Frick
Resource Consultants, Inc.
P. O. Box Q
Fort Collins, CO 80522

Re: Civil Action No. 80CV1405
Larimer County District Court
Loomis vs. City of Loveland

Dear Dave:

Enclosed herewith you will find the Answers of the Big Thompson Ditch and Manufacturing Company to our outstanding Interrogatories. The Answers do not provide all of the information we desired, but may indeed be helpful to you in completing your analysis.

It would be helpful to me if you would advise me of the status of your investigation and indicate what further information you feel it is necessary to obtain in order for you to complete your studies. I can then determine whether or not the information can be obtained via discovery proceedings or whether we will need to seek the information via other alternatives. One important step will be the deposition of Dr. Yung Hai Chen. However, I do not wish to take his deposition until we have a pretty good idea of where we are going with our case from a technical standpoint so that I can get some assistance from you in formulating questions for Dr. Chen.

Your continued assistance is appreciated.

Very truly yours,

Byrum C. Lee, Jr.

BCL/bn

cc: Mr. Neal Carpenter
Arix
Mr. John C. Overton
DPFC
File No. 220706
w/Attachment
The following answers to the Interrogatories submitted by Third-Party Defendant, Nelson, Haley, Patterson & Quirk, Inc. ("Nelson") are made by Big Thompson Ditch and Manufacturing Company ("Ditch Company"), Third-Party Plaintiff.

1. INTERROGATORY: Please identify, as that term is defined in the preamble hereto, the individual or individuals answering for and on behalf of the plaintiff and, if more than one individual, indicate each interrogatory answered by each individual.

1. ANSWER: N. Eugene Brownwood, President of Big Thompson Ditch and Manufacturing Company, 2165 Fourteen S.E., Loveland, Colorado 80537. I am answering these Interrogatories on behalf of the Ditch Company.
2. INTERROGATORY: Describe the business organization and purpose of the Big Thompson Ditch and Manufacturing Company.

2. ANSWER: The Ditch Company is a Colorado non-profit corporation organized with the purpose of providing water to its shareholders.

3. INTERROGATORY: Identify, as that term is defined in the preamble hereto, the engineer or firm who designed the original diversion structure.

3. ANSWER: The original diversion structure was apparently designed in the 1800's by the farmers who started the Ditch Company.

4. INTERROGATORY: Describe the nature, scope and extent of any damage done to the diversion structure during the 1976 Big Thompson Flood.

4. ANSWER: The diversion dam was damaged and undermined. The bypass pipe was partially destroyed. Damage occurred to the headgate structure. Sediment and debris from the flood were deposited along approximately 1,000 feet of the canal southeast of the headgate. Flood debris was deposited in the vicinity of the headgate.

5. INTERROGATORY: Describe all repairs to the diversion structure following the 1976 flood, including within your response:

   A. The identity of the engineer or firm designing the repairs;

   B. The nature, scope and extent of the repairs;

   C. The identity of the contractor making the repairs;

   D. The cost of the repairs.

5. ANSWER:

   A. The Soil Conservation Service of the U.S. Department of Agriculture made some recommendations regarding reconstruction after the 1976 flood. No engineer was called in to design the repairs.

   B. General concrete work was done to repair the diversion dam. Minor repairs were performed on the sluice-gate. Excavation and backfilling work were performed.

D. $31,362.75. Of this amount, $24,500.00 came from federal and state disaster assistance; $6,862.75 came directly from the Ditch Company.

6. INTERROGATORY: Provide a complete technical description of all changes in design of the diversion structure made during the repairs following the 1976 flood.

6. ANSWER: No major design changes in the diversion structure were effected. The only design change that I am aware of was the addition of a cut-off wall on the south side of the diversion dam.

7. INTERROGATORY: Describe in detail all work performed between 1976 and 1980 which involved grading of the bank, dredging of the channel, placing of riprap or otherwise altering or affecting the Big Thompson River bank or channel within the area immediately upstream and immediately downstream of the diversion structure for a distance of 100 yards and for all such work, state:

A. The nature, scope and extent of the work;

B. The date the work was performed;

C. The identity of the firm designing or detailing the work;

D. The identity of the firm doing the work;

E. The identity of the person or firm authorizing the work;

F. The cost of the work.

7. ANSWER: To the best of my knowledge the river was dredged at some point following the 1976 flood by an unidentified party. Prior to the 1980 flood, the City of Loveland installed a sewer line which crossed the river. I have no further information regarding the work referenced in the Interrogatory.

8. INTERROGATORY: For the 48 hour period immediately preceding and immediately following the 1976 flood, state whether the Big Thompson diversion structure gates were open
or closed, including within your response the dates and
times of opening and closing and whether the gates were
fully or partially opened or closed at each time interval.

8. ANSWER: The Ditch Company has no records indi-
cating the status of the headgates prior to the 1976 flood. At this time the Ditch Company is in the process of procuring
the desired information.

9. INTERROGATORY: For the 48 hour period immediately
preceding and immediately following the 1980 flood, state
whether the Big Thompson diversion structure gates were open
or closed, including within your response the dates and
times of opening and closing and whether the gates were
fully or partially opened or closed for each time period.

9. ANSWER: For the 48-hour time period before the
1980 flood, both headgates were closed. The headgate
structure was subsequently washed away in the flood.

10. INTERROGATORY: At any time during the 1976 flood
did floating debris accumulate or back up at the diversion
structure?

10. ANSWER: Yes.

11. INTERROGATORY: At any time during the 1980 flood
did floating debris accumulate or back up at the diversion
structure?

11. ANSWER: I can't really answer the Interrogatory. To
the best of my knowledge, I don't know of anyone who
would have witnessed any debris accumulation before the
headgate structure washed away in the flood.

12. INTERROGATORY: If your response to either of the
two immediately preceding interrogatories was in the affirm-
itive, compare the extent of the debris buildup.

12. ANSWER: Extensive debris accumulated in the
vicinity of the headgate and the canal during the 1976
flood. I have no knowledge of any debris buildup during the
1980 flood.

13. INTERROGATORY: Describe the nature and sequence
of the failure of the diversion structure in 1980, including
within your answer a chronology of the diversion structure's
failure.

13. ANSWER: No Ditch Company representatives observed
the failure of the diversion structure in 1980. Homer Loomis
has advised that on April 30, 1980, the water began washing
out the riverbank in the vicinity of the sewer crossing. The washing out of the riverbank progressed upstream to the diversion structure.

14. INTERROGATORY: State the exact time as closely as can be determined that water first broke through the diversion structure during the 1980 flood.


15. INTERROGATORY: Provide a complete description of the nature, scope and extent of all damage done to the diversion structure during the 1980 flood.

15. ANSWER: After the flood the diversion dam had shifted in the riverbed, and the balance of the diversion structure was gone.

16. INTERROGATORY: Describe in detail all repair or remedial work performed on the diversion structure following the 1980 flood and with respect to all such work, state:
   A. The nature, scope and extent of the work;
   B. The date or dates the work was performed;
   C. The person or firm recommending the work;
   D. The person or firm preparing the plans and specifications for such work;
   E. The person or firm doing the work;
   F. Whether or not the work was the subject of the contract, and if so, the contract date, parties and amount;
   G. The total remedial cost for work broken down by:
      1. Remedial project or job;
      2. Cost of materials, including the complete listing of materials used and their costs;
      3. Engineering, architectural or investigation costs to develop the plan for the work.

16. ANSWER: Shortly after the flood a temporary diversion system was effected through other ditch companies to provide water to the Big Thompson Ditch and Manufacturing Company shareholders. The plan for this temporary system
was drafted by various members of the Ditch Company. Ed Shefferd, 1954 Fourteen S.E., Loveland, Colorado 80537, performed the construction work. The work was not the subject of any contract. The cost in 1980 to complete the temporary system was $2,694.38.

A new diversion structure and concrete pipeline link to the existing canal of the Ditch Company were constructed in 1981. Construction commenced about March of 1981 and has yet to be entirely completed. The reconstruction work was not recommended in the true sense of the word, but rather necessitated by the destruction of the diversion structure. All reconstruction work was authorized by a majority of the Ditch Company’s stockholders. The plans and specifications for this reconstruction were prepared by Bruns, Inc., 16 Mountain View Avenue, Suite 106, Longmont, Colorado 80501. The work was performed by Bebo Construction Company, Inc., 3536 Weld County Road No. 8, Post Office Box 820, Berthoud, Colorado 80513. The permanent reconstruction work was the subject of a contract dated March 23, 1981 between the Ditch Company and Bebo Construction Company, Inc. for $303,055.05. The remedial project cost to date is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid advertising</td>
<td>$39.10</td>
</tr>
<tr>
<td>Bebo Construction Company, Inc.</td>
<td>313,153.52</td>
</tr>
<tr>
<td>Bruns, Inc.</td>
<td>39,455.72</td>
</tr>
<tr>
<td>Associated attorney fees</td>
<td>8,086.49</td>
</tr>
<tr>
<td>Easements</td>
<td>9,200.00</td>
</tr>
</tbody>
</table>

All materials were provided by the contractor, Bebo Construction Company, Inc. The Ditch Company is seeking to obtain a cost breakdown from the contractor.

17. INTERROGATORY: Identify, as that term is defined in the preamble hereto, all individuals known to you to have witnessed the flooding on your property.

17. ANSWER: People identified in answers filed by the Loomis Plaintiffs, various representatives of state and local governmental agencies, Homer Loomis (1514 West Shore Drive, Loveland, Colorado 80537), residents of the Loomis house and their guests. These individuals witnessed the flooding but probably not the actual destruction of the Ditch Company property.

18. INTERROGATORY: Are you, your agents, or attorneys aware of or have you taken any statements from any witness to your accident? If so, for each statement state:

A. The name of the witness;

B. The person taking the statement;
C. The date of the statement;
D. A summary of the statement's contents.

18. ANSWER: Homer Loomis has given a statement to the insurance company for the City of Loveland. I know nothing further of the nature or circumstances of the statement.

19. INTERROGATORY: Have you, your agents, or attorneys taken, or are you aware of any other statements regarding the facts involved in this litigation? If so, state:

A. The name of the person giving the statement;
B. The name of the person taking the statement;
C. The date of the statement;
D. A summary of the statement's contents.

19. ANSWER: Objection is made to Interrogatory 19 on the basis that the matters involved are part of the attorney work product.

20. INTERROGATORY: If any person or entity has made payment to you for any portion of the damages claimed or costs allegedly associated with the subject flood, for each such person or entity state:

A. The person or entity making payment;
B. The amount paid by each person or entity and the service or loss intended to be covered by such payment;
C. Whether or not the plaintiff has been authorized to recover such payment on behalf of the person or entity making payment or reimbursement.

20. ANSWER: No person or entity has reimbursed the Ditch Company.

21. INTERROGATORY: Have you, your agents, or attorneys received any reports from any flood control agencies or other agencies or entities regarding your alleged damages? If so, state:

A. The name of the agency or entity;
B. The date of the report;
C. A summary of the report's contents.

21. ANSWER: The United States Department of Housing and Urban Development issued a damage survey report dated May 9, 1980. The report described the general damage done to the Ditch Company's facilities and delineated proposed emergency construction work to enable the Ditch Company's shareholders to receive water.

22. INTERROGATORY: Itemize in detail the components of all expenses you have incurred since the flood, which you attribute to the flood.

22. ANSWER: See answer to Interrogatory 16.

23. INTERROGATORY: With respect to the damages you claimed to have incurred in your Complaint and any and all other damages you claimed to have incurred as a result of any action or inaction of this defendant or any other defendant herein, state:

A. The total amount of damages known and ascertained at the present time;

B. How such damages are calculated and what the methods and ingredients of the calculations are;

C. Identify any and all individuals by name and last known address who had any part in the calculations of such damages, including the gathering of information, computation of data, and determination of the stated amounts;

D. Identify any and all individuals the plaintiff intends to call as witnesses at the trial of this matter who will testify to any facet of the calculations or experience of damage;

E. Identify any and all documents which in any way bear upon or tend to establish any item of damages and with respect to each such document, indicate whether the plaintiff intends to use such document as an exhibit at the trial of this matter.

23. ANSWER:

A. $372,629.21.

B. The damages are calculated using the actual cost of replacing the destroyed diversion structure, plus those costs incidental to this actual replacement cost.
C. Richard S. Gast
March, March, Myatt, Korb & Carroll
110 East Oak Street
Post Office Box 469
Fort Collins, Colorado 80522.

Randolph W. Starr
Cross, Christensen, Price & Starr
215 East 7th Avenue
Loveland, Colorado 80537.

In addition, personnel associated with Bruns, Inc., Bebo Construction Company, Inc. and the Ditch Company played roles in the calculation of costs.

D. The Ditch Company has yet to identify those witnesses who will testify at trial regarding the damages issue. The Ditch Company's counsel will supply the names of these witnesses not later than thirty (30) days prior to trial.

E. The documentation bearing on the damages issue primarily involves cost invoices from the reconstruction of the Ditch Company's diversion structure and invoices representing the costs incurred by the Ditch Company which were incidental to the reconstruction. Further documentation lies in the easement grants to the Ditch Company from Homer and Mabelle Loomis, Ray and Ruby Shipley, and Loveland Ready-Mix Concrete, Inc. It is undetermined at this point which documents will be used as exhibits in the trial of this matter.

24. INTERROGATORY: Has any architect or engineer licensed to practice in the State of Colorado or elsewhere, or any other individual familiar with the design professions, advised the plaintiff or its attorneys that in his opinion the professional work allegedly done by the Third-Party Defendant Nelson, Haley, Patterson & Quirk, Inc. was any way contrary to, fell short of or failed to measure up to or comply with the minimum standards for the practice of architecture and/or engineering in the locale of the subject property?

24. ANSWER: Yes.

25. INTERROGATORY: With respect to the preceding interrogatory, state whether any such person has given any opinion or is of the opinion that the Third-Party Defendant Nelson, Haley, Patterson & Quirk, Inc. was negligent or guilty of professional negligence in regard to any professional
services rendered by the Third-Party Defendant Nelson, Haley, Patterson & Quirk, Inc. in connection with the design of the subject property.

25. ANSWER: Yes.

26. INTERROGATORY: If the answer to either of the previous two interrogatories is in the affirmative, identify, by giving the information requested in the preamble to these interrogatories, any and all such persons who have communicated or given such opinion, the date or dates upon which each opinion was communicated, to whom it was communicated, in what manner it was communicated, the substance of each such opinion, and the facts upon which each such opinion is based.

ANSWER: Dr. Yung Hai Chen, Civil Engineering Department, Colorado State University, Fort Collins, Colorado 80523. Dr. Chen, in conversations with Mark L. Korb, counsel for the Ditch Company, has advised that the design of the sewer crossing at the Loomis property failed to properly take into account river hydrology and therefore was deficient with respect to providing protection to that property adjacent to the structure being constructed. All communications were oral. No formal report has yet been provided.

27. INTERROGATORY: Please identify each person the plaintiff expects to call as an expert witness at the trial of this case to testify as an expert with regard to the practice of architecture and/or engineering, and state:

A. The substance of the subject matter upon which each such expert is expected to testify;

B. The facts and/or opinions to which each such expert is expected to testify;

C. A summary of the grounds for each such opinion;

D. A complete description of the material, data, basis and facts considered by, given to or used by such expert in forming the basis of such opinion.

ANSWER: Dr. Yung Hai Chen will be called. The balance of the matters inquired into in paragraphs A through D has not yet been completed in a formal report.

28. INTERROGATORY: Has the plaintiff or its attorneys received a written report from any of the experts listed? If so, state:

A. The name of each expert and the date of such report;
B. The name and address of the person now having custody of the report;

C. Set forth the entire report verbatim in your answer, or if you wish attach a copy of the report to your answer.

28. ANSWER: No.

29. INTERROGATORY: Has the plaintiff or its attorneys or anyone on its behalf received any oral report from any expert listed above. If so, state:

A. The name of each expert giving such report;

B. Provide a detailed exposition of the report;

C. Please state whether any notes, memoranda, or correspondence exist which reflect the substance of said report in whole or in part and identify any person, firm or corporation having care, custody or control of such memoranda.

29. ANSWER: Yes, Dr. Yung Hai Chen. The matters involved in those conversations have been discussed in the responses to previous interrogatories.

30. INTERROGATORY: Please identify any and all other experts with whom the plaintiff, its attorneys, or its agents have consulted, whose names have not been given in response to any previous interrogatory, and regardless of whether or not you intend or expect to use such expert at the trial of this matter.

30. ANSWER: Objection is made to Interrogatory No. 30 on the basis that the matters involved are privileged and would not lead to discoverable or relevant testimony.

31. INTERROGATORY: Has the plaintiff or its attorneys received any written or oral report from any of the experts identified in response to the immediately preceding interrogatory? If so, state:

If written:

A. The name of each expert and the date of each report;

B. The name and address of the person having custody of the report;
C. Set forth the entire report verbatim in your answer or if you wish, attach a copy of the report to your answer.

If oral:
A. The name of each expert giving such report;
B. The name and address of the person to whom such report was given;
C. A detailed exposition of the report;
D. State whether or not any notes, memoranda, or correspondence exist which reflect the substance of the report in whole or in part and identify any person, firm, or corporation having care, custody or control of the memoranda.

31. ANSWER: See answer to Interrogatory 30.

32. INTERROGATORY: Have you taken or do you have in your possession, custody or control any photographs of the area of the subject accident? If so, state:
A. The number of photographs taken;
B. The dates the photographs were taken;
C. The identity of the photographer;
D. The purpose for which the photographs were taken;
E. What each photograph is intended to portray.

32. ANSWER: Yes. Numerous photographs have been taken by many individuals including the Plaintiffs, the City of Loveland, Larimer County newspapers and various other governmental agencies. These photographs were taken at various times during and following the flooding. Photographs which are in the possession and control of the Plaintiffs will be made available at the Defendant's request. All photographs basically depict what occurred during the course of and after the flood.

Dated this 11th day of December, 1981.

N. Eugene Brownwood
STATE OF COLORADO )
COUNTY OF ) ss.

The foregoing instrument was subscribed and sworn to before me this ___ day of December, 1981, by N. Eugene Brownwood.

Witness my hand and official seal.

My commission expires ________.

Notary Public

OBJECTION IS MADE TO THE REQUESTS CONTAINED IN INTERROGATORIES 19, 30 AND 31 FOR THE REASON THAT SUCH INTERROGATORIES SEEK MATTERS WHICH ARE PART OF THE ATTORNEY'S WORK PRODUCT, ARE PRIVILEGED AND WOULD NOT OTHERWISE LEAD TO DISCOVERABLE, RELEVANT OR ADMISSIBLE TESTIMONY.

Dated this 11th day of December, 1981.

MARCH, MARCH, MYATT, KORB & CARROLL

By Mark L. Korb, #7804
Attorneys for Plaintiffs
110 East Oak Street
Post Office Box 469
Fort Collins, Colorado 80522
Telephone: 482-4322

CERTIFICATE OF MAILING

The undersigned hereby certifies that on the ___ day of December, 1981, copies of the foregoing Answers of Big Thompson Ditch and Manufacturing Company to Interrogatories
of Nelson, Haley, Patterson & Quirk, Inc. were placed in the United States mail, postage prepaid and properly addressed to:

Mr. Edwin A. Howe II
1512 Larimer Street, Suite 960
Writers Square
Denver, Colorado 80202

Mr. Byrum C. Lee, Jr.
Knapp and Lee, P.C.
1725 Blake Street
Denver, Colorado 80202.

Robin Wick, Esq.
110 East Oak Street
Fort Collins, Colorado 80524
September 8, 1981

Mr. Jack C. Overton
Design Professionals
Financial Corporation
Union Bank Building
50 California Street
San Francisco, CA 94111

Re: American Motorists Insurance File
File No. 220706
Arix ads City of Loveland

Dear Mr. Overton:

As you are aware, the depositions of Chuck Sapp and Carroll Bohannon were taken in Kansas City on September 3. Since the depositions were out of state, I discussed with you the prospect of having the plaintiff pickup our costs for the deposition. Rather than actually go to Fort Collins to argue the question before the Court, a venture which including attorney's fees could be nearly as costly as the cost to be awarded for the Kansas City trip, we agreed to let the City of Loveland argue the point and the other parties would abide by the Court's decision with respect to costs for the City. No costs were awarded.

The deposition of Carroll Bohannon was taken the morning of the 3rd and Chuck Sapp's deposition consumed the afternoon. Mr. Sapp was the project manager of construction for the actual river crossing on the Loomis property. Mr. Bohannon then came on to the job as project manager for construction of the sewer line itself.

Prior to actual construction of the river crossing, Mr. Sapp met on-site two to three times with John Tarranto who was serving as Arix's field engineer. During pre-construction discussions, Sapp suggested that the design of the river crossing be modified. The design change was proposed to Tarranto by Bruce Laughlin of Garney. According to Sapp, Garney had constructed
crossings with the detail designed by Arix and experienced trouble with the sewer line floating at high water times. They had also constructed the design they proposed on some dozen or so occasions and felt it to be superior.

Jack, to assist in your understanding of the changes, I am enclosing details showing the original Arix design and the design proposed by Garney which is the one actually built. The first sheet shows the original Arix design. The second and third sheets show the Garney design with red line notations, presumably those of John Tarranto. The third and fourth sheets appear to incorporate the red line notations. Mr. Sapp, however, testified that he actually constructed the project from the second and third sheets. The principal differences involve the driving of sheet piling to serve as an erosion cut off wall and the pouring of a concrete cap vs. the concrete blocks with openings at the pipe bells as designed by Arix.

In order to gain a more complete understanding of the reasons for the change, as well as the respective parts played by Garney and Arix, I will plan to schedule the deposition of Bruce Laughlin. Garney's attorney has promised to make him available in Colorado for that deposition. In the meantime, I will try to meet with John Tarranto to obtain as much detail as he can recall regarding the change. While we do not yet know the plaintiff's theory from an expert witness standpoint, it appears that there case is narrowing in on two alleged problems:

1. A failure to place riprap in the cut in the bank, thus permitting the start of the erosion process,

2. The installation of the erosion cut off wall which in some manner interrupted the down stream rush of water causing it to swirl and creating back currents which acted to cut away the bank in that area.

In prior correspondence, I had commented upon the fact that stream flow had to be diverted first to one side and then to the other to facilitate Garney's work. That now appears to be a non-issue. Stream flow was only three inches to four inches and all that was involved was pushing a small earthen dam first to one side of the existing river channel and then to the other. At no time was the bank disturbed nor was it necessary to do any rechanneling outside of the existing riverbed.
In addition to an alleged failure to place stone riprap on the bank cut, the plaintiff's had alleged that their "erosion control device" consisting of wrecked car bodies had been disturbed. Mr. Sapp testified that they indeed removed two or three car bodies, but they were replaced upon completion of the work. The plaintiff when installing the cars ran a cable through the open windows of each car to tie them together. Mr. Sapp believes that Garney replaced the cable, but has no recollection of specifically doing so. Likewise, Mr. Sapp cannot recall actually removing the cable and does not know whether they undid one end and pulled the cable through the cars or whether they cut it at the point of their work.

According to Sapp's testimony, the cut in the riverbank was refilled with the sandy gravelly material taken from it. The fill was placed in layers and tamped with the backhoe bucket. He is unaware of any compaction testing done by either his firm or the engineers on the fill.

I am still totally unable to evaluate the viability of the plaintiff's theories. With the information gathered in the Sapp and Bohannon depositions and the soon to be filed answers to our interrogatories, our experts should be able to provide some thoughts on whether the plaintiff's theories merit any credence. By copy of this letter to Mr. Frick, I am forwarding copies of the Garney crossing design and requesting his comments on the entire range of problems as soon as convenient.

Mr. Haylock, upon receipt of this letter, please have John Tarranto contact me to discuss his recollection of the events leading to the design proposal made by Garney.

Based upon informal discussions with the plaintiff's attorney while in Kansas City, it appears that the complaint of the Big Thompson Ditch Company will be filed in the very near future. The theories are apparently identical to the theories being pursued by the Loomis plaintiffs and Linda Wright. Mr. Korb has indicated, however, that he intends to drop all direct claims
against the City of Loveland and pursue only respondeat superior claims against Loveland. All other claims will be direct claims against Arix and Garney.

Very truly yours,

Byrum C. Lee, Jr.

BCL/kb

Enclosure

cc:  David M. Frick, P.E.
     Resource Consultants, Inc.
     P.O. Box Q
     Fort Collins, CO 80522
     w/enclosure

Mr. Neal Carpenter
Arix, A Professional Corporation
2021 Clubhouse Drive
Greeley, CO 80631

Mr. Wayne Haylock
Arix, A Professional Corporation
2021 Clubhouse Drive
Greeley, CO 80631
Limits Of Downstream Cut-Off Wall
120 LF

SECTION D

NAMAQUA INTERCEPTOR
BIG THOMPSON RIVER CROSSING
STA. 92+50

Scale: Horiz.: 1" = 25'
Vert.: 1" = 5'

Steel Casing Pipe
SHOP DRAWING REVIEW

Review is only for general conformity with the design concept and is limited to requirements called for in the contract documents. Contractor is responsible for the accuracy of dimensions, quantities and details requiring correlation with other materials or equipment, and for information that pertains solely to the techniques of fabrication or construction.

- No exceptions taken
- Make corrections noted
- Amend and resubmit
- Rejected

DNC NWPO, INC.
ARCHITECTS, ENGINEERS, PLANNERS

NELSON, HALEY, PATTERTON 
& CLYNE, INC.
ENGINEERING CONSULTANTS

Greeley, Denver, Colorado Springs, Colorado Springs, Colorado Springs

Date: 7/6/76

SECTION D

NAMAQUA INTERCEPTOR
BIG THOMPSON RIVER CROSSING
STA 92+25.0
CONCRETE CAP W/WELDED WIRE FABRIC

Flow

Downstream Cut-Off Wall

MP-115 SHEET PILING (SEE ATTACHED DETAIL)

SECTION C

Scale: 1/2" = 1'-0"

NAMAQUA INTERCEPTOR

BIG THOMPSON RIVER CROSSING
FLOW

- PRECAST CONCRETE WEIGHT BLOCKS
  - 1 MIN
  - 3'-0 MIN

- DOWNSTREAM CUT-OFF WALL
  - 3'-0 MIN

- CONCRETE CAP W/WELDED WIRE FABRIC
  - 2'-0 MIN

- MP-115 SHEET PILING (SEE ATTACHED DETAIL)

SECTION C

Scale: 1/2" = 1'-0"

NAMAQUA INTERCEPTOR
BIG THOMPSON RIVER CROSSING
Sapp has been with Garney approximately 17 years. Before coming with Garney in 1965 he was also involved in pipeline construction for approximately 10 years.

He was not involved in the bidding or estimating for the Loveland sewer. He was in charge of arranging materials and supplies for the job and getting his crews out to the site. His supervisor was H. B. Raymond.

Raymond is Vice-President of Utilities. Sapp's responsibility was to put in the river crossings. There were two crossings, one at the fair grounds, and one on the Loomis' property.

Sapp recognizes Sheet No. 15 of the plans as the designed river crossing.

He recognizes Sheet No. 39 as containing the detailed drawings for the crossing itself.

The Loomis crossing starts at station 92 plus 50. Sapp admits that he did not construct what is actually shown on page 39 of the drawings. The design was changed.

Prior to starting the work, Sapp flew out the site and spent a day inspecting the project. John Taranto made the inspection with him. He does not recall the exact date.

John Taranto pointed out to him where the river crossing on the Loomis property was to be made. The line was staked out at that point. The north bank across from the Loomis property was straight up and down rock and dirt mixed with a dirt topping and approximately 6 1/2 foot vertical elevation up and down. It was sloped only slightly. It contained all different sizes of sand gravel and rock. The river bed was gravel and rock of varying sizes.
20. Maximum size of rock in the river bed was maybe six inches to a foot.

21. Sapp was able to cross the river by walking on rocks without getting wet. The flow was very low. South bank had a bunch of cars piled against the bank. He cannot recall if the front end of the car or the rear end of the car were uphill or downhill. The cars were up and down the bank lengthwise. The cars were "covered" with soil.

22. The cars were not totally covered, they just layed against the bank.

23. The cars were "free standing" against the bank. They were not buried into the river bed.

24. Sapp does not remember how far up and down the bank the cars extended.

25. Up stream the cars probably ran for 100 feet, but he does not know how far downstream.

26. The cars were in physical contact side by side. They had silt inside of them. He did not take any photographs. The bank of the south side of the river was approximately 10 feet above the bed. The cars did not project above the top line of the bank.

27. Sapp saw a cable running through the car. He believes it was 3/4 inch cable. The cable was run through the open windows from car to car but was not wrapped around any part of the car.

28. He did not determine were the cable went that he saw in the cars and does not know how it was tied down.

29. There was virtually no discussion with John Taranto regarding the work to be done at that time.

30. When they came onto the job site sometime later to actually start construction, they did discuss access and other job related subjects with Taranto. Sapp did not handle the design change for the river crossing. That was Don by Bruce Laughlin.

31. He did work with Bruce on the change. He suggested to him that there were some changes that could be made to make the design better. He did not discuss the proposed change with Taranto while he was on-site. The discussion with Bruce Laughlin and Sapp occurred after Sapp returned to Kansas City.
32. Sapp took pictures when he came onto the site, but he does not know where they are. He did not take any pictures during the course of construction or after construction. It took approximately two days to do the Loomis crossing. Sapp did not do work other than the crossings.

34. He had a crew of the three to five men besides himself. The crew included J. C. Johnson as leadman, Mac Brown as foreman, and Bill Hyatt as backhoe operator. The other people were local, one of them was an operator named Romeo and the other was Howard Ahman, a laborer.

35. The design change was proposed to "make it better". He wanted to avoid trouble later on.

36. He was afraid that the original design would wash out. He was concerned that the wall had no footing underneath it. He was afraid it would tip over. (He speaking here of the downstream cutoff wall)

37. He was afraid water would "eat around it".

38. He had seen projects constructed with designs similar to that designed Arix and the cutoff wall had failed.

39. He has used the designed he proposed "dozen of times" in Missouri. The concrete blocks in the original design would not prevent the pipe from floating if the cutoff wall failed since it was not continuous.

40. Sapp does not know who Bruce Laughlin talked to at the engineer's office to get the change made.

41. Garney prepared a drawing to send to John Taranto showing the proposed crossing design.

42. He believes they may have taken the design from an old project they did for the Missouri Water Company. The cutoff wall used on that project and proposed for the Loomis crossing was steel sheeting. They also proposed to use a concrete arch with the spring line over the top of the pipe.
44. Sapp does not believe there was any real cost difference between the original design and their proposals. He thinks the design actually constructed probably costs Garney more.

48. In constructing crossing they used a 235 Cat (backhoe) and a 955 Highloader.

49. Since the river was flowing they "crowded it over to the west side. All they had to do was make a little dirt dam with material from the bank.

50. The diversion dam was only a foot or two high.

51. The dam was only a scope or two wide from the backhoe. Pumps were used to dewater the trench during construction. They did not undercut the trench. He does not recall if there was any special bedding for the trench. They did not use special backfill because the pipe was encased in concrete.

52. John Taranto was on-site when they began the work. They started on the southeast bank in the area where the cars were. They had to move two or three cars to get down to the river bed. The backhoe while sitting on the bank reached down and lifted out the cars.

53. They took the cable out. The cars were set over to one side while they were working. They had to remove grass and weeds and maybe a few trees. He does not remember.

55. The spoilage from the excavation was piled along side the trench. He does not remember what size bucket was used on the backhoe. The trench sloped so that it was 15 to 20 feet at the top and about a foot above the top of the pipe the trench was vertical on down.

58. After they got part was across the river, they diverted the water to the south or east side from the earlier dam they had built on the west or north side.

60. The trench was refilled with the original material that had been removed. It was placed with the backhoe in layers and tamped with the bucket.
62. Sapp cannot recall the depth of layers utilized. He does not remember what the specs called for. No density or compaction or moisture tests were run.

63. After the work was completed, the cars were placed back in place lined up with the rest of the cars. They dug little trenches to set the cars down in a bit to line them up with the rest of the cars.

64. Sapp does not remember putting any rip-rap along the bank. He does not believe he did.

65. The cable was run back through the windows. Sapp does not remember how it was reconnected. He does not remember how it was disconnected, whether it was cut or pulled through. Bill Hyatt is the one who might be able to answer the questions about the cable.

66. The silt and material that was in the cars when they were initially removed from their position along the bank was left in the cars when they were replaced.

71. Sapp has done over two dozen river crossings and about a dozen of them constructed the same way as the Loomis crossing. He has never had any problems with crossings of that sort. He has never had any problems with the lines floating on crossings of that nature.

72. He is unaware of any later erosion in the area of the crossings. When the river on the Loomis property was diverted, first to one side and then the other, at no time was the river ever directed out of its existing channel. The river flow was three to four inches.

75. Sapp does not know who actually prepared the construction drawings for the crossing in its modified design form. That is, he does not know whether it was Garney or Arix.

76. While Sapp did not place rip-rap on the bank after he had finished his work, there was no rip-rap on it when he started the work. As nearly as he could determine, he returned the bank to its original condition. He does not really know whether he removed any trees or not.
77. The backhoe operator, Bill Hyatt, is still with Garney and is presently located someplace in Colorado.

84. Sapp has placed rip-rap on banks following work in the past when required. Primarily on corps engineers specs.
Abstract of Deposition of Carroll J. Bohannon
taken in Kansas City, Missouri
on September 3, 1981

Re: District Court of Larimer, State of Colorado
Civil Action No. 80CV1405
Kirk Loomis, et al. vs.
The City of Loveland, Colorado, et al.

Numbers at left correspond to page numbers of deposition.

3. Bohannon was employed by Garney Construction Company.

4. He has been with Garney about 11 years.

8. He became a project manager in 1976.

9. He was project manager for the Loveland Sewer project.
   His supervisors were Dan Davin and Scott Kincaid.

11. Bohannon was not involved in bid preparation for the
    project or in keeping track of contract of contract of
    contract documents. His only responsibility was the
    actual on-site construction.

14. Garney kept no daily records. That was done by the
    engineers.

15. Bohannon now thinks that they maybe did have a daily
    report but does not know where they are.

17. The Loveland project had already been started when
    Bohannon arrived on the project. He finished it. He
    thinks he probably left some time in November of 1978.

18. He was only on site maybe once prior to May of 1978.
    That was probably sometime in April.

19. His April visit was just to look at the site prior to
    construction. At that time he believes they had made
    one river crossing. He walked the job.

21. He did not look at the Loomis crossing that Sapp had
    done until they actually began construction on the
    site.
22. Construction near the Loomis property probably began in August or September.

29. Bohannon did not discuss Sapp's work on the river crossing with him.

30. Bohannon assumed Sapp left the property in the same condition it was when he started work.

32. Sapp was sent to do the crossings, not because he has any ability different than the other project managers in the company, but because he was available. The crossings were put in first in order to get them in before the spring runoff.

33. It was about a month and a half after the crossings were put in before the pipe line was started.

36. When Bohannon started the work and came on to the Loomis property, he did notice that there were cars on the bank.

37. He does not know the exact location, but the cars were downstream from the "spill way".

40. The trench that Sapp had dug for the river crossing had been returned to the same elevation as the surround ground.

43. The material along the bank was sandy, gravely material. Three-quarter inch to six inch.

44. All Bohannon can remember about the cars is that there was a continuous line of cars up and down the bank including the area where the crossing was made.

48. Sapp's work had been from Manhole 32 to 33 across the river.