Conclusions

Failure of the Ouzinkie water transmission line should be expected in the near future. The transmission pipe material was never meant for a pressure application. Inadequate cover was provided over the pipe during installation. Any pressure surge in the line at this point may rupture of pipeline. The City of Ouzinkie should take the necessary steps to secure funding and replace the line as soon as possible.

Ouzinkie Dam Design

John Warren

0

October 8, 2012

Approved Design Budget

Task Description	Engr Dir	Engr Mgr	Lead Civil	Civil Engr	Assoc Civ Engr	Sr Mech Engr	Mech Engr	Sr Elec Engr	Elec Engr	CAD Mngr	Lead CAD Tech	CAD Tech III	Survey Mngr	Surveyor, PLS	Surveyor	Sr Const Mgr	Const Estimator	Lead TUS Engr	Permit Spec	Archaeologist	total sheet	Amount
Labor Grade	77	75	74	72	71	74	73	74	73	72	70	25	73	71	70	73	72	74	69	70		
Billing Rate	151	130	121	106	99	121	113	121	113	106	93	87.6	113	98.9	93	113	106	121	88	93		
Project Work Plan																						
Site visit	16		16									24				16					72	$ 8,261.89
Approval of site and scope	1	4																			5	$ 671.09
Design schedule	2		2							1			1								6	$ 762.53
Design estimate	8		4							4			4								20	$ 2,566.22
Labor Subtotal	27	4	22	0	0	0	0	0	0	5	0	24	5	0	0	16	0	0	0	0	103	$ 12,261.73
Expenses																						$ 3,000.00
Field Work SUBTOTAL																						**$ 15,261.73**
Preliminary Engineering Report																						
Design management	4									2			3								9	$ 1,154.02
General (G Sheets)											2										2	$ 185.97
Survey (V Sheets)														8							8	$ 791.57
Geotechnical (B Sheets)	2																				2	$ 302.18
Civil (C Sheets)	8	24	4								4	30									70	$ 7,813.44
Structural (S Sheets)			8																		8	$ 967.81
Architectural (A Sheets)																					0	$ -
Plumbing (P Sheets)																					0	$ -
Process (D Sheets)																					0	$ -
Mechanical (M Sheets)						16															16	$ 1,935.61
Prepare Report	8		60	20															4	4	96	$ 11,300.57
Design Review	2		8																2		12	$ 1,445.25
Labor Subtotal	24	24	80	20	0	16	0	0	0	2	6	30	3	8	0	0	0	0	6	4	223	$ 25,896.41
Expenses																						$ 250.00
Report SUBTOTAL																						**$ 26,146.41**
35% Design																						
Design management	8	4								4	8		4								28	$ 3,346.21
A/E Contract Administration																					0	$ -
General (G Sheets)	2		8									16									26	$ 2,672.06
Survey (V Sheets)	2		2								1			70	140						215	$ 20,581.45
Geotechnical (B Sheets)	2		8									16									26	$ 2,672.06
Civil (C Sheets)	16		40									40									96	$ 10,761.68
Structural (S Sheets)	8		40									32									80	$ 8,851.91
Architectural (A Sheets)																					0	$ -
Plumbing (P Sheets)																					0	$ -
Process (D Sheets)																					0	$ -
Mechanical (M Sheets)						24															24	$ 2,903.42
Electrical (E Sheets)																					0	$ -
Design Review	2	2	8								2					2					16	$ 1,941.67
35% Design Labor Subtotal	40	6	106	0	0	24	0	0	0	4	11	104	4	70	140	2	0	0	0	0	511	$ 53,730.46
A/E Subcontracts																						$ 15,000.00
Expenses																						$ 6,250.00
35% SUBTOTAL																						**$ 74,980.46**
65% Design																						
Design management	16	4								4	8		4								36	$ 4,554.94
A/E Contract Administration																					0	$ -
General (G Sheets)	2		8								6										16	$ 1,827.91
Survey (V Sheets)			4											20	40						64	$ 6,182.28
Geotechnical (B Sheets)			8								2	10									20	$ 2,030.08
Civil (C Sheets)			60	40							40	100									240	$ 23,962.64
Structural (S Sheets)			40	40							16	80									176	$ 17,558.85
Architectural (A Sheets)																					0	$ -
Plumbing (P Sheets)																					0	$ -
Process (D Sheets)																					0	$ -
Mechanical (M Sheets)						16															16	$ 1,935.61
Electrical (E Sheets)																					0	$ -
Design Review	2		12								4			2		2					22	$ 2,549.44
65% Design Labor Subtotal	20	4	132	80	0	16	0	0	0	4	76	190	4	22	40	2	0	0	0	0	590	$ 60,601.75
A/E Subcontracts																						$ -
Expenses																						$ 250.00
65% SUBTOTAL																						**$ 60,851.75**
95% Design																						
Design management	16	8									8		4								36	$ 4,652.77
A/E Contract Administration																					0	$ -
General (G Sheets)	1		2								1	4									8	$ 836.55
Survey (V Sheets)																					0	$ -
Geotechnical (B Sheets)			4								2	2									8	$ 845.14
Civil (C Sheets)			80	40							20	200									340	$ 33,285.39
Structural (S Sheets)			40	20							16	100									176	$ 17,200.62

Architectural (A Sheets)																					0	$ -
Plumbing (P Sheets)																					0	$ -
Process (D Sheets)																					0	$ -
Mechanical (M Sheets)						24															24	$ 2,903.42
Electrical (E Sheets)																					0	$ -
Design Review	4		16	4							8	4									36	$ 4,056.55
95% Design Labor Subtotal	21	8	142	64	0	24	0	0	0	0	55	310	4	0	0	0	0	0	0	0	628	$ 63,780.43
A/E Subcontracts																						$ -
Expenses																						$ 500.00
95% SUBTOTAL																						**$ 64,280.43**
100% Design																						
Design management	16	12								8	16											$ 6,309.56
A/E Contract Administration																						$ -
General (G Sheets)	1		4	4							2	8										$ 1,944.17
Survey (V Sheets)	1		2	4																		$ 815.21
Geotechnical (B Sheets)	1		2	6								2										$ 1,201.55
Civil (C Sheets)	8		60	80							20	80										$ 25,780.70
Structural (S Sheets)	6		32	60							16	40										$ 16,103.23
Architectural (A Sheets)																						$ -
Plumbing (P Sheets)																						$ -
Process (D Sheets)																						$ -
Mechanical (M Sheets)						24																$ 2,903.42
Electrical (E Sheets)								24														$ 2,903.42
Design Review	2	2	16	4						8	8											$ 4,508.18
100% Design Labor Subtotal	35	14	116	158	0	24	0	24	0	16	62	130	0	0	0	0	0	0	0	0	0	$ 62,469.44
A/E Subcontracts																						$ -
Expenses																						$ 2,900.00
100% SUBTOTAL																						**$ 65,369.44**
Engineering Permits																						
Fire Marshall																					0	$ -
ADEC																					0	$ -
Misc Permits	4	2	40	20															24	24	114	$ 12,149.01
Eng. Permits Labor Subtotal	4	2	40	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	24	114	$ 12,149.01
Expenses																						$ 15,000.00
Eng. Permits SUBTOTAL																						**$ 27,149.01**
LABOR TOTALS	**171**	**62**	**638**	**342**	**0**	**104**	**0**	**24**	**0**	**31**	**210**	**788**	**20**	**100**	**180**	**20**	**0**	**0**	**30**	**28**	**2,169**	**$ 290,889.23**
NON-LABOR TOTALS																						**$ 43,150.00**
TOTAL PROJECT FEE																						**$ 334,039.23**

Ouzinkie Dam Design

Design Cost Estimate - Expenses

Estimated by: John Warren

Date: 10/8/2012

EXPENSE ITEM	UNITS	QUANTITY	UNIT COST	AMOUNT
Field Investigation				
Airline Airfare and Car Rental	each	3	$ 800.00	$ 2,400.00
Per Diem & Lodging	man days	6	$ 100.00	$ 600.00
Plumbing Materials	lump sum		$ 1,000.00	$ -
				$ -
Subtotal				**$ 3,000.00**
Conceptual Design Phase				
Title Search	job	1	$ 250.00	$ 250.00
Airline Airfare and Car Rental	trips		$ 1,000.00	$ -
Water Treatment Pilot Testing	job		$ 20,000.00	$ -
Per Diem & Lodging	nights		$ 200.00	$ -
Subtotal				**$ 250.00**
35% Design Phase				
Mailing & expediting	job	1	$ 250.00	$ 250.00
Per Diem & Lodging	days	14	$ 200.00	$ 2,800.00
Airfare	trips	4	$ 800.00	$ 3,200.00
Subtotal				**$ 6,250.00**
65% Design Phase				
Mailing & expediting	job	1	$ 250.00	$ 250.00
Per Diem & Lodging	days		$ 200.00	$ -
Airfare	trips		$ 800.00	$ -
Subtotal				**$ 250.00**
95% Design Phase				
Mailing & expediting	job	1	$ 500.00	$ 500.00
Per Diem & Lodging	days		$ 200.00	$ -
Airfare	trips		$ 1,000.00	$ -
Subtotal				**$ 500.00**
100% Design (Stamped Plans)				
Mailing & expediting	job	1	$ 500.00	$ 500.00
Per Diem & Lodging	days	4	$ 200.00	$ 800.00
Airfare	trips	2	$ 800.00	$ 1,600.00
Subtotal				**$ 2,900.00**
Permiting Process				
Permit Fees (Plan Review, etc.)	Lump Sum		$ 1,500.00	$ -
ADEC Permit to Construct	Each		$ 999.00	$ -
Dam Safety	Each	1	$ 15,000.00	$ 15,000.00
Subtotal				**$ 15,000.00**
Total Estimated Expenses				**$ 28,150.00**

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D C B A

Division of Environmental Health and Engineering
3900 Ambassador Drive, Suite 301
Anchorage, Alaska 99508
(907) 729-3600

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BAR IS ONE INCH ON ORIGINAL DRAWING, IF NOT ADJUST SCALES ACCORDINGLY

OUZINKIE, AK
REPLACEMENT OF DAM, PENSTOCK AND HYDRO-ELECTRIC TURBINE

MRK	DATE	DESCRIPTION	INIT

PLAN SET:	OUZ-12-000
PROJ MGR:	---
PROJ ENG:	JAW
TUS ENG:	---
DRAWN BY:	ALH

SHEET TITLE

SITE PLAN

C-101

SHEET 1 OF 1

R&M CONSULTANTS, INC.
9101 Vanguard Drive, Anchorage, Alaska 99507
(907) 522-1707, FAX (907) 522-3403, www.rmconsult.com

September 27, 2011

R&M No. 1764.01

The Honorable Dan Clarion, Mayor
City of Ouzinkie
P.O. Box 109
Ouzinkie, AK 99644

RE: Emergency Measures for stabilizing Mahoona Lake Dam

Dear Mayor Clarion:

Subsequent to the September 23 inspection of the Mahoona Lake Dam by John Magee and Matt Morrow as a follow-on from the Periodic Dam Safety inspection of September 15, 2011 the structure has been further evaluated and confirmed to be deteriorated to the point where operation at full reservoir level is unwise. We reported this to you in a telephone call on September 26 and to Mr. Charles Cobb, P.E. State Dam Safety Engineer as well. At that time we recommended the reservoir level be lowered two feet below the spillway crest level to reduce the hydraulic loading on the dam and discussed the need to return the low level outlet pipe to service by reinstalling the gate operating stem and removing the rubber bladder from the outlet pipe so the reservoir could be lowered and the level maintained as rainfall runoff flowed in over the next weeks. The reservoir levels must be closely monitored and the outlet gate operated whenever the level begins to rise above the noted maximum elevation.

The reason the reservoir level must be lowered is that a number of structural members are compromised due to splitting at bolt holes and, in one case in particular, a wale is broken at the point of intersection with a strut and stud at about mid-height of the dam. Probing the structural members with a carpenter's awl showed that many of the 8X8 and 6X6 structural members and the 3-inch face planks of the dam are rotted to some degree. In some cases the awl could be easily pushed into the structural member 4 inches with no resistance; this is also the case with the face planks on the lower portion of the face where the awl could be easily pushed into the 3-inch plank over 2 inches and could in fact have been pushed all the way through with little effort.

Accordingly, we recommend the following step be taken immediately to secure the structure for continued use and operation for a short time until remedial work can defined and be performed to essentially "shore-up" the structure so it can remain in use for about the next two years while plans are completed for either a major maintenance/replacement of the existing dam or construction of a new dam of more durable materials just downstream from the existing structure.

1- Reinstall the low level outlet control gate stem and return the gate to operable condition (this will likely require a diver and will require shutting down the penstock and water system tap from the penstock to prevent diver injury).

2- Lower the reservoir level to two feet below the spillway crest elevation and maintain the lake level at this elevation or lower until suitable repairs to the dam can be made.

3- Investigate the Penstock Gate Valve immediately upstream from the vacuum-relief valve at the vent and service the valve so it is operable.

4- Post warning of possible inundation/flood hazard at the creek road crossing at the water treatment plant.

5- Warn residents of possible flood if dam breaches.

6- Repair/shore-up critical structural members as soon as possible (strategy and plan to be developed).

Critical Action Plan- A plan for critical repairs to the dam sub structure must be developed immediately and materials procured for use in the repairs. Planning for the repairs includes consideration for outage of the water supply/penstock so as to define the maximum time that the water treatment plant can be out of service and over which power will be supplied by diesel generators.

A contractor or City force-account work force should be arranged for to effect the most critical immediate repairs to the structural members and face of the dam. The repairs should be done under the supervision of the engineer so that any problems discovered in the conduct of the repairs can be dealt with on the spot.

Remedial Repairs Action Plan - A plan for less critical remedial repairs intended to extend the life of the dam for about two years must be developed. This includes replacement/repairs to the dam including the face of the dam and supporting structure. The extent of the repair/replacement needs to be determined/designed ASAP, materials procured and the work performed by a contractor or City force-account personnel. Planning this work will include due consideration of outages on the water supply and hydropower plant.

We are available to discuss planning and a strategy to effect the critical and remedial repairs at your convenience. Please contact the undersigned at 907-646-9646 (cell 907-748-7781). Matt Morrow is out of town for the next several days at a remote site so will not generally be able to be involved in any discussions for the next 5 or 6 days.

In the meantime we are preparing the formal Periodic Safety Inspection report for the Mahoona Lake Dam.

Sincerely,
R&M Consultants, Inc.

John K. Magee, P.E.
Group Leader

Attachment: Photos from September 23, 2011 inspection

Cc:
Charles Cobb, P.E. DSCU
Matt Morrow, P.E.

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

IMGP3410 13:14:29 2011:09:23

IMGP3411 13:16:07 2011:09:23

IMGP3412 13:16:15 2011:09:23

IMGP3413 13:16:53 2011:09:23

IMGP3414 13:21:06 2011:09:23

IMGP3415 13:22:27 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

IMGP3416 13:30:22 2011:09:23

IMGP3417 13:30:32 2011:09:23

IMGP3418 13:30:38 2011:09:23

IMGP3419 13:32:21 2011:09:23

IMGP3420 13:32:30 2011:09:23

IMGP3421 13:44:04 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

IMGP3422 13:44:20 2011:09:23

IMGP3423 13:44:43 2011:09:23

IMGP3424 13:47:21 2011:09:23

IMGP3425 13:47:54 2011:09:23

IMGP3426 13:48:13 2011:09:23

IMGP3427 13:48:44 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

IMGP3428 13:49:04 2011:09:23

IMGP3429 13:50:00 2011:09:23

IMGP3430 13:50:15 2011:09:23

IMGP3431 13:51:04 2011:09:23

IMGP3432 13:51:38 2011:09:23

IMGP3433 13:53:13 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

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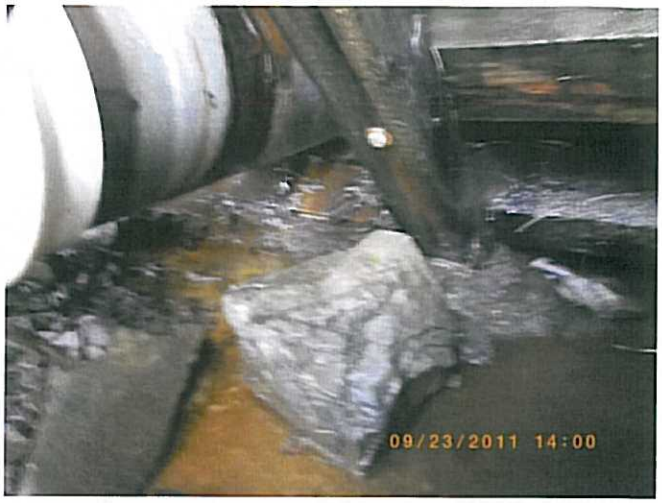

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IMGP3436 14:00:42 2011:09:23

IMGP3437 14:00:57 2011:09:23

IMGP3438 14:01:06 2011:09:23

IMGP3439 14:10:37 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

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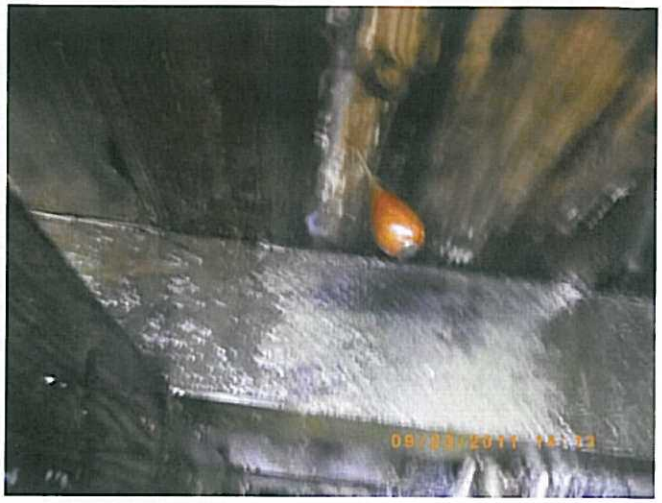

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IMGP3445 14:16:56 2011:09:23

IMGP3446 14:17:04 2011:09:23

IMGP3447 14:17:14 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

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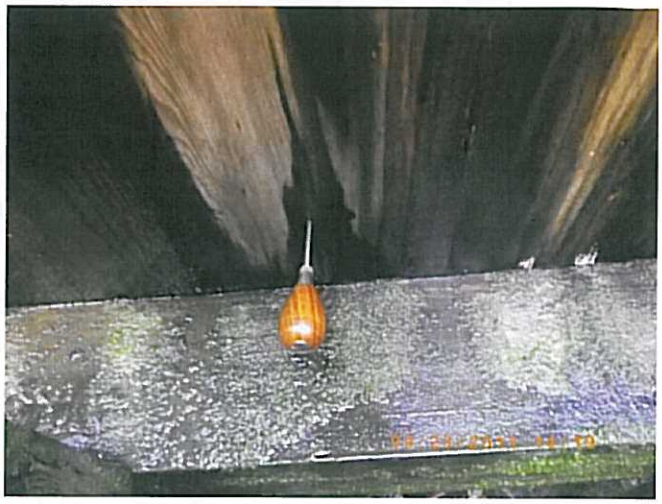

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IMGP3454 14:21:59 2011:09:23

IMGP3455 14:22:06 2011:09:23

MAHOONA LAKE DAM STRUCTURAL INSPECTION PHOTOS BY MAGEE 092311

IMGP3456 14:22:12 2011:09:23

IMGP3458 14:29:53 2011:09:23

IMGP3459 14:30:18 2011:09:23

IMGP3460 14:54:07 2011:09:23

IMGP3461 14:54:42 2011:09:23

IMGP3462 15:03:32 2011:09:23