

2012 INSPECTION COMPLIANCE FORM FOR OWNERS OF HIGH, VERY HIGH & EXTREME CONSEQUENCE DAMS

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BY JANUARY 28, 2013, PLEASE SUBMIT FORM TO:

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By Fax at: By email at:	250-952-6792 dam.safety@gov.bc.ca)52-6792 safety@gov.bc.ca		N, NL, WL, PG
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File: 2009-01

File: 0323688 0346479 - MRWUC

November 12, 2012

Mr. John Ross

s.22

<u>RE: Water License C053694 – Arminius Springs</u> <u>RE: Water License C053695 – Storage at McCuddy Reservoir No. 2</u>

Dear Mr. Ross:

Your email of October 5, 2012 to Monty Miedreich has been passed to me.

I believe that I have a good understanding of your circumstances from your email. I would like to start by reviewing both your water licenses and the BC Water Act with you.

There is a statutory requirement for dams in BC to be regularly evaluated, and for dam safety reports to be submitted to the Water Management Branch. Such a report has not been submitted for the McCuddy Reservoir No. 2 Dam which is why all licensees authorized to use that dam got the letter from Glen Davidson. The evaluation can determine if a dam requires any significant work to bring it up to acceptable safety standards.

Conditional Water License 053694 (your water license for domestic and irrigation water) includes the following conditions:

(h) The works authorized to be constructed are diversion structure, pipe, sprinkler system and trough.

(i) The construction of said works shall be commenced on or before the 30th day of November, 1980, and shall be completed and the water beneficially used on or before the 31st day of December, 1983.

(j) Any water diverted and used under this license during the period 30th June to 30th September must be taken from storage provided in the reservoir authorized under Conditional Water License 53695, or any license issued in substitution thereof.

Ministry of Forests, Lands and Natural Resource Operations	Water Management Branch Licensing and Allocation Section	Mailing Address: PO Box 9340 Stn Prov Govt Victoria BC V8W 9M1	Location: 3rd Floor, 395 Waterfront Cres Victoria BC V8T 5K7
Resource Stewardship Division		Telephone: 250-387-1154 Facsimile: 250-356-0605	

Conditional Water License 053695 authorizes use of a dam and reservoir (McCuddy Reservoir No. 2) for storage of 15 acre feet per annum. The dam and reservoir were constructed in the early 1980's under an ARDSA project for the McKinney Road Water Users' Community. You agreed to participate as a member of that water users' community.

The works authorized by both your licenses are operated by the McKinney Road Water Users' Community and your licenses are included within membership on the Community's certificate of incorporation.

Based on what you have written it appears that you have not been making beneficial use of water as authorized under your licenses. Unused water licenses may be subject to cancellation after 3 or more years. See *Section 23* of the *BC Water Act* (enclosed). At this time I am not aware of any plans for such action by the Comptroller or Regional Water Manager.

Enclosed is *Sections 51 to 61* of the *BC Water Act* regarding provisions for water users' communities. As noted in the Section 56 (1) (a) (i) of the BC Water Act the manager of the WUC has the power to prepare an assessment roll showing the money required for replacement and maintenance of the works.

The co-managers of the McKinney Road WUC prepared an assessment roll dated April 25, 2012. The co-managers swore a declaration on May 3, 2012 that the members were served notice of their assessment on April 25, 2012. The members of the WUC had 14 days from the time they were assessed to appeal the assessment, but no appeals were received by our office. On June 4, 2012 the Comptroller confirmed the assessment roll, making it binding on all persons who are affected by it, including you. Copies of these documents are enclosed.

Your Options may include, but are not limited to:

- 1. Continue as a member of the MRWUC, which would require payment of your assessments and retention of your water licenses.
- 2. You may withdraw from membership of the MRWUC and abandon your water licences thereby limiting your obligations to pay assessments up to the date of abandonment. If you plan to develop your property at a later date, re-apply for new water licenses and rejoin the MRWUC, it would be their right to charge you a joining fee which may be more or less than what you would save by not being a member for several years. There is also no guarantee that unrecorded water (i.e. water not already allocated under other licenses) would be available for licensing in the future.
- 3. You may withdraw from the MRWUC with the intention of developing works independent of those operated by MRWUC, such as the storage facility and works envisioned under your original 1976 water licenses (C046372 & C046373 enclosed). It is our understanding, however, that Arminius Springs were inundated by the construction of McCuddy Reservoir No. 2 and water may now only be accessible via the MRWUC. Any plan to use alternate works would require amendment of your current licenses.

- 4. A reduction of your assessment payable if the members agreed by vote of a majority in interest to determine members' interests are based on the area of land actually irrigated, rather than by the current method of by the amount of water they are entitled, as set out under *Section 54* of the *BC Water Act*. In such a case, members would not have to pay an assessment if no water is used.
- 5. Any retention of water rights obligates you to use the water beneficially (something you may not be currently doing) or risk having your licenses cancelled.
- 6. There may be other options that I am not aware of, or that are a combination of the above.

I have not seen your site, nor do I know the local situation other than what I have read in the files and read in your email, so I am clearly not in a position to make any recommendations to you. I do hope, however, that I have successfully answered your questions about what your available options are.

I would suggest that your first line of action would be to contact the co-managers of the WUC and ask them if they have plans to submit the required dam safety report.

Yours truly,

Bruce O'Neill, P.Eng. Water Management Engineer

Enclosures

pc: Dam Safety Section – File 76915-20/D220009-01

 $I: Watershare \water \water \Licensing \STAFF \LARRY \WUCINFO \Mckinney Road \Letter to John Ross. doc$

Copy for Dan Safety

Morgan, Chris FLNR:	EX			
From: Sent: To: Subject:	Morgan, Scott FLNR:EX Tuesday, October 16, 2012 9 Morgan, Chris FLNR:EX FW: Dam Owner File76915-2	:10 AM :0/D220009-01, &-02/	201 / ERR Lic.C053694 & 95	rega
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WUC and it sounds to Act).	me that this letter is	an appeal of the	WUC assessment (sec	57 of Water
Please advise.				
Cheers, Scott-				
Original Message From: Miedreich, Mont Sent: Friday, October To: Morgan, Scott FLN Subject: FW: Dam Owne	2 Ey FLNR:EX 12, 2012 9:18 AM IR:EX Er File76915-20/D220009-	01, &-02/ Lic.CO	53694 & 95	
This is on McCuddy #2	2.			
Monty Miedreich Senior Dam Safety Off Water Management Brar Bus: (250) 387-3264	icer Ich			
Original Message From: s.22 Sent: Friday, October To: Miedreich, Monty Subject: Dam Owner Fi	5, 2012 2:40 PM FLNR:EX .le76915-20/D220009-01,	&-02/ Lic.C053694	4 & 95	
10/05/2012 Gentlemen:				
We know this is long,	please bear with us: (the *** is the sl	nort version)	
Glen Ďavidson signed appropriate that this	the letter we received should be handed off t	via registered n o him.	nail (10/04/012) so	it may be
Subsequent to that a desires.	water users group was f	s.22	n independent of our	plans and
s.22 modification.	2 So	our plans for th	nis real estate need	led
		1.		

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(

The person from whom we purchased the land, s.22 , was then the principal of this water users group and it was peopled by others who subsequently purchased land from him (it is possible that some whose purchase derived from another parcel to the East of the original ranch.)

s.22 He wanted us to roll our water license into the Water Users Community in combination with licenses that appertained to his holdings which he then called McCuddy Creek Ranch. We consented but continued paying for our license separately.

s.22

s.22

There have been many ups and downs in that water community and while we still know a few originals we have found that communication was difficult --remember, we have never washed our hands using this water, but have paid a significant portion of each years expenses

The water users community based the allocation of costs on the water license and would not consider any proposal that would acknowledge the differences in water actually used----I was told "I don't think that proposal will get anywhere.."

Recently everyone began dropping out of this group and we remain in the dark as to why and pending some good information we have balked at the latest assessment in excess of \$900.

s.22

Now we receive this notice with a deadline so near and it is the first we have heard of it or at least of the draconian nature of its "failure to comply"

s.22

What we require from you (or from someone) is some information as to available options on how to proceed since we have lost faith in what we are being told by the water users community.

Regards John R.Ross and Reiko Ross: owners

2

Registered Mail



September 14, 2012

File: 76915-20/D220009-02 D220009-01

HENRY Y MANN

s.22

Dear Dam Owner:

Re: For Your Immediate Attention <u>Dam Owner Responsibility – Dam Safety Review and Report</u>

Our records show that you are one of the dam owners of a high, very high, or extreme consequence dam(s) as described in the following table:

Water Licence Number	Dam Name	Dam File Number	Consequence Class
C126935	MCCUDDY CREEK RESERVOIR #2	D220009-02	HIGH
C126935	SADDLE DAM	D220009-01	HIGH
	MCCUDDY RESERVOIR #2		

This letter, or one similar to it, is being sent to all owners of the above dam(s).

A dam owner's obligations under the *Water Act*'s BC Dam Safety Regulation (Regulation) include an obligation for the owners of a high, very high, or extreme consequence dams to retain a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review (DSR) of the dam in accordance with section 7 of the Regulation. The DSR had to be completed by the end of 2010. Our records indicate that a dam safety report of the results of that review has not yet been provided to this office.

Late last fall (2011) the Comptroller of Water Rights sent a letter to the largest storage licensee on the dam with a reminder of the obligation under the Regulation for the completion of a DSR in accordance with requirements specified for that review and to submit a dam safety report in the form and manner specified. Further details of that previous correspondence are set out below under the heading of *Background Information*. Please ensure that you read the *Background Information* in this letter.

Ministry of Forests, Lands & Natural Resource Operations	Water Management Branch Dam Safety Section	Mailing Address: PO Box 9340 Stn Prov Govt Victoria BC V8W 9M1	Location: 3 rd Floor, 395 Waterfront Cres Victoria BC V8T 5K7
Resource Stewardship Division		Telephone: 250-952-6790 Facsimile: 250-952-6792	6

As noted above, a dam safety report for this high, very high, or extreme consequence dam has not been submitted. Therefore, in order to ensure compliance with the requirements of the Regulation:

• You are hereby required, by January 31, 2013, to provide this office with a copy of the dam safety report, prepared by a professional engineer with qualifications and experience in dam safety analysis, as required under section 7(b) of the Regulation.

If you have retained a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review and you provide me with evidence that the professional engineer's dam safety report is underway and will be completed in a timely manner, I may be prepared to consider an extension to that deadline to allow for the completion of that report. Otherwise, failure to comply with the Regulation, by failing to complete a DSR and by failing to submit the required dam safety report by January 31, 2013, will result in enforcement action being considered against you, which might include one or more of the following steps:

- a ticket and associated fine,
- an Order requiring you to drain the reservoir,
- charges under the *Water Act*, or
- cancellation of your water licence.

In addition, if the Province is forced to take action, for example, to take steps on your default, such as to lower the reservoir, any costs incurred may be recovered from you.

BACKGROUND INFORMATION

Please take the time to read the more detailed review of this matter as follows:

• On November 30, 2011 or December 1, 2011, the Comptroller of Water Rights sent a letter to the largest storage licensee with a reminder of the obligation under the BC Dam Safety Regulation for the completion of a Dam Safety Review for the high or extreme consequence dam. The Comptrollers letter stated in part:

"Dam Safety Review Requirement: As noted in my previous annual compliance letter to you in 2009 and 2010, Dam Safety Reviews were to be completed and submitted to a Dam Safety Officer by the end of 2010. Dam owners who have not complied with this requirement will be contacted by the Dam Safety Officer and/or Compliance and Enforcement Officer to begin an escalating enforcement process. Non-compliance may lead to an Order to drain the reservoir and/or cancellation of water rights."

• The BC Dam Safety Regulation states in part:

7 (1) A dam owner of a dam that has a classification of high, very high or extreme must, no less frequently than is specified for the classification of the dam in item 7 in the Schedule 2 table,

- (a) have a professional engineer with qualifications and experience in dam safety analysis,
 - (i) carry out a review, in accordance with the requirements of the comptroller or regional water manager,
 - (A) to determine whether the dam is safe, and
 - (B) if it is determined that the dam is not safe, to determine what actions are required to make the dam safe; and
 - (ii) prepare, in the form and manner specified by the comptroller or regional water manager, a dam safety report, and
- (b) submit to a dam safety officer, for acceptance by the dam safety officer, a copy of the dam safety report prepared by the professional engineer.
- Failure to comply with the Regulation is an offence under the *Water Act*. Section 93 (2) (r) of the *Water Act* states:

93(2) A person who does any of the following commits an offence:...

(r) breaches the regulations or a term or condition of a licence, an approval, a permit or a drilling authorization, other than in relation to a condition established under section 5 or 6 of the *Fish Protection Act*;

• In addition, Section 93 (4) of the *Water Act* states:

93(4) A person who commits an offence under this section is liable on conviction to the following:

- (c) in the case of an offence that is not a continuing offence, a fine of not more than \$200 000 or imprisonment for not longer than 6 months, or both;
- (b) in the case of a continuing offence, a fine of not more than \$200 000 for each day the offence is continued or imprisonment for not longer than 6 months, or both...

PLEASE NOTE:

- If you have already submitted a dam safety report, please contact our office at your earliest convenience.
- Where there are multiple owners of a dam, the owners/licensees may decide to share costs for the DSR and related dam safety report based on the proportion of water rights each dam owner/licensee holds, although other cost sharing arrangements may be made by the owners/licensees.

For your reference, a copy of the Regulation can be found at the following website:

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_44_2000

If you have any questions regarding the above, please contact our office via e-mail at <u>Monty.Miedreich@gov.bc.ca</u>, or at the address below.

Yours truly,

Jepie •

Glen Davidson, P.Eng. Comptroller of Water Rights

pc: Monty Miedreich, Senior Dam Safety Officer

Registered Mail



September 14, 2012

File: 76915-20/D220009-02 D220009-01

JAMES D WIENS AND LEAH D WIENS

s.22

Dear Dam Owner:

Re: For Your Immediate Attention <u>Dam Owner Responsibility – Dam Safety Review and Report</u>

Our records show that you are one of the dam owners of a high, very high, or extreme consequence dam(s) as described in the following table:

Water Licence Number	Dam Name	Dam File Number	Consequence Class
C126416	MCCUDDY CREEK RESERVOIR #2	D220009-02	HIGH
C126416	SADDLE DAM MCCUDDY RESERVOIR #2	D220009-01	HIGH

This letter, or one similar to it, is being sent to all owners of the above dam(s).

A dam owner's obligations under the *Water Act*'s BC Dam Safety Regulation (Regulation) include an obligation for the owners of a high, very high, or extreme consequence dams to retain a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review (DSR) of the dam in accordance with section 7 of the Regulation. The DSR had to be completed by the end of 2010. Our records indicate that a dam safety report of the results of that review has not yet been provided to this office.

Late last fall (2011) the Comptroller of Water Rights sent a letter to the largest storage licensee on the dam with a reminder of the obligation under the Regulation for the completion of a DSR in accordance with requirements specified for that review and to submit a dam safety report in the form and manner specified. Further details of that previous correspondence are set out below under the heading of *Background Information*. Please ensure that you read the *Background Information* in this letter.

.../2

Ministry of Forests, Lands & Natural Resource Operations	Water Management Branch Dam Safety Section	Mailing Address: PO Box 9340 Stn Prov Govt Victoria BC V8W 9M1	Location: 3 rd Floor, 395 Waterfront Cres Victoria BC V8T 5K7
Resource Stewardship Division		Telephone: 250-952-6790 Facsimile: 250-952-6792	3

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As noted above, a dam safety report for this high, very high, or extreme consequence dam has not been submitted. Therefore, in order to ensure compliance with the requirements of the Regulation:

• You are hereby required, by January 31, 2013, to provide this office with a copy of the dam safety report, prepared by a professional engineer with qualifications and experience in dam safety analysis, as required under section 7(b) of the Regulation.

If you have retained a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review and you provide me with evidence that the professional engineer's dam safety report is underway and will be completed in a timely manner, I may be prepared to consider an extension to that deadline to allow for the completion of that report. Otherwise, failure to comply with the Regulation, by failing to complete a DSR and by failing to submit the required dam safety report by January 31, 2013, will result in enforcement action being considered against you, which might include one or more of the following steps:

- a ticket and associated fine,
- an Order requiring you to drain the reservoir,
- charges under the Water Act, or
- cancellation of your water licence.

In addition, if the Province is forced to take action, for example, to take steps on your default, such as to lower the reservoir, any costs incurred may be recovered from you.

BACKGROUND INFORMATION

Please take the time to read the more detailed review of this matter as follows:

• On November 30, 2011 or December 1, 2011, the Comptroller of Water Rights sent a letter to the largest storage licensee with a reminder of the obligation under the BC Dam Safety Regulation for the completion of a Dam Safety Review for the high or extreme consequence dam. The Comptrollers letter stated in part:

"Dam Safety Review Requirement: As noted in my previous annual compliance letter to you in 2009 and 2010, Dam Safety Reviews were to be completed and submitted to a Dam Safety Officer by the end of 2010. Dam owners who have not complied with this requirement will be contacted by the Dam Safety Officer and/or Compliance and Enforcement Officer to begin an escalating enforcement process. Non-compliance may lead to an Order to drain the reservoir and/or cancellation of water rights."

• The BC Dam Safety Regulation states in part:

7 (1) A dam owner of a dam that has a classification of high, very high or extreme must, no less frequently than is specified for the classification of the dam in item 7 in the Schedule 2 table,

- (a) have a professional engineer with qualifications and experience in dam safety analysis,
 - (i) carry out a review, in accordance with the requirements of the comptroller or regional water manager,
 - (A) to determine whether the dam is safe, and
 - (B) if it is determined that the dam is not safe, to determine what actions are required to make the dam safe; and
 - (ii) prepare, in the form and manner specified by the comptroller or regional water manager, a dam safety report, and
- (b) submit to a dam safety officer, for acceptance by the dam safety officer, a copy of the dam safety report prepared by the professional engineer.
- Failure to comply with the Regulation is an offence under the *Water Act*. Section 93 (2) (r) of the *Water Act* states:

93(2) A person who does any of the following commits an offence:...

(r) breaches the regulations or a term or condition of a licence, an approval, a permit or a drilling authorization, other than in relation to a condition established under section 5 or 6 of the *Fish Protection Act*;

• In addition, Section 93 (4) of the Water Act states:

93(4) A person who commits an offence under this section is liable on conviction to the following:

- (b) in the case of an offence that is not a continuing offence, a fine of not more than \$200 000 or imprisonment for not longer than 6 months, or both;
- (b) in the case of a continuing offence, a fine of not more than \$200 000 for each day the offence is continued or imprisonment for not longer than 6 months, or both...

PLEASE NOTE:

- If you have already submitted a dam safety report, please contact our office at your earliest convenience.
- Where there are multiple owners of a dam, the owners/licensees may decide to share costs for the DSR and related dam safety report based on the proportion of water rights each dam owner/licensee holds, although other cost sharing arrangements may be made by the owners/licensees.

For your reference, a copy of the Regulation can be found at the following website:

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If you have any questions regarding the above, please contact our office via e-mail at <u>Monty.Miedreich@gov.bc.ca</u>, or at the address below.

Yours truly,

Jepie

Glen Davidson, P.Eng. Comptroller of Water Rights

pc: Monty Miedreich, Senior Dam Safety Officer

Registered Mail



September 14, 2012

File: 76915-20/D220009-02 D220009-01

HARVEY & KIMBERLY DEMELO

s.22

Dear Dam Owner:

Re: For Your Immediate Attention <u>Dam Owner Responsibility – Dam Safety Review and Report</u>

Our records show that you are one of the dam owners of a high, very high, or extreme consequence dam(s) as described in the following table:

Water Licence Number	Dam Name	Dam File Number	Consequence Class
C126936	MCCUDDY CREEK RESERVOIR #2	D220009-02	HIGH
C126936	SADDLE DAM	D220009-01	HIGH
	MCCUDDY RESERVOIR #2		

This letter, or one similar to it, is being sent to all owners of the above dam(s).

A dam owner's obligations under the *Water Act*'s BC Dam Safety Regulation (Regulation) include an obligation for the owners of a high, very high, or extreme consequence dams to retain a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review (DSR) of the dam in accordance with section 7 of the Regulation. The DSR had to be completed by the end of 2010. Our records indicate that a dam safety report of the results of that review has not yet been provided to this office.

Late last fall (2011) the Comptroller of Water Rights sent a letter to the largest storage licensee on the dam with a reminder of the obligation under the Regulation for the completion of a DSR in accordance with requirements specified for that review and to submit a dam safety report in the form and manner specified. Further details of that previous correspondence are set out below under the heading of *Background Information*. Please ensure that you read the *Background Information* in this letter.

.../2

Ministry of Forests, Lands & Water Management Branc Natural Resource Operations Dam Safety Section Resource Stewardship Division Image: Comparison	h Mailing Address: PO Box 9340 Stn Prov Govt Victoria BC V8W 9M1 Telephone: 250-952-6790 Facsimile: 250-952-6792	Location: 3 rd Floor, 395 Waterfront Cres Victoria BC V8T 5K7
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As noted above, a dam safety report for this high, very high, or extreme consequence dam has not been submitted. Therefore, in order to ensure compliance with the requirements of the Regulation:

• You are hereby required, by January 31, 2013, to provide this office with a copy of the dam safety report, prepared by a professional engineer with qualifications and experience in dam safety analysis, as required under section 7(b) of the Regulation.

If you have retained a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review and you provide me with evidence that the professional engineer's dam safety report is underway and will be completed in a timely manner, I may be prepared to consider an extension to that deadline to allow for the completion of that report. Otherwise, failure to comply with the Regulation, by failing to complete a DSR and by failing to submit the required dam safety report by January 31, 2013, will result in enforcement action being considered against you, which might include one or more of the following steps:

- a ticket and associated fine,
- an Order requiring you to drain the reservoir,
- charges under the Water Act, or
- cancellation of your water licence.

In addition, if the Province is forced to take action, for example, to take steps on your default, such as to lower the reservoir, any costs incurred may be recovered from you.

BACKGROUND INFORMATION

Please take the time to read the more detailed review of this matter as follows:

• On November 30, 2011 or December 1, 2011, the Comptroller of Water Rights sent a letter to the largest storage licensee with a reminder of the obligation under the BC Dam Safety Regulation for the completion of a Dam Safety Review for the high or extreme consequence dam. The Comptrollers letter stated in part:

"Dam Safety Review Requirement: As noted in my previous annual compliance letter to you in 2009 and 2010, Dam Safety Reviews were to be completed and submitted to a Dam Safety Officer by the end of 2010. Dam owners who have not complied with this requirement will be contacted by the Dam Safety Officer and/or Compliance and Enforcement Officer to begin an escalating enforcement process. Non-compliance may lead to an Order to drain the reservoir and/or cancellation of water rights."

• The BC Dam Safety Regulation states in part:

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7 (1) A dam owner of a dam that has a classification of high, very high or extreme must, no less frequently than is specified for the classification of the dam in item 7 in the Schedule 2 table,

- (a) have a professional engineer with qualifications and experience in dam safety analysis,
 - (i) carry out a review, in accordance with the requirements of the comptroller or regional water manager,
 - (A) to determine whether the dam is safe, and
 - (B) if it is determined that the dam is not safe, to determine what actions are required to make the dam safe; and
 - (ii) prepare, in the form and manner specified by the comptroller or regional water manager, a dam safety report, and
- (b) submit to a dam safety officer, for acceptance by the dam safety officer, a copy of the dam safety report prepared by the professional engineer.
- Failure to comply with the Regulation is an offence under the *Water Act*. Section 93 (2) (r) of the *Water Act* states:

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(r) breaches the regulations or a term or condition of a licence, an approval, a permit or a drilling authorization, other than in relation to a condition established under section 5 or 6 of the *Fish Protection Act*;

• In addition, Section 93 (4) of the Water Act states:

93(4) A person who commits an offence under this section is liable on conviction to the following:

- (a) in the case of an offence that is not a continuing offence, a fine of not more than \$200 000 or imprisonment for not longer than 6 months, or both;
- (b) in the case of a continuing offence, a fine of not more than \$200 000 for each day the offence is continued or imprisonment for not longer than 6 months, or both...

PLEASE NOTE:

- If you have already submitted a dam safety report, please contact our office at your earliest convenience.
- Where there are multiple owners of a dam, the owners/licensees may decide to share costs for the DSR and related dam safety report based on the proportion of water rights each dam owner/licensee holds, although other cost sharing arrangements may be made by the owners/licensees.

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If you have any questions regarding the above, please contact our office via e-mail at <u>Monty.Miedreich@gov.bc.ca</u>, or at the address below.

Yours truly,

Jepie

Glen Davidson, P.Eng. Comptroller of Water Rights

pc: Monty Miedreich, Senior Dam Safety Officer



Registered Mail

September 14, 2012

File: 76915-20/D220009-02 D220009-01

JOHN R ROSS

s.22

Dear Dam Owner:

Re: For Your Immediate Attention <u>Dam Owner Responsibility – Dam Safety Review and Report</u>

Our records show that you are one of the dam owners of a high, very high, or extreme consequence dam(s) as described in the following table:

Water Licence Number	Dam Name	Dam File Number	Consequence Class
C053695	MCCUDDY CREEK RESERVOIR #2	D220009-02	HIGH
C053694	SADDLE DAM	D220009-01	HIGH
	MCCUDDY RESERVOIR #2		

This letter, or one similar to it, is being sent to all owners of the above dam(s).

A dam owner's obligations under the *Water Act*'s BC Dam Safety Regulation (Regulation) include an obligation for the owners of a high, very high, or extreme consequence dams to retain a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review (DSR) of the dam in accordance with section 7 of the Regulation. The DSR had to be completed by the end of 2010. Our records indicate that a dam safety report of the results of that review has not yet been provided to this office.

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Ministry of Forests, Lands &	Water Management Branch	Mailing Address:	Location:
Natural Resource Operations	Dam Safety Section	PO Box 9340 Stn Prov Govt Victoria BC V8W 9M1	3 rd Floor, 395 Waterfront Cres Victoria BC V8T 5K7
Resource Stewardship Division		Telephone: 250-952-6790 Facsimile: 250-952-6792	

As noted above, a dam safety report for this high, very high, or extreme consequence dam has not been submitted. Therefore, in order to ensure compliance with the requirements of the Regulation:

• You are hereby required, by January 31, 2013, to provide this office with a copy of the dam safety report, prepared by a professional engineer with qualifications and experience in dam safety analysis, as required under section 7(b) of the Regulation.

If you have retained a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review and you provide me with evidence that the professional engineer's dam safety report is underway and will be completed in a timely manner, I may be prepared to consider an extension to that deadline to allow for the completion of that report. Otherwise, failure to comply with the Regulation, by failing to complete a DSR and by failing to submit the required dam safety report by January 31, 2013, will result in enforcement action being considered against you, which might include one or more of the following steps:

- a ticket and associated fine,
- an Order requiring you to drain the reservoir,
- charges under the Water Act, or
- cancellation of your water licence.

In addition, if the Province is forced to take action, for example, to take steps on your default, such as to lower the reservoir, any costs incurred may be recovered from you.

BACKGROUND INFORMATION

Please take the time to read the more detailed review of this matter as follows:

• On November 30, 2011 or December 1, 2011, the Comptroller of Water Rights sent a letter to the largest storage licensee with a reminder of the obligation under the BC Dam Safety Regulation for the completion of a Dam Safety Review for the high or extreme consequence dam. The Comptrollers letter stated in part:

"<u>Dam Safety Review Requirement</u>: As noted in my previous annual compliance letter to you in 2009 and 2010, Dam Safety Reviews were to be completed and submitted to a Dam Safety Officer by the end of 2010. Dam owners who have not complied with this requirement will be contacted by the Dam Safety Officer and/or Compliance and Enforcement Officer to begin an escalating enforcement process. Non-compliance may lead to an Order to drain the reservoir and/or cancellation of water rights."

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- (b) in the case of a continuing offence, a fine of not more than \$200 000 for each day the offence is continued or imprisonment for not longer than 6 months, or both...

PLEASE NOTE:

- If you have already submitted a dam safety report, please contact our office at your earliest convenience.
- Where there are multiple owners of a dam, the owners/licensees may decide to share costs for the DSR and related dam safety report based on the proportion of water rights each dam owner/licensee holds, although other cost sharing arrangements may be made by the owners/licensees.

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Yours truly,

Sepie

Glen Davidson, P.Eng. Comptroller of Water Rights

pc: Monty Miedreich, Senior Dam Safety Officer



Registered Mail

September 14, 2012

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File: 76915-20/D220009-02 D220009-01

KEVIN K TULAK & LORINDA M GARTNER

s.22

Dear Dam Owner:

Re: For Your Immediate Attention Dam Owner Responsibility – Dam Safety Review and Report

Our records show that you are one of the dam owners of a high, very high, or extreme consequence dam(s) as described in the following table:

Water Licence Number	Dam Name	Dam File Number	Consequence Class
C054571	MCCUDDY CREEK RESERVOIR #2	D220009-02	HIGH
C054571	SADDLE DAM	D220009-01	HIGH
	MCCUDDY RESERVOIR #2		

This letter, or one similar to it, is being sent to all owners of the above dam(s).

A dam owner's obligations under the *Water Act*'s BC Dam Safety Regulation (Regulation) include an obligation for the owners of a high, very high, or extreme consequence dams to retain a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review (DSR) of the dam in accordance with section 7 of the Regulation. The DSR had to be completed by the end of 2010. Our records indicate that a dam safety report of the results of that review has not yet been provided to this office.

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Ministry of Forests, Lands & Natural Resource Operations	Water Management Branch	Mailing Address:	Location:
	Dam Safety Section	PO Box 9340 Stn Prov Govt	3rd Floor, 395 Waterfront Cres
Resource Stewardship Division		Victoria BC V8W 9M1 Telephone: 250-952-6790 Facsimile: 250-952-6792	

As noted above, a dam safety report for this high, very high, or extreme consequence dam has not been submitted. Therefore, in order to ensure compliance with the requirements of the Regulation:

• You are hereby required, by January 31, 2013, to provide this office with a copy of the dam safety report, prepared by a professional engineer with qualifications and experience in dam safety analysis, as required under section 7(b) of the Regulation.

If you have retained a professional engineer with qualifications and experience in dam safety analysis to carry out a Dam Safety Review and you provide me with evidence that the professional engineer's dam safety report is underway and will be completed in a timely manner, I may be prepared to consider an extension to that deadline to allow for the completion of that report. Otherwise, failure to comply with the Regulation, by failing to complete a DSR and by failing to submit the required dam safety report by January 31, 2013, will result in enforcement action being considered against you, which might include one or more of the following steps:

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- charges under the Water Act, or
- cancellation of your water licence.

In addition, if the Province is forced to take action, for example, to take steps on your default, such as to lower the reservoir, any costs incurred may be recovered from you.

BACKGROUND INFORMATION

Please take the time to read the more detailed review of this matter as follows:

• On November 30, 2011 or December 1, 2011, the Comptroller of Water Rights sent a letter to the largest storage licensee with a reminder of the obligation under the BC Dam Safety Regulation for the completion of a Dam Safety Review for the high or extreme consequence dam. The Comptrollers letter stated in part:

"<u>Dam Safety Review Requirement</u>: As noted in my previous annual compliance letter to you in 2009 and 2010, Dam Safety Reviews were to be completed and submitted to a Dam Safety Officer by the end of 2010. Dam owners who have not complied with this requirement will be contacted by the Dam Safety Officer and/or Compliance and Enforcement Officer to begin an escalating enforcement process. Non-compliance may lead to an Order to drain the reservoir and/or cancellation of water rights."

- The BC Dam Safety Regulation states in part:
 - 7 (1) A dam owner of a dam that has a classification of high, very high or extreme must, no less frequently than is specified for the classification of the dam in item 7 in the Schedule 2 table,
 - (a) have a professional engineer with qualifications and experience in dam safety analysis,
 - (i) carry out a review, in accordance with the requirements of the comptroller or regional water manager,
 - (A) to determine whether the dam is safe, and
 - (B) if it is determined that the dam is not safe, to determine what actions are required to make the dam safe; and
 - (ii) prepare, in the form and manner specified by the comptroller or regional water manager, a dam safety report, and
 - (b) submit to a dam safety officer, for acceptance by the dam safety officer, a copy of the dam safety report prepared by the professional engineer.
- Failure to comply with the Regulation is an offence under the *Water Act*. Section 93 (2) (r) of the *Water Act* states:
 - 93(2) A person who does any of the following commits an offence:...

(r) breaches the regulations or a term or condition of a licence, an approval, a permit or a drilling authorization, other than in relation to a condition established under section 5 or 6 of the *Fish Protection Act*;

• In addition, Section 93 (4) of the *Water Act* states:

93(4) A person who commits an offence under this section is liable on conviction to the following:

- (a) in the case of an offence that is not a continuing offence, a fine of not more than \$200 000 or imprisonment for not longer than 6 months, or both;
- (b) in the case of a continuing offence, a fine of not more than \$200 000 for each day the offence is continued or imprisonment for not longer than 6 months, or both...

PLEASE NOTE:

- If you have already submitted a dam safety report, please contact our office at your earliest convenience.
- Where there are multiple owners of a dam, the owners/licensees may decide to share costs for the DSR and related dam safety report based on the proportion of water rights each dam owner/licensee holds, although other cost sharing arrangements may be made by the owners/licensees.

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For your reference, a copy of the Regulation can be found at the following website:

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_44_2000

If you have any questions regarding the above, please contact our office via e-mail at <u>Monty.Miedreich@gov.bc.ca</u>, or at the address below.

Yours truly,

Jupie

Glen Davidson, P.Eng. Comptroller of Water Rights

pc: Monty Miedreich, Senior Dam Safety Officer

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2006 DAM INSPECTION COMPLIANCE SURVEY

Definitions:

Formal Inspections are intended to be a more thorough inspection performed by the appropriate representative of the owner (i.e. the individual responsible for safety surveillance). The frequency of a formal inspection shall be semi-annual or annual for high consequence dams and semi-annual for very high consequence dams. The formal inspection shall be recorded in a formal inspection report and kept by the dam owner as an historical record.

Dam Safety Concerns are conditions that may be hazardous to the dam.

Site Surveillance is part of the routine maintenance and is the most economical means of assuring the safety and long life of the dam. Routine site surveillance is a straightforward procedure that allows any properly trained person to make an accurate assessment of a dam's condition. The surveillance involves a check of the surface of all parts of the structure. Seepage readings (or any other condition that is subject to change) should be measured and recorded during the site surveillance. Reservoir level, operational conditions, outlet and spillway releases should also be recorded as this may give insight into any deficiencies found on the dam.

Site surveillance is usually performed on a weekly basis for all high and very high consequence dams. Reduced frequencies of the site surveillance may be selected to suit seasonal conditions (i.e. snow cover). Any site surveillance schedule other than weekly should be described in the Operation, Maintenance & Surveillance Manual. It is a requirement of the Dam Safety Regulation, Section 3, that this OMS Manual be prepared and, if requested by the Dam Safety Officer, submitted to the Dam Safety Officer for acceptance.

Dam Safety Regulation Requirements:

It is a requirement of the Dam Safety Regulation that all dam owners operate and maintain their dam in accordance with all of the following:

- The Dam Safety Regulation,
- Any applicable (water) licence or approval,
- Any order that is made under the (Water) Act,
- *The Emergency Preparedness Plan (high and very high consequence dams only),
- *The Operation, Maintenance and Surveillance Manual (low, high and very high consequence dam owners only).

*Note: simplified versions of EPP and OMS for less complex dams may be acceptable (see templates in our Guidebook entitled <u>Inspection & Maintenance of Dams</u>, available on our Dam Safety Webpage (www.env.gov.bc.ca/wsd/public_safety/dam_safety/)).

It is also a requirement of the Dam Safety Regulation that a dam owner keeps the records of the formal inspections and site surveillance.

Management and Standards Branch 4th Floor – 1175 Douglas St, Victoria BC Tel (250) 952-6790 Fax (250) 952-6792 Mailing Address: PO Box 9340 STN PROV GOVT Victoria BC V8W 9M1 Website: www.env.gov.bc.ca



2011 IN L. ECTION COMPLIANCE FORM FO., OWNERS OF HIGH, VERY HIGH & EXTREME CONSEQUENCE DAMS

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	3 RD	Water Management Floor, 395 Waterfront Crescent, Victoria BC Te Mailing Address: PO Box 9340 STN PROV Website: www.env.qu	Branch el (250) 952 ′ GOVT Vict ov.bc.ca	6790 Fax (250) 952-6792 oria BC V8W 9M1	



2008 DAM INSPECTION COMPLIANCE FORM FOR OWNERS OF HIGH & VERY HIGH CONSEQUENCE DAMS

Formal Inspections are defined in the Dam Safety Regulation (DSR) as a thorough inspection performed by the appropriate representative of the owner (i.e. the individual responsible for safety surveillance). A Dam Inspection & Maintenance Guidebook is available on our website and Dam Inspection & Maintenance Workshops are available through the BC Water & Waste Association. Many dam owners hire an engineering consultant to inspect their dams but this is not a requirement. The minimum frequency for formal inspections is <u>annual</u> for high consequence dams and <u>semi-annual</u> for very high consequence dams. A formal inspection report shall be recorded and kept by the dam owner, and must be available for review by the Dam Safety Officer on request.

Dam Safety Concerns: Do you have any concerns regarding the safety of the dam? The Dam Safety Officer is available to discuss any concern you may have and will be able to assist you to determine the severity of your concern. Please also see Section 8, Hazardous Conditions at a dam in the Dam Safety Regulation.

Site Surveillance is part of the routine maintenance and is the most economical means of assuring the safety and long life of the dam. Routine site surveillance is a straightforward procedure that allows any properly trained person to make an accurate assessment of a dam's condition. The surveillance involves a check of the surface of all parts of the structure. Seepage readings (or any other condition that is subject to change) should be measured and recorded during the site surveillance. Reservoir level, operational conditions, outlet and spillway releases should also be recorded as this may give insight into any deficiencies found on the dam.

Site surveillance is usually performed on a weekly basis for all high and very high consequence dams, see Dam Safety Regulation, Schedule 2. Reduced frequencies of the site surveillance may be selected to suit seasonal conditions (e.g. snow cover). Any site surveillance schedule other than weekly should be described in the dam owners Operation, Maintenance & Surveillance Manual*. It is a requirement of the Dam Safety Regulation, Section 3, that this OMS Manual be prepared and, if requested by the Dam Safety Officer, submitted to the Dam Safety Officer for acceptance.

Other Dam Safety Regulation Requirements:

- *Prepare an Emergency Preparedness Plan
- Update EPP as required every 6 months,
- Maintain a record of all formal inspections and site surveillance,
- Submit information to, or undertake an activity requested by, or notify a Dam Safety Officer as required.

Dam owners must also operate and maintain their dam in accordance with the following:

- Any applicable (water) licence or approval,
- Any order that is made under the (Water) Act,

*<u>Note</u>: simplified versions of EPP and OMS for less complex dams may be acceptable (see templates in our Guidebook entitled <u>Inspection & Maintenance of Dams</u>, available on our Dam Safety Webpage (www.env.gov.bc.ca/wsd/public_safety/dam_safety/)).

Management and Standards Branch 3rd Floor, 395 Waterfront Crescent, Victoria BC Tel (250) 952-6790 Fax (250) 952-6792 Mailing Address: PO Box 9340 STN PROV GOVT Victoria BC V8W 9M1 Website: www.env.gov.bc.ca

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2011 DAM INSPECTION COMPLIANCE FORM FOR OWNERS OF HIGH, VERY HIGH & EXTREME CONSEQUENCE DAMS

(1) Formal Inspections are defined in the Dam Safety Regulation (DSR) as a thorough inspection performed by the appropriate representative of the owner (i.e. the individual responsible for safety surveillance). A Dam Inspection & Maintenance Guidebook is available on our website and Dam Inspection & Maintenance Workshops are available through the BC Water & Waste Association. Many dam owners hire an engineering consultant to inspect their dams but this is not a requirement. The minimum frequency for formal inspections is <u>annual</u> for high and very-high consequence dams and <u>semi-annual</u> for extreme consequence dams. A formal inspection report shall be recorded and kept by the dam owner, and must be available for review by the Dam Safety Officer on request.

(2 & 3) Dam Safety Concerns: Do you have any concerns regarding the safety of the dam? The Dam Safety Officer is available to discuss any concern you may have and will be able to assist you to determine the severity of your concern. Please also see Section 7.1, Potential safety hazard at a dam and Section 8, Hazardous Conditions at a dam in the Dam Safety Regulation.

(4) Site Surveillance is part of the routine maintenance and is a straightforward procedure that allows the dam tender to make an accurate assessment of a dam's condition. Surveillance involves an assessment of the surface of all parts of the structure. Seepage readings (or any other condition that is subject to change) should be measured and recorded as well as the reservoir level, operational conditions and releases from outlets and spillways. Site surveillance is usually performed on a weekly basis for all high, very high and extreme consequence dams; see Dam Safety Regulation, Schedule 2. Reduced frequencies of the site surveillance may be selected to suit seasonal conditions (e.g. snow cover). Any site surveillance schedule other than weekly should be described in the dam owners Operation, Maintenance & Surveillance Manual*.

(5 & 6) Dam Safety Reviews (DSRs) are comprehensive formal evaluations by a qualified engineer conducted every 10 years for high and very high and every 7 years for extreme consequence classification dams to determine whether an existing dam meets current engineering standards. DSRs shall be carried out in accordance with the Dam Safety Regulations and the Canadian Dam Association Guidelines. A guideline is available from the Dam Safety Officer or as a download from the Dam Safety Webpage.

Other Dam Safety Regulation Requirements:

- (7) *Prepare an Operation Maintenance and Surveillance (OMS) manual and an Emergency Preparedness Plan (EPP)
- (8) Review, revise, update and submit the OMS & EPP as per Schedule 2 of the Dam Safety Regulation.
- Maintain a record of all formal inspections and site surveillance,
- Submit information to, or undertake an activity requested by, or notify a Dam Safety Officer as required.

Dam owners must also operate and maintain their dam in accordance with the following:

- Any applicable (water) licence or approval,
- Any order that is made under the (Water) Act.

*<u>Note</u>: simplified versions of EPP and OMS for less complex dams may be acceptable (see templates in our Guidebook entitled <u>Inspection & Maintenance of Dams</u>, available on our Dam Safety Webpage (www.env.gov.bc.ca/wsd/public_safety/dam_safety/)).

> Water Management Branch 3rd Floor, 395 Waterfront Crescent, Victoria BC Tel (250) 952-6790 Fax (250) 952-6792 Mailing Address: PO Box 9340 STN PROV GOVT Victoria BC V8W 9M1 Website: www.env.qov.bc.ca

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2011 DAM INSPECTION COMPLIANCE FORM FOR OWNERS OF HIGH, VERY HIGH & EXTREME CONSEQUENCE DAMS

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(1) Formal Inspections are defined in the Dam Safety Regulation (DSR) as a thorough inspection performed by the appropriate representative of the owner (i.e. the individual responsible for safety surveillance). A Dam Inspection & Maintenance Guidebook is available on our website and Dam Inspection & Maintenance Workshops are available through the BC Water & Waste Association. Many dam owners hire an engineering consultant to inspect their dams but this is not a requirement. The minimum frequency for formal inspections is <u>annual</u> for high and very-high consequence dams and <u>semi-annual</u> for extreme consequence dams. A formal inspection report shall be recorded and kept by the dam owner, and must be available for review by the Dam Safety Officer on request.

(2 & 3) Dam Safety Concerns: Do you have any concerns regarding the safety of the dam? The Dam Safety Officer is available to discuss any concern you may have and will be able to assist you to determine the severity of your concern. Please also see Section 7.1, Potential safety hazard at a dam and Section 8, Hazardous Conditions at a dam in the Dam Safety Regulation.

(4) Site Surveillance is part of the routine maintenance and is a straightforward procedure that allows the dam tender to make an accurate assessment of a dam's condition. Surveillance involves an assessment of the surface of all parts of the structure. Seepage readings (or any other condition that is subject to change) should be measured and recorded as well as the reservoir level, operational conditions and releases from outlets and spillways. Site surveillance is usually performed on a weekly basis for all high, very high and extreme consequence dams; see Dam Safety Regulation, Schedule 2. Reduced frequencies of the site surveillance may be selected to suit seasonal conditions (e.g. snow cover). Any site surveillance schedule other than weekly should be described in the dam owners Operation, Maintenance & Surveillance Manual*.

(5 & 6) Dam Safety Reviews (DSRs) are comprehensive formal evaluations by a qualified engineer conducted every 10 years for high and very high and every 7 years for extreme consequence classification dams to determine whether an existing dam meets current engineering standards. DSRs shall be carried out in accordance with the Dam Safety Regulations and the Canadian Dam Association Guidelines. A guideline is available from the Dam Safety Officer or as a download from the Dam Safety Webpage.

Other Dam Safety Regulation Requirements:

- (7) *Prepare an Operation Maintenance and Surveillance (OMS) manual and an Emergency Preparedness Plan (EPP)
- (8) Review, revise, update and submit the OMS & EPP as per Schedule 2 of the Dam Safety Regulation.
- Maintain a record of all formal inspections and site surveillance,
- Submit information to, or undertake an activity requested by, or notify a Dam Safety Officer as required.

Dam owners must also operate and maintain their dam in accordance with the following:

- Any applicable (water) licence or approval,
- Any order that is made under the (Water) Act.

*<u>Note</u>: simplified versions of EPP and OMS for less complex dams may be acceptable (see templates in our Guidebook entitled <u>Inspection & Maintenance of Dams</u>, available on our Dam Safety Webpage (www.env.gov.bc.ca/wsd/public_safety/dam_safety/)).

> Water Management Branch 3rd Floor, 395 Waterfront Crescent, Victoria BC Tel (250) 952-6790 Fax (250) 952-6792 Mailing Address: PO Box 9340 STN PROV GOVT Victoria BC V8W 9M1 Website: www.env.gov.bc.ca



Emergency Plan Prepared :

Emergency Plan Submitted :

OMS Plan Prepared : OMS Plan Submitted :

Dam Safety Review Requirement Discussed:

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Comments: - record deary of	pulway repair la	3-boom
- monitor seepage d	ear area arond	seepize collectur
Dam Safety Officer: <u>Scott</u> Marca	Owner (if present) :	HARVET Demelo /Page 2 over
		Ū

Printed: February 2004

White: LWBC

Yellow: Dam Owner
RISK LEVEL CHART

.....page 2

Failure Probability	Failure Consequence Rating ¹				
Rating	Very High	High	Low	Very Low	
Large	1	1	2	3	
Significant	1	2	2	- 4	
Small	3	3	. 4	5	
Very Small	3	4	5	5	

 ALERT – immediate attention: enhanced monitoring / consultants involved / repairs ASAP / may restrict reservoir operation / EP reviewed / CWR or RWM notified, possible Order

 2) CAUTION – considerable work to do: increased monitoring / planning for rehab / may modify reservoir operation / EP reviewed / may request submission of Inspection Report (perhaps weekly), OMS, or early DSR / CWR or RWM made aware of situation

- STABLE some work required: regular owner inspections plus monitoring operation under peak loading / rehab as appropriate / may request submission of Annual Inspection Report, OMS, or early DSR / may audit on an increased frequency
- 4) NO CONCERNS: included in regular audit program to identify any changes / normal operation
- EFFECTUAL (Low and Very Low ONLY) LOW dams included in regular audit program to monitor failure consequence only/ normal operation

Printed: February 2004

White: LWBC

Yellow: Dam Owner

¹ Schedule 1, Dam Safety Regulations, BC Reg. 44/2000

On-File Index Sheet

The document indicated below is included in	n
the Library of the Dam Safety Section	

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Catalogue Number: 0928

Publication Title:	Report Study Road Irrigation	/ of Feasib on Propos	ility & Cost fe al	or McKinney
Author Name:	Vernon Engin	eering Serv	vices	
Date of Publication	: 01/04/1979		Volumes:	1
Project Name:	McCuddy Cre	ek Dam		
D-File Number: 22	0009	File Numb	er: 76915 20	-
Addendum to an ite	em already in ti	he library?		
Addendum catalog	ue number:	0		

Comments:

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15/02/2006

DAM OWNER SURVEY FOR HIGH AND VERY HIGH CONSEQUENCE DAMS

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SUBMIT FORM TO: by mail:	Public Safety Secti Ministry of Environ	on, Wat er Managem	ent Branch
	PO Box 9340 Stn F	rov Govt, Victoria,	BEEVSWENT BRANCH
Or by fax to:	(250) 952-6792		10.000
Magaida Croals Dam	·	JUL Control June on	<u>102001</u>
Miccuddy Creek Dam		Contact wante an	Address conect?
McKinney Road Water Users Co	ommunity	YES V NO	lease conject below:
Stuart Busman			
s.22		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
		·····	
File Number for correspondence	:•D220013	· · · · · · · · · · · · · · · · · · ·	
I. Did you complete a Formal	Inspection* in the y	ear 2000?	
YES_V_NO Date: _	Inspected	bý:	
Have you planned (or done)	a Formal Inspection	n in the year 2001?	
YES / NO Date: _	JUNE 10		
Have all identified hazards b	een addressed? YES	S_₩_NO (ple	ase comment)
2. Do you have an Emergency	Preparedness Plan	*? Y.	ESNO
Last update:	Updated by:		
3. Do you have an Operation ,	Maintenance & Su	rveillance Plan*? Y	ES <u>/</u> NO
Last update: <u>2000</u>	Updated by:		
4. A series of one-day worksho	ps based on the Insp	ection and Maintena	nce Manual is
planned for the Fall/Winter of	of 2001/02. They wi	ll be held at regional	centres around
BC for a fee of approximatel	y \$40 to cover exper	uses and lunch.	
Would you (or your staff) wish to participate	? Y.	es <u> </u>
Number of people interes	sted in attending?	1	
5. Comments or suggestions: _	· · · · · · · · ·		
	· · · · · · · · · · · · · · · · · · ·	•	
* Please see Background Infor	mation for further in	nformation.	· · · · · · · · · · · · · · · · · · ·
Submitted by: s.22		Date: Jerry	28 01
Position	<u></u>	Phone:	c 22
			3.22 <u> </u>
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Province of British Columbia Ministry of Environment, Lands and Parks

BC## Environment Nater Management Division /65 Broughton Street Victoria British Columbia V8V 1X5

February 5, 1992

File: D220013 76915-06

McKinney Road Water Users' Community c/o Mr. Henry Mann

s.22

Dear Sir:

Re: McCuddy Creek Dam #2

Enclosed is a report on the dam inspection at McCuddy Creek Dam #2 dated November 28, 1991.

Recommendations for remedial works are included in the report and should be complied with as soon as possible.

Yours truly,

William Jolley Dam Inspection Officer Dam Safety Section

WJ:gg

Enclosure

cc: Mr. Steve Rowe Dam Inspection Officer Southern Interior Region - Penticton



June 15, 1982

File: 0270545

DAM INSPECTION REPORT

MCCUDDIE CREEK DAM #2

Inspected By: G. F. Cox and G. D. Smith

Inspection Date: June 12, 1982

McCuddie Creek Dam #2 is owned and operated by McKinney Road Water Users Community for the purpose of storage for irrigation. Mr. Henry Mann acted as guide for our inspection and we were accompanied by Mr. Niel Banera, Water Allocation Engineer, and Mr. Ollie Podzun, Dam Inspection Officer from the Penticton Regional Office.

The structure is 35 foot high zoned earthfill dam built in 1981 under the ARDSA program.

The structure was designed and construction was supervised by Mr. Gordon Wilson of Vernon Engineering. Mr. Wilson was not available during our inspection. A recent slough in the downstream toe area near the left abutment had been repaired by placement of a berm across the downstream base of the dam. The left abutment half of the berm was composed of rock material while the right half was composed of local material which was almost impervious.

After placing the stabilizing berm, two french drains were installed on the right side of the berm to allow drainage of the saturated toe area. The drainage had been prevented by the impervious nature of the berm material. The remedial work appeared to be functioning satisfactorily on the left abutment side of the berm where the rock material had been used. Consulting Engineer Herman Fellhauer, has been called in to recommend what further action is required to correct this problem.

\$3800

G. F. Cox, Dam Safety Engineer.

G. D. Smith, Dam Inspection Technician.

June 15, 1982 File: 0270545

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G. F. Cox, Dam Safety Engineer.

G. D. Smith, Dam Inspection Technician.

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107 211 horpy 46-502 yellow wolley 202-84 тизряи..... Cropp ? Operator..... ~ (2353 p/07 wy)) s.22 s.22 NAM 202 TAANIZ Returned your call Wants to see you Mill call again Called to see you ILED 9259 benonqeleT<u>Or.of.......</u> natal and the state of the second state TELEPHONE From WHILE YOU WERE OUT ΟŢ MESSAGE

Page 43 FNR-2013-00149

P. 1

s.22

-FEB 14/97 FAX to SUSAN LEWIS 250-387-1898 ministry of Environment Victoria BC DEAR SUSAN s.22 & we only HAUF to sort out Payments on water hisconces. However the hawyers & myself & the purchason CANNOT UNDERSTAND THE BILLING ON Some of the Lisconces. WE CAN UNDERSTAND HE BILLING on the following C.L. 110500 HSCONCES. CL 110505 CL 110504 CL 110506 CL 110499 CL 059414 we can pay these. Howadon However we cannot undenstand the tophowing FL 062207 CL 110501 GL 53691 CL 62282 FL 110566 the Billing for 1997 is At ODDS with the 1996 Bills & it is At ODDE with AL HARE'S Letter to A LAW/ HA for the PURCHASOR. (Enclosed) COULDYOU PLEASE SORT HIS OUT FOR US IN A MANNER HAT IS UNDERSTANDABLE HAnd You Linphy REGALDS HUNDY Enclosed Summary FEB 12/97 Ranch Raised & Performance Tested Cattle Backed by the CCA Code of Ethics

Province of MEMORANDUM British Columera FROM: TO: \$ 7 box me HM Id Q 22 ε Paul a_ Ret SUBJECT: DATE: ms Ļ 0270545 C ~ 7/82 Please O.K. and Return Per Your Request For Your Information Please Discuss With Me For Your Signature Return With More Details Please Process Investigate and Report Please Answer For Your File <u>25/82</u> M réner T 5 MA 720 Envelope old Here for Window Envelope Fold Here for Window dela REPLY ttle 13 47 Ø Ý Ē

FILE COPY FOR YOUR RECORD OF THE INQUIRY AND REPLY

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Province of Ministry of the British Columbia Environment

Regional Operations Division Victoria, B. C.

Date: August 25, 1982 File: 12.0425 Wtr. File: D 220 163

E1-244

MEMORANDUM

Attention: Mr. E.D. Anthony Assistant Deputy Minister

Re: Quarterly Report . McCuddy Dam

I refer to your memo of July 19, 1982, in which you request details of the averted dam failure on McCuddy Creek.

The details reported to me by Water Management staff are as follows:

McCuddy #2 dam is located approximately 9 miles east of Oliver and approximately ½ mile north of McCuddy Creek ranch, and about 600 feet west of McCuddy Creek, on land owned by Weyerhaeuser Canada Ltd.

The reservoir is formed by a saddle dam at the north end and a main dam, McCuddy Dam #2, at the south end. A survey by the Licences indicated a storage capacity of approximately 180 ac.ft.

The dams were designed and constructed under the A.R.D.S.A. Program. Consulting Engineers were Vernon Engineering Services Ltd., with Mr. Gordon Wilson, P.Eng., responsible for the design and supervision of construction. The works were completed in 1981, Mr. Bill Stevenson was the A.R.D.S.A. Project inspector.

During the scheduled first filling of the reservoir a dam toe failure occured where approximately 200 c.y. of material from the downstream embankment was displaced to flow approximately 12 ft. past the original toe of the dam. A scarp 35 ft. wide and 5 ft. high extended from 10 ft. west of the east abutment to 5 ft. east of the sluice pipe. The phreatic line was visible about 0.5 ft. above the material remaining in the dam above the slide area. Miniature slides and pooling of water on the slide surface indicated a complete failure was imminent.

AUC × 7 1982

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Mr Brankers. Aug Commons. Aug Commons.

E.D. Anthony - 2 -Assistant Deputy Minister

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August 25, 1982

The Licencee was instructed to lower the water level in the reservoir, to move his livestock to safer ground and to order equipment to make the necessary repairs. These repairs were begun in the same day under the supervision of the consulting engineer, Mr. Gordon Wilson, P.Eng.

Regional Water Management staff made several inspections during these repairs and on July 13, 1982, made a joint inspection with Mr. G.F. Cox of the Victoria staff. Mr. Cox had been contacted earlier for technical advice on this work.

Mr. Herman Fellbauer, who was engaged as a Consulting Engineer for the repairs, visited the site on July 17 and 18, 1982. His report and recommendations for the long term remedy to this failure is expected shortly.

If you require more information please contact me directly.

T.H. Oxland Director Okanagan Region

THO/bm



MATERIALS - JTING - FIELD SUPERVISION SOILS - CONCRETE - ASPHALT - ROOFING - CORING -

0270595

August 6th, 1982.

Herman Fellhauer Eng. Cons., 4845 McKenzie Drive, West Vancouver, B. C. V7W 1K1

ATTN: Mr. Herman Fellhauer, P. Eng.

Dear Sir:

RE: McCubby Dam, Oliver, B. C.

Enclosed, please find an Aggregate Chart showing the gradation of the pitrun sample delivered to the Laboratory.

As can be noted, it is a well graded pitrun with 6.8% passing the No. 200 sieve.

If we may be of any assistance, please do not hesitate to give us a call.

Thank you.

Yours truly,

INTERIOR TESTING SERVICES LTD.

0. 7

C. L. Szarko, C.E.T.

CLS/las. Enclosure.

And the second

cc G. F. Cox, Dam Safety Engineer, Ministry of Environment, Victoria, B.C.



0270545

Province of MEMORANDUM **British Columbia** TO: FROM: W. Jolley, Mr. H. Fellhauer, P. Eng., Engineering Consultant, Water Management Branch, Ministry of Environment, 4845 McKenzie Drive, West Vancouver, B. C. 818 Fort Street, Victoria, B. C. <u>V8W 1K1</u> SUBJECT: DATE: McCuddy Creek Dam No. 2 Filter Material. August 13, 1982 K For Your Information Please O.K. and Return Please Discuss With Me Per Your Request For Your Signature Please Process Return With More Details Investigate and Report D Please Answer G For Your File Enclosed is a sieve analysis of a soil sample taken near McCuddy Creek Dam No. 2 and sent to this office by Mr. O. Podzun. The soil appears to be suitable as a filter material. W. Jolley, Power and Special Projects. REPLY: O. Podzun, Penticton Regional Office. CC: cc: Neil Morrison, Water Supply Section. Page 51 FNR-2013-00149



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H.196 Rev. 80/01

Prov Briti	rince of sh Columbia	🤹 : N	IEMÓRAI	NDUM
TO: Mr. H. Fel Engineerin 4845 McKen West 1cc V7W 1ki	Ihauer, P. Eng., og Consultant, zie Drive, ouver, British Col	umbia.	OM: W. Jolley, Water Mangger Ministry of 1 818 Fort Stre Victoria, Bri	0270545 ment_Branch, Environment, eet, itish Columbia
SUBJECT: McCuddy Cr	eek Dam No. 2	DATI	E: July 13, 198:	2
For Your Information	Please O.K. and Return Return With More Details	Please Discuss With Me Investigate and Report	Per Your Request	☐ For Your Signature ☐ For Your File
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0.600 0.300 0.150	7716 #30 #50 #100	//9.0 /.38./ / 2.7.2 77./	11-8 13-7 12-6 7-6	45.C 31.3 1.8.7 1.1.1	REMARKS
0.075 PASS 0. (#200)	#200 PAN 075 mm PAN +E	35.6 1.7 76.2	3.5 7.6	7.6	

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MEMORANDUM

To: Ir. G. F. Cox Dam Safety Engineer Power & Special Projects Section Water Management Branch 818 Fort Street Victoria, British Columbia V8V 1X5 Date: ,1

June 3/82

File: 0242512-168

Re:

Inspection of McDuddy #2 Dam McKinney Road Irrigation Project

A slide has occurred at the downstream toe of McCuddy #2 Dam which is one of three dams recently built by the McKinney Road Water Users Community under the ARDSA program. The dam is an earth fill, zoned structure about 12 m high and would impound about 160 dam³ at F.S.L.

At the time of the slide the reservoir was about 2 m below F.S.L. and some seepage had previously been observed by the owner. After the slide the owner called in Gordon Wilson, P. Eng., the consulting engineer who designed and was responsible for the construction of the dam, and Water Management Branch staff from the regional office in Penticton. As a result of the site meeting the owner began to release water from storage and rock was placed on the downstream toe in the slide area.

McCuddy Creek, which at the time was overflowing its banks up above the east abutment, has since been realigned away from the dam in an attempt to prevent saturation of the abutment.

The owner is concerned about the safety of this structure and would like a second opinion on the possible cause of the slide and on remedial measures to stabilize it.

As the Ministry Dam Safety Engineer, you may be interested in this particular problem and wish to visit the site. If so, would you kindly advise Mr. N. Morison of a convenient date. It may be possible to arrange this visit to coincide with a meeting of the Farleigh Lake Water Users Committee.

Aller,

J. V. Eby, Head Water Supply Section Water Management Branch

FROM Fil 976 Lab SUBJECT DATE auk Dam Sept 24/80 0 270 595 **}**~ inday Dease O.K. and Return Please Discuss With Me Per Your Request For Your Signature E For Your Information Return With More Details Please Process Investigate and Report D Please Answer 🔲 For Your File L. sed. by m O Pada l terlo tions been uch eg M ß 4 rd. • 127 Logo PEng SIGNATURE DATE OF REPLY WRITE YOUR REPLY AND RETURN THIS SHEET. **MEMOGRAM**

THE PROVINCE OF BRITISH COLUMBIA-WATER ACT CONDITIONAL WATER LICENCE

is/are hereby authorized to store

water as follows:----

MINISTRY OF ENVIRONMENT

and such additional quantity

- (a) The source(s) of the water-supply is/are McCuddy Creek and West Fork Baldy Creek with storage in McCuddy Reservoir #2.
- (b) The point(s) of diversion and rediversion is/are located as shown on the attached plan.
- (c) The date from which this licence shall have precedence is 23rd August, 1979.
- (d) The purpose for which the water is to be used is as set out in Conditional Water Licence 54570.
- (e) The maximum quantity of water which may be stored is 10 acre feet per annum,

as the Engineer may from time to time determine should be allowed for losses.

- (f) The period of the year during which the water may be diverted into storage is lst October to 15th June.
- (g) The land upon which the water is to be used and to which this licence is appurtenant is as set out in Conditional Water Licence 54570.
- (h) The works authorized to be constructed are diversion structure, pipe, ditch, dam and reservoir,

which shall be located approximately as shown on the attached plan.

- (i) The construction of the said works has been commenced and shall be completed and the water beneficially used on or before the 31st day of December, 1983.
- (j) Construction of the dam authorized under clause (h) hereof shall not be commenced until plans of same have been submitted to and approved by the Engineer for the Penticton Water District. Upon completion of construction, the licensees shall submit to the Comptroller of Water Rights, two copies of drawings of the dam and appurtenances as built, certified by the licensees' engineer.

J.E. Farrell, Deputy Comptroller of Water Rights.

File No.0355221 Date issued: 6th November 1980

Conditional Licence No.54571



British

Columbia

PENTICTON WATER DISTRICT SIMILKAMEEN DIVISION OF YALE DISTRICT

Scale: 40 Chains to 1 inch



The boundaries of the land to which this licence Signature Signature

200-1076-2627

Date Gth Nov. 1980. CL. 54570 File 0355221 R/W Permit No. 12553 Fairview Precinct

For Storage See C.L. 54571

THE PROVINCE OF BRITISH COLUMBIA-WATER ACT

CONDITIONAL WATER LICENCE

Dert C. and Penny L. Emerson of Box 156, Oliver, B.C. VOH 1TO

is/arc hereby authorized to divert and use

- water as follows:---
- (a) The source(s) of the water-supply is/are McCuddy Creek and West Fork Baldy Creek.
- (b) The point(s) of diversion is/are located as shown on the attached plan.
- (c) The date from which this licence shall have precedence is 23rd August, 1979.
- (d) The purpose for which the water is to be used is irrigation.
- (e) The maximum quantity of water which may be diverted is 10 acre feet per annum,
 - as the Engineer may from time to time determine should be allowed for losses.
- (f) The period of the year during which the water may be used is 1st April to 30th September.
- (g) The land upon which the water is to be used and to which this licence is appurtenant is
 Lot B of Lot 669, Similkameen Division of Yale District, Plan 28040 of which 4 acres may be irrigated.
- (h) The works authorized to be constructed are diversion structure, pipe and sprinkler system,

which shall be located approximately as shown on the attached plan.

- (i) The construction of the said works has been commenced and shall be completed and the water beneficially used on or before the 31st day of December, 1983.
- (j) Any water diverted and used under this licence during the period 15th June to 30th September must be taken from storage provided in the reservoir authorized under Conditional Water Licence 54571 or any licence used in substitution thereof.
- (k) The rights granted hereunder are exercisable only during such times as the works authorized under Conditonal Water Licence 54571 or any licence issued in substitution thereof are being maintained and operated to the satisfaction of the Engineer for the Penticton Water District.

J.E. Farrell, Deputy Comptroller of Water Rights.

File No. 0355221 Date issued: 6 November 1980 Conditional Licence No. 54570

FILE COPY

	· · · · · ·
Water Resources S Dam Information	ervice Sheet D-220013 File: 0355221
Completed by: W. Jolley	DAM CLASSIFICATION 123456
Date: June 22, 1982	DISASTER POTENTIAL (ABC)
BACKGROUND	CLASSIFICATION
Name of Dam McCuddy Creek #2	_ Reservoir
Location west of Oliver	
Latitude 49°09' Longitude 119°2 Diversions from McCuddy Creek and	4' Map No. 82 E 3 W .
Source West Fork Baldy Creek	_ Purpose
Tributary to Inkaneep Creek	Licenced Quantity 10 ac.ft. storage
Owner McKinney Road Water Users'	Community (Alice Froment)
Year of Completion 1981	•
Water Licence Nos. C054570-1	· · ·
Plan Nos.	_ Microfilm No
History	
*McCuddy Creek - 1020 acres. WATERSHED West Fort Baldy Creek - 3246	acres.
Area * Forest Cover% Ag	riculture% Urban%
Elevation: Range	Median
Soil Type	ExposureSouth-West
Met. Records	
Runoff Records	• •
RESERVOIR	
Capacity: Live 77 acre feet	ead 0 Total 77 ac.ft.
Area: Sill Level 12.3 acres 0	utlet Level0
Elevation: Sill Level 3421 feet 0	utlet Level3390 feet
Inflow: DiversionsC	apacity
RecordsF	`ile
Releases: RecordsF	`ile:
Fetch	
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DAM	
Structure	_ Of
TypeEarth-fill	Designed By Vernon Engineering
Height (35')	_ Base Width
Crest LengthWidth	17 feet Elevation 3425 feet
Slopes Upstream2.25:1	Downstream 2:1
Armour Protection none	Crest Protection none
Full Supply Elevation <u>3421</u>	_ Design Flood Elevation
Operating Range	
POWER FACILITIES	•
Number and Size of Units N/A	κ₩
Capacity (cfs)	Turbine Type
SLUICE	
Type Gate valve with sloping upstream	.stem - also downstream valves.
Capacity Elevation	Control U/S V D/S V
Collars Size	Outlet Weir
SDITINAV	
Type Concrete chute	Size 5' wide x 5' deep
Sill Elevation 3421 Capacity	At Elevation
Log Boom Across Spillway Yes	No V
Protection: Apron no protection .	Entrance wing walls
Gross Freeboard 5 feet	Net Freeboard
DEMARKS OR SPECIAL CONSIDERATIONS	74
<u>ALI IMARO OR DE HOIMB CONSTBURATIONS</u>	·
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	Water Management Branch		0210545-14
REPLY	818 Fort Street		
COL J	Victoria, B. C.		
TO	ATTENTION: MR. W. JOLLEY	DEPT.	DATE
	Storey		September 4, 1980
	Enclosed McKinney Road Irrigation	Proposal	
2	Dear Sir:		
are dinance din Reference com			
	Further to our letter to Water Ri	ghts Branch in Kelowna, a	and your request
이 가장 것을 알려졌다. 이 가장 것은	for copy of the above mentioned r	eport, please find the re	eport enclosed
lin de	herewith.		
			نوب
in de de de la compañía Al anter estador	Yours truly,		
and the second s	VERNON ENGINEERING SERVICES LIMIT	ED	
	ENCL:		
REPLY			
P Second			
)			
	Dear Mr. C. Storey:		,
	Thanks for the report you se	ent on the McKinney R	òađ
 Statistics and Bar Statistics and Bar 			
	ILLIGATION PLODOSAT:		
		YFROM	REPLY DATE
		W. Jolley	18 September 39

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Α	The docume indicated below is to be included in the Library of the Division. Received from M.O. Jodgum Kulauma BC. Number of copies received
В	Title of Document What Aludy of Seasibility Casts for Minning Author Unon Engineer, Annuis Itd. Date of Publication
	Catalogue No. 728

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10 October, 1980 Files:0355221 0270545-A

Mr. O. Podzun, Regional Dam Inspector, Water Management Branch, 1905 Kent Road, Kelowna, British Columbia.

Re: McCuddy #2 Dams.

With regard to the above-named dams a review has been conducted $Q^{\pm 2}$ the material listed below:

- 1) Licence Application File #0355221
- 2) April 23, 1979, report from Vernon Engineering Services Ltd. entitled "Feasibility & Costs for McKinney Road Irrigation Proposal".
- 3) August 13, 1980, letter from Vernon Engineering Services Ltd. including drawings #790912-3,4 and 5.
- 4) September 10, 1980, letter from Vernon Engineering Services Ltd. including drawing #780615.

In addition to the review of the above material, independent studies have been carried out of various aspects of the project including hydrology studies using both the statistical and hydrometeorological methods and the following conclusions have been arrived at:

- 1) The spillway design flow in inadequate.
- 2) The drop-inlet=pipe spillway is not the preferred type of structure for this particular situation, and in addition may prove expensive to build and very hard to maintain.

I would, therefore, recommend that a concrete chute spillway be constructed large enough to handle a design flow of 450 cubic feet per second. No spillway length has been specified since the designer may wish to vary the sill length to match the proposed crest elevation of the dam.

I look forward to receiving new proposals shortly.

17 Floor

G. F. Cox, P. Eng., Dam Safety Engineer, Power & Special Projects.

COX/hjg

H. FELLHAUER P. Eng. ENGINEERING CONSULTANT

4845 McKENZIE DRIVE WEST NCOUVER, B.C. V7W have PHONE (604) 926-7912

DATE August 25, 1982 FILE 146 Your File: 0270545-C

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Mr. G.F. Cox, P.Eng. Dam Safety Engineer Power & Special Projects Ministry of Environment Water Management Branch Parliament Buildings Victoria, B.C. V8V 1X5

Dear Gerry:

Enclosed please find two copies of my report "McCuddy Dam - Drainage Improvement Works" dated August 24, 1982.

After completing the report I made a rough estimate of the fill material which has to be placed. Pit run borrow material will amount to about 1,000 c.y. and select borrow material for filter to about 400 c.y. The actual quantities, particularly that of the pit run material, will depend on how much stripping will be required.

Yours truly,

H. Fellhauer

Enclosures

Copies of Report: Neil Morrison 01e Podzun Henry Mann

H. FELLHAUER P. Eng. ENGINEERING CONSULTANT

4845 McKENZIE DRIVE WES ANCOUVER, B.C. V7W 101 PHONE (604) 926-7912

McCUDDY DAM - DRAINAGE IMPROVEMENT WORKS

REPORT

1. GENERAL

McCuddy storage reservoir of McKinney Road Water Users Community is located on the property of Mr. H. Mann, R.R. No. 3, Oliver, B.C. some nine road miles outside of Oliver. The reservoir is contained by two dams, formerly named McCuddy No. 2 South Dam and McCuddy No 2 North Dam. This report deals with McCuddy No 2 South Dam, called herein for simplicity reasons: McCuddy Dam.

2. DESCRIPTION OF THE EXISTING DAM

The dam built during 1980 - 1981 is a zoned earthfill dam, its height approximately 40 feet. According to the design the zones consist of an inside core of silty fine sands and the outer shells upstream and downstream of gravelly sand with little silt.

The reservoir provides irrigation water which is released througha 10inch concrete culvert pipe, with a sliding gate at the intake on the reservoir side and steel pipe with valves at the downstream side. Inflow into the reservoir is carried through a diversion ditch from McCuddy Creek. The diversion flow is controlled by a small intake structure with removable stoplogs. When the full reservoir level is reached, which is about four feet below the crest of the dam, any excess water is spilling over a small four-foot wide concrete flume discharging into an open unlined earth channel located on the east abutment.

3. PRESENT CONDITION OF THE DAM.

During the first filling of the reservoir in the freshet of 1982 when the reservoir reached a level of six feet below full reservoir, the following event has been reported:

On May 26 Mr. Henry Mann during his daily inspections of the dam noticed a fairly large, shallow slip had occurred on the downstream face of the dam. Water-saturated embankment material had flown down the slope and spread over the ground downstream of the toe of the dam. Mr. Ole Podzun of the Penticton Regional Office of the Water Management Branch who happened to be at the site during his inspection visit, described the slip in his report as follows:

"Immediate inspection of McCuddy #2 dam showed that approximately 200 cubic yards of embankment material had slid out of the toe of

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DATE August 24, 1982 FILE 146 the dam......The area affected was approximately 35 ft. wide. Looking upstream, it extended from 10 feet left of the right abutr t to 5 feet short of the sluice pipe. Wet areas, which tops were and at the same elevation, indicated the phreatic line. There are three distinct areas at which seepage takes place, at both abutments and the center of the slide, with dry areas in between. The right toe drain could not be found, probing for it revealed the soil to be very wet, which in all likelihood is the result of the partically missing toe drain.....Repairs began at 4:00 p.m.....The dam was re-inspected the following morning.....It was noted that the recommended pervious material (recommended by Mr. Wilson who designed the dam) was not used for the repairs, instead use made of native soil which, at best is semi or impervious."

Shortly afterwards, I was asked to visit the site. I found a berm had been placed against the toe of the dam, about eight to ten feet high, the top of the berm at the height of the wet areas, and of a thickness of some 12 feet, measured horizontally. The eastern half of the berm fill appeared to consist of boulders of varying sizes mixed with some dirty soil, the western half completely of dirt, mainly top soil. On the face of the dam the wet areas had already risen to two feet above the berm surface, and as later observations showed still rose further to 5 - 6 feet above the berm as of August 4. Seepage water was flowing over the top and from the toe of the berm fill. On the western boundary of the berm at the abutment, the seepage had caused considerable sloughing of berm and abutment material. The ground surface immediately downstream of the toe of the berm fill was likewise covered with large patches of very wet and soft material, which appeared to extend also upstream into the base of the berm fill. The dumped debris from earlier stripping and spillway excavation on the east abutment slope, bulldozed surface material from the recent construction of an access road to the berm covering the slope of the west abutment, the hastily dumped berm fill and the sloughed wet soils at the toe with so many little water courses from seepage, all this made a rather messy picture of the downstream dam.

4. DESIGN CONSIDERATIONS

Knowledge about the condition of the dam is still too meagre—in order-to find the cause of the part-failure of the structure and to arrive at a most rational design of an obviously needed improvement of the dam. Information was obtained from my own observations made in the field, limited to what could be seen on the surface of the dam only. The design drawings were available, but they have not been revised to show the "as built" structure. It was noticed, for example, that the spillway was moved from the west to the east abutment. The filter shown in the design on both sides of the core zone of the embankment could be omitted since the shell material found in the borrow area had a grain size distribution that did not require such filter zones, as communicated to me by Gordon Wilson, the designer. He provided me with the information material he had in possession, but most of it dealt with the design stage only. Gordon Wilson could assure me that the type of embankment material actually used for construction was the same as tested and specified in the design. Accordingly

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the core material placed was silty sand and sand-silt mixtures with over 35 recent fines, smaller than No. 200 sieve, the shell material of both outer zones of a poorly graded sand and gravelly sand with little silt. The latter was confirmed by the test results of a soil sample of shell material taken from the surface at the location of the slip, see Figure 2, and a sample of shell material taken about one meter below the surface of the slip, Figure 3. The grain size curves of both samples are identical, showing a well graded gravelly sand with seven to eight percent fines.

Regarding the seepage condition of the site, seepage inflow from both abutments has been reported. On the west abutment, near the toe of the dam, outflows from one or two springs were observed already since the time the filling of the reservoir was started, it may have existed already before that time. Henry Mann reported that the amount of seepage at this place remained constant during the filling period of the reservoir. On the east side of the dam the entire abutment has always been wet, most likely from seepage of McCuddy Creek water. A recent relocation of the creek bed apparently reduced the seepage, but during my inspection, I noticed some seepage outflows all along the abutment slope upstream and downstream of the dam.

With respect to seepage through the embankment the appearance of wet or damp areas on the downstream face of the dam, and the occurrence of the slip, indicate a high phreatic surface within the embankment. The top of the wet spots may be taken as the terminal point of the top flow line of the seepage through the dam, the capillary rise of water into the sand neglected. A record of the height of the wet areas on the downstream face of the dam and of the corresponding reservoir levels was kept since May 26, from observations made by Ole Podzun when he visited the site. The data are shown on the drawing. Of interest is also Henry Mann's observation of a damp spot at the toe of the eastern section of the dam, the wet area extending some four feet up the slope, already noticed early in the reservoir filling period.

In order to find an explanation for the high seepage line I made a theoretical calculation of the location of the top flow line through the dam assuming the embankment were a homogeneous earthfill section. I found, at full reservoir, elevation 96 ft., the phreatic surface would exit on the downstream face at elevation 75 ft. From experience we know the wet areas reached up to elevation 68.5 ft. on August 4 with a preceding reservoir level of about elevation 90 ft. In both cases the phreatic surface drops about an equal amount of 21 feet which leads to the conclusion that the dam acts more like a homogeneous embankment and not like a zoned dam. The cause of this situation could not be definitely determined. More investigations and studies and observations of piezometers would be needed.

It is conceivable that the effective permeability of the core could be higher than intended in the design - the core may be anisotropic, its permeability in the horizontal direction significantly higher than in the vertical direction caused by the fact that the material

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is placed and compacted in horizontal layers and the smooth rolled surfall of the layers not perfectly scarified - and/or the downstream shell material may be less permeable due to its silt content, its permeability coming nearer to that of the core. An additional cause could be seepage flow from the reservoir flowing through pervious seams in the abutment entering the shell material downstream past of the core. Seepage from McCuddy Creek in the east abutment could also adversely affect the seepage situation. Once seepage water approaches the surface slope of the dam the saturated shell material becomes unstable, sloughing, erosion and even sliding may occur. This danger was kept in mind in the design of the improvement works.

5. DESIGN OF THE IMPROVEMENT WORKS

The design shown on the drawing should not be regarded as final in all respects as the information available for the design was incomplete. It is not unusual in the design process of dams and particularly in the design of repair work of existing dams that the initial design made in the office has to be checked and verified or modified in the field during construction. Conditions at the site and of the existing structure may be found different from those assumed. I believe that more information will be obtained after the site has been stripped, the foundation and abutment areas exposed.

The proposed basic design consists of placing a filter layer of high permeability against the slope of the downstream embankment and the exposed slopes of the abutment. The tentative height of the filter layer should be not lower that the estimated location of the phreatic surface at full reservoir. A drainage system collecting and carrying away the seepage will be installed at the bottom of the filter. This will ensure draining off safely all seepage water. If seepage flow out of the embankment or abutment is encountered in a concentrated localized spot, a separate drainage collection should be made. To maintain stability of the filter layer and the underlying embankment slope, the filter will be loaded with pervious fill material. No stability analysis could be made, but it is estimated that the width of the berm fill should be not less than 20 feet, measured horizontally.

6. CONSTRUCTION

(a) Source of Material

A promising borrow pit for filter and berm material has been found during my visit to the dam. The area is located a few miles from the dam, the exact location known to Ole Podzan and Henry Mann. A sample from the potential borrow pit has been tested, the grain size analysis shown on the attached graph, Figure 4. The sample represents a well graded sand - gravel mix with 2.2 percent fines. The bulk of the berm fill will be pit run material. By some selective digging in the borrow pit the filter material having a grain size distribution close to that recommended in Figure 1 should be obtainable. Reconnoitring the borrow area by making a few bulldozer cuts in advance of the borrow operation is suggested. The required

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small amount of coarse sand-fine gravel mix to be placed around the drain pipes, if not found, may have to be screened borrow material.

(b) <u>onstruction Procedure</u>

The site of the new berm has to be stripped of all unsuitable material, that is of all organic matter, top soil, loose fill, soft displaced material, including all the temporary berm fill placed last May. The stripped area which will be occupied by the filter and berm fill shall expose a firm and compacted embankment, the base and the slopes of the abutment expose an undisturbed firm original ground.

After installing the drainage system shown on the drawing, the filter material can be placed onto the sloping surfaces. It will be compacted in conjunction with the compaction of the bulk fill of the berm. Or it can be placed and compacted in conjunction with the placing and compaction of the berm fill. At the base, the filter will be placed in two equal layers and adequately compacted. The pit run fill shall be placed in 10-inch layers and compacted to a practical density with several passes of a medium heavy, vibratory compactor. Care must be taken that the fill material is well compacted against the embankment and abutment slopes: If construction extends into the winter it should be watched that no lumps of frozen material are contained in the fill after compaction.

7. INSPECTION AND SUPERVISION OF CONSTRUCTION

As already mentioned, after completion of all stripping the Engineer shall inspect the site. He will have to review the design, make the necessary changes if required and give further instructions to the field staff to ensure that the design and construction is adapted to the field conditions encountered at that time. A detailed layout of the drainage system will have to be made. A second inspection is envisaged some time later for a check of the suitability of the selected material and the construction methods taken by the contractor.

Throughout the construction period an experienced soil inspector shall supervise and control on a daily basis the construction work and advise the Contractor. I suggest Ole Podzun be at the site as inspector since he is now familiar with the site and with the objectives of the design as I have discussed with him many aspects of construction. Should he be not available, the chosen inspector should be experienced in the construction and to some extent be familiar with the design of earthfill dams. Daily construction reports shall be prepared. The inspector shall frequently communicate with the Engineer, consult him on construction problems encountered and on any contemplated deviation from the design. At the completion of the job, the drawing shall be revised to show in all details the "as built" structure.

H. Fellhauer, P.Eng.






FIGURE





Ministry of Environment Water Resource Management Water Resource Management ffice of the Regional Engineer

Our Telephone: 860-6280

Our File: D 220105

0270545=A

1905 Kent Road, Kelowna, B.C. VlY 7S6

May 23rd, 1980. MINISTRY OF THE ENVIRONMENT

MAY 28 1980

MAJL ROOM VICTORIA, B.C.

VERNON, B.C. VIT 2M6

Vernon Engineering Services Ltd.,

Ste. 104, 3304 - 32nd Avenue,

Attention: H. Gordon Wilson, P. Eng.

Dear Sirs:

Re: Embankment Material at Baldy Creek #1 Reservoir Site

Further to our telephone conversation of May 20th and 22nd, 1980, regarding the above.

On the 14th of May, Mr. Allan Boom of our Oliver office and I visited the Baldy Creek construction site. We noticed a change in the texture of the soil presently being incorporated into the embankment. I pointed the change out to your Inspector, Mr. Robert Smith; he assured me that he had discussed the material with you on Friday, May 9th and that you had, in his words, "O.K.'d the material as suitable". I must again express our concern about the quality of the soil and request that a sufficient number of tests be run during construction to insure a stable embankment. All questionable material must be wasted.

Should the present borrow pit be exhausted, and it is necessary to open up another one, a full line of soil tests will be required on the new material and the results be forwarded to this office.

Yours truly,

D.B. Lovdahl, P. Eng. WATER RESOURCE MANAGER.

ilE 5,3263 11

per: U.O. Podzun, Regional Dam Inspector.

UOP:ggh

cc: Mr. Henry Mann, s.22

s.22

/Mr. G.F. Cox, Dam Safety Engineer, Parliament Buildings, Victoria, B.C.

File: 0270545

16 November, 1979

Mr. O. Podzun, Kelowna Regional Office, 1905 Kent Road, Kelowna, British Columbia V1Y 7S6

Dear Ollie:

Re: Baldy Creek Dam #1

Thank you for the copy of your 9 November, 1979 letter to H. Mann regarding plans for the above-named dam.

I have reviewed the two plans mentioned and have discussed them also with Mr. Morison of Water Investigations Branch. Listed below are the points where we feel modifications are necessary:

- 1. Unless more justification is provided, the upstream slope of the dam should be 3 to 1 not 2.5 to 1 as shown.
- 2. The C.S.P. outlet pipe should be completely surrounded by concrete in a ditch dug into native undisturbed material.
- 3. An upstream gate should be used on the outlet line preferably with an inclined gate stem running up the upstream face of the dam on a continuous concrete anchor pad.
- 4. The seepage cut-offs provided around the outlet pipe would be better if constructed of concrete with light reinforcing rather than the 12 gauge galvanized steel shown.
- 5. The 6 inch solid drain and the 6 inch gate valve shown on the toe drain near the downstream toe of the dam should be removed.

. O. Podzun

16 November, 1979

6. The use of synthetic rubber diaphragm on this dam should be discouraged due to placing problems which would mitigate against obtaining a waterproof seal.

I trust you will discuss these points with the consultant and dam owner and keep me informed of the results.

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Yours truly,

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G. F. Cox, Dam Safety Engineer.

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NOV 1 5 1979

Our Phone: 860-6280

Our File: D220105

MAIL ROOM VICTORIA, B.C. TTE: DSSOTO

1905 Kent Road Kelowna, B.C. VIX 786

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November 9, 1979

Mr. Henry Kann

s.22

Dear Sir:

Re: Baldy Creek Dam #1

We are in receipt of the revised drawings for your proposed storage dam on Baldy Creek, which were submitted to us on your behalf for our approval by Vernon Engineering Services Limited.

Drawings 790912-1 Revision "A" and 790912-2 Revision "C" have been approved and construction of the dam is authorized, pending the receipt of a letter from Vernon Engineering, giving assurance of the stability of the soil incorporated into the dam embankment. Full supervision during construction is required. Also a "As Constructed Report" complete with all tests taken during construction, and pictorial documentation of the completed works will have to be submitted to us for our records.

The storage of water behind the dam is restricted to the quantity of water authorized by the storage licence and your compliance of the clearing of the reservoir as laid out in the Forest Service Clearence Permit.

Due to the soil composition of the reservoir-bottom the permit will differ slightly from our "Minimum Clearing Standards for Reservoirs".

Yours truly,

D. B. Lovdahl, P. Eng., Acting Regional Manager

- . U.C. France

per: U. O. Podzun Technician

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UOP/dd

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<u>к</u>

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sc: Director of Water Management Parliament Buildings VICTORIA, B.C.

> Attention: G. Cox Inspection Engineer

Vernon Engineering Services Ste. 104 - 3304 - 32nd Avenue VERNON, B.C. V11 246

2 Attachiour G. Wilson, P. Bas.

Morgan, Scott LWBC:EX

From: jent: To: Cc: Subject: Jolley, William LWBC:EX April 17, 2003 8:06 AM Mattison, Jim LWBC:EX; Davidson, Glen W LWBC:EX Morgan, Scott LWBC:EX; Rowe, Steve LWBC:EX FW: McCuddy Dam

Jim/Glen.

Steve Rowe has reported that the source of the leak at the McCuddy Dam has been found. It was the joint between the downstream end of the outlet sluice and a PVC pipe that is connected to it for irrigation. Have a look at the first 3 photographs below, they tell the story.

This dam continues to be rated as a Risk Level 3; High Con. with some lingering seepage problems. The good news is that they reported the problem right away and they have a much improved surveillance system compared to a couple of years ago. The compliance and ed/awareness program is working!!

Will

Original	Message
From:	Rowe, Steve LWBC:EX
Sent:	April 16, 2003 4:05 PM
To:	Morgan, Scott LWBC:EX
Subject:	RE: McCuddy Dam

Hi Scott

The leakage was from the LLO joint at the transition from encased RCP to bare PVC. The narrow overlap used a metal strap and concrete as a seal - which eventually failed with a "thumb size hole" which created the observed leak nearly vertop of the joint.

Cliff Ask & Butch Hayes (WUC manager/member) are going to fix the joint by sealing a longer pipe into the encased section, and pouring say 2 feet (in length) of concrete to permanently seal the joint, which will exit to a flange attachment. The 10" PVC would then be reattached to the flange, and reburied about 8 feet into the berm. They seem to have the repair well in hand. They are going to take photos of the repair and send them in, along with an as-built sketch. Photos of the exposed joint are attached.

One item you may want to note is the nearby moist area between the LLO and the groin. It doesn't appear to be too dissimilar to the past, but it should perhaps be better defined vs time and conditions. I mentioned this to Cliff Ask, along with the measuring of the seepage pipe discharges.

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	- 20				
	~ 60				





Conc to PVC.JPG Leaking Joint.JPG (91 KB)



Valve.JPG (10... Berm.JPG (10...

Joint 12 ft from Other Wet Area at Wet at Berm.JPG (105 KB)

Later Steve R.

> -----Original Message-----Morgan, Scott LWBC:EX From: Sent: April 16, 2003 11:05 AM To: Rowe, Steve LWBC:EX Subject: McCuddy Dam

Steve, is there anything you need from me re: McCuddy Creek Dam? Sounds like you have things under control as usual. Thanks. Keep us informed on what you see tomorrow.

Cheers, Scott-

Scott Morgan Dam Safety Officer - Water Management Branch Land and Water British Columbia Inc. phone (250) 387-3265 cell (250) 380-8849 mailto:scott.morgan@gems9.gov.bc.ca

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	[1] .	Water Resources Dam Information	Servi 1 Shee	ce t	File:	D-220013 0355221
1 - NG	Completed by: W. Jolley		DA	M CLASS	IFICATION	123456
	Date: June 22, 1	982	DI	SASTER	POTENTIAL	
	BACKGROUND		CL	ASSIFIC	ATION	
	Name of Dam McCuddy C	creek #2	Re	servoir	Same	
	Location West of C)liver	,	ten 2004 film distance and an	mc24hh2nndbmag1manw4kh4khaa3coangad	1814-1814-1814-1814-1814-1814-1814-1814
	Latitude 49° 09'	Longitude 119° 24	4'	Мар	No. 82 E	3 W
	Diversions from Source West Fork Baldy	McCuddy Creek and	Pu	rpose	Storage	
	Tributary to Inkaneep	Creek	Ĺ	cenced	Quantity10	ac.ft. storage
e,	Owner McKinney	Road Water Users' Co	ommunit	y (Alice	Froment)	most teplay more
	Year of Completion 1981	- 		\$2~11/17.00211/07.01/17-12.1.2.0. AN	an again ann fallan fa mar an an an again an	an and a far and a far the standard and an and a far and
	Water Licence Nos. C054	570-1	and a possible for comme	ara ang ang ang ang ang ang ang ang ang an	a a a gui a <u>fuar sh</u> a fa a sa dhara da a g ^{uin a} fara	nga alam ing u titu ang uni ang di chur sa lan ang u titu ang uni uti ang u
8	Plan Nos, Lot B-DL669 Pla	an 28 040	Mi	crofilm	No.	ning talakat ta taun tana talah sa tala
	History Construction 19	80-81, Remedial Worl	ks Spri	ing 1983.	The state of the s	annon, a cata da yang ang ang mga mga ng ang ang ang ang ang ang ang ang an
建产	*McCuddy Creek - 1020 acres. WATERSHED West Fort Baldy Creek - 3246 acres.					
	Area 6.6 sq. miles For	est Cover <u>60</u> % A	lgricu	lture	<u>40</u> % Urba	n N/A %
1 m ⁽¹	Elevation: Range 3400	- 5800'	Me	dian	774-CIRQIA439799-03-CILLUSEOIISBARG-37454-7	and ward in the data way and a set of the data way was a start of the data and the data of the data of the data
2	Soil Type Glacial	<u>111</u>	Ex	posure	South-west	
	Met. Records 1977	an a		aller all the last of an all public and the set		NA PERMUTUR HERVICE FOR A 2017 LAND OF A 1
	Runoff Records 1977	nina sanadani minaga ang ang ang ang ang ang ang ang ang	· Seven and a second	000 (2007) AM 2010 (2010) (2010) (2010)	100-10-11	Print and inclusion and a subject from the supervise within a
	RESERVOIR	-	×			×
	Capacity: Live 77 ad	cre feet	Dead	0	To	tal 77 ac.ft.
	Area: Sill Level 12.3	acres	Outle	t Level	0	an management and the second to the second
	Elevation: Sill Level_32	241 feet	Outle	t Level	3390 feet	ally skilvalled Good (1990-111), vynawia najmalle die skil band
	Inflow: Diversions Natur	cal run-off	Capac	ity	1300 ac.ft.	/annum
	Records Limit	ced .	File	www.coasadar.coaradar.com	Marina (Sector of Constant)	alan din server yang kanala di serut wang basa kanala kanala kanala kanala
1	Releases: Records	адома <mark>так 2</mark> ан бан фан (фан (фан (фан (фан (фан (фан (фа	File	Final Start East (SA (Start 2.4))	Rooter in the range and successing section in the	25102 0071 400 M-04104 85021 MB/04 9876 8876 8876 8876 9876
	. Fetch		•			

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Page 84 FNR-2013-00149

The second secon	
Structure 1	0f2
TypeEarth-fill	Designed By Vernon Engineering
Height 10.6m (35')	Base Width
Crest Length 52m (170') Width	17 feet Elevation 3425 feet
Slopes Upstream 2.25:1	Downstream 2:1
Armour Protection None	Crest Protection None
Full Supply Elevation 3421'	Design Flood Elevation
Operating Range	₩1915₩101100₩101100₩101100₩1010₩10100₩1010₩10100₩1010₩1010₩1010₩10110₩1010₩1010₩1010₩1010₩1010₩1010₩1010₩1010₩
POWER FACILITIES	a di
Number and Size of Units N/A	kW
Capacity (cfs)	Turbine Type
Type Gate valve with sloping upstream stem -	also downstream valves.
CapacityElevation_3421-2	Control U/S X D/S X
CollarsSize	Outlet - Weir
SPILLWAY	Ϋ́
Type Concrete chute	Size 5' wide x 5' deep
Sill Elevation 3421 Capacity	At Elevation
Log Boom Across Spillway Yes	Ne X
Protection: Apron No protection	Entrance wing walls
Gross Freeboard 5 feet	Net Freeboard
REMARKS OR SPECTAL CONSIDERATIONS	

17

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Small earthfill saddle dam at north end of reservoir.

.

Water	Resources	Service
Dam	Information	1 Sheet

Dam Informatic	File: 0355221
Completed by: W. Jolley	DAM CLASSIFICATION (103456
Date: June 22, 1982	DISASTER POTENTIAL
BACKGROUND	CLASSIFICATION
Name of Dam McCuddy Creek #2	Reservoir Same
Location West of Oliver	*
Latitude 49°09' Longitude 119°	24' Map No. 82 E 3 W
Source Diversions from McCuddy Creek and West Fork Baldy Creek	Purpose Storage 10 ac.ft.diversion
Tributary to Inkaneep Creek	Licenced Quantity10 ac.ft. storage
Owner McKinney Road Water Users'	Community (Alice Froment) must taking mo
Year of Completion 1981	Rent bertref 1994 of beig unterday attraction attraction and an and a second statement and second statement of the
Water Licence Nos. C054570-1	ατινό του
Plan Nos. Lot B-DL669 Plan 28 040	Microfilm No.
History Construction 1980-81, Remedial Wo	rks Spring 1983.
McCuddy Creek - 1020 acres. WATERSHED West Fort Baldy Creek - 3246 acr	es.
Area 6.6 sq. miles Forest Cover 60 %	Agriculture 40 % Urban N/A %
Elevation: Range 3400 - 5800'	Median
Soil Type Glacial Till	Exposure South-west
Met. Records 1977	- የሚመርዮሩ ዚያ ይያም ነው ይገኛውም የውጥ ውጥ የም የሚመርያ የሚሆን እና የሚመርያ የሚመርያ የሚያ የሆኑ የማ የሚሆን የሚያ የሚያ የሚያ የሚሆን የሚሆን የሚሆን የሚሆን የሚ
Runoff Records 1977	وي محمد و محمد محمد محمد محمد محمد محمد و محمد و محمد و محمد محمد
RESERVOIR	
Capacity: Live 77 acre feet	Dead 0 Total 77 ac.ft.
Area: Sill Level 12.3 acres	Outlet Level 0
Elevation: Sill Level 3241 feet	Outlet Level 3390 feet
Inflow: Diversions Natural run-off	Capacity 1300 ac.ft./annum
Records Limited	File
Releases: Records	File
Fetch	

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DAM # 2	
Structure 1	0f2
TypeEarth-fill	Designed By Vernon Engineering
Height <u>10.6m (35')</u>	Base Width
Crest Length 52m (170') Width	17 feet Elevation 3425 feet
Slopes Upstream 2.25:1	Downstream 2:1
Armour Protection None	Crest Protection None
Full Supply Elevation 3421'	Design Flood Elevation
Operating Range	
POWER FACILITIES	3.
Number and Size of Units N/A	I W
Canacity (cfs)	Turbine Pune
SLUTCE	,
Type <u>Gate valve with sloping upstream stem -</u>	also downstream valves.
Capacity Elevation 3421	Control U/S X D/S X
CollarsSize	Outlet - Weir
SPILLWAY	
Type Concrete chute	Size 5' wide x 5' deep
Sill Elevation 3421 Capacity	At Elevation
Log Boom Across Spillway Yes	Nc X
Protection: Apron No protection	Entrance wing walls
Gross Freeboard 5 feet	Net Freeboard
REMARKS OR SPECIAL CONSIDERATIONS	

Small earthfill saddle dam at north end of reservoir.





DAM INSPECTION REPORT

H. U

Province Ministry	of British Columbia DAN y of Environment	INSPECTIO	N REPORT	
	McCuddy Creek Da	<u>am #2</u> RESEI	RVOIR DA	TE June 12, 1982
	FWT7CWL 054570/1	· . 	FILE NO. D_2	20013
	LICENCEE McKinney Road Wa	ater Users'	Community (Alice	Froment)
	WATERSHED AND RESERVOIR CONDI	ITIONS		ater Supply System (Irrig
	 Saturated Wet Dry Freeboard Water Level ≈3 meters from crest 	6. 7. 8. meters 9. meters	Outlet Discharge Spillway Discharge Reservoir Debris Reservoir Bank Stal	m3/s m3/s @ M L bility H @ L Saturated in several areas.
	<u>NOTE</u> : Items marked >	K require atter	ntion - See Remarks	<u> </u>
	EMBANKMENTS	<u>OUTI</u>	ET WORKS Upstre	am and downstream gate
	10.Growth-11.Upstream Slope-12.Crest-13.Downstream Slope1½:114.Downstream Toe×15.Rip Rap×16.Seepage×17.ErosionMinor18.Sloughing×19.Boils-	- 30. - 31. - 32. - 33. - 34. - 35. - 36. - 37. - 38. - 39.	Gate Sluice Submerged Walls Stilling Basin Toe Drain Channel Weir Erosion Seepage	x Exposed 12" P.U.C. x Rock Pit x Pipe None Minor
	GATE WORKS	<u>SPIL</u>	LWAY	
	20.AccessibilityGood21.Wheel"22.Threads"23.Pedestral"24.Stem Guides"25.Stem"26.Gate"27.Grill"28.Boomx None29.Gaugex None	40. 41. 42. 43. 43. 44. 45. 46. 46. 47. 48. 49.	Boom Entrance Walls Spill Apron Channel Growth Erosion Seepage Debris	New conc. structure

REMARKS: (Refer Above)

14. Saturated and slumping.

- Heavy/embankment saturated. 16.
- 17. Minor
- 18. Some (berm built on bottom covering slumping material)
- rock drain dug into embankment appears to be draining as intended. 40. None
- 47. Downstream

INSPECTED WITH_

- 48. Embankment
- 35. Rock berm recently added.

SIGNED.

Dam Inspector

NOTE TO LICENSEE: Section 18(1) of the Water Act states:

"Every licensee and person who has obtained approval under Section 7 shall exercise reasonable care to avoid damaging any land, works, trees, or other property, and shall make full compensation to the owners for any damage or loss resulting from the construction, maintenance, use of operation of the licensee's works." Page 89 FNR-2013-00149

FROM то File 97 lox Dam Safety i DATE UBJECT Il & Cuddy Cuch 0270545 Sou Luc 24/80 For Your Information Please O.K. and Return Per Your Request For Your Signature Please Discuss With Me Return With More Details Please Process Investigate and Report Please Answer For Your File Several questions have been roused by Mr. O Podyum with regar topla The. above manuel dama d ai 711. lang to we decided 12 th del inould a opened up SIGNATURE DI COX PENG DATE OF REPLY RETAIN THIS COPY FOR YOUR RECORD OF THE INQUIRY AND REPLY. EVERGREEN PRESS LIMITED - CARBON READY SETS SALES OFFICE 950 HOMEN STREET, VANCOUVER, D.C. V68 2W6 682-7722 **MEMOGRAM**

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MCCUDDY CREEK DAM



Reservoir area for proposed dam.



Another view.

Water	Resources	Service
Dam	Information	n Sheet

	File: 0355221			
Completed by: W. Jolley	DAM CLASSIFICATION 123456			
Date: June 22, 1982	DISASTER POTENTIAL (ABC			
BACKGROUND	CLASSIFICATION			
Name of Dam McCuddy Creek #2	Reservoir			
Location west of Oliver	*			
Latitude 49 ⁰ 09' Longitude 119 ⁰ Diversions from McCuddy Creek a Source West Fork Baldy Creek	Purpose Storage			
Tributary to Inkaneep Creek	10 ac.ft. diversion			
Owner McKinney Road Water Users	s' Community (Alice Froment)			
Vear of Completion 1981	те на стал тури удинија је на је на на нај нај нај нај нај на на на нај на је нај нај нај нај нај нај нај на на на нај нај			
Water Licence Nos C054570-1	aktin genom gestickter genomen och att som anvende i genom den genomen att som den standarder (bland and beden som det som av som			
Plan Nos	Microfilm No.			
History				
*McCuddy Creek - 1020 acres WATERSHED West Fort Baldy Creek - 33	s. 246 acres.			
Area* Forest Cover_%	Agriculture % Urban %			
Elevation: Range	Median			
Soil Type	Exposure South-West			
Met. Records				
Runoff Records				
RESERVOIR				
Capacity: Live 77 acre feet	Dead 0 Total 77 ac.ft.			
Area: Sill Level 12.3 acres	Outlet Level 0			
Elevation: Sill Level 3421 feet	Outlet Level 3390 feet			
Inflow: Diversions	Capacity			
Records	File			
Releases: Records	File			
Fetch				

D-220013

DAM	
Structure	0f
TypeEarth-fill	Designed By Vernon Engineering
Height (35')	Base Width
Crest Length Width	17 feet Elevation 3425 feet
Slopes Upstream 2.25:1	Downstream 2:1
Armour Protection none	Crest Protection none
Full Supply Elevation 3421'	Design Flood Elevation
Operating Range	
POWER FACILITIES	-ei -
Number and Size of Units N/A	kW
Capacity (cfs)	Turbine Type
SLUICE	
Type Gate valve with sloping upstream	stem - also downstream valves.
Capacity Elevation	Control U/S V D/S V
Collars Size	Outlet Weir
SPTLLWAY	·
Type Concrete chute	Size 5' wide x 5' deep
Sill Elevation 3421' Capacity	At Elevation
Log Boom Across Spillway Yes	No
Protection: Apron no protection	Entrance wing walls
Gross Freeboard 5 feet	Net Freeboard
DEMADES OF SPECIAL CONSTDERATIONS	

June 15, 1982 File: 0270545

DAM INSPECTION REPORT

McCUDDIE CREEK DAM #2

Inspected By: G. F. Cox and G. D. Smith

Inspection Date: June 12, 1982

McCuddie Creek Dam #2 is owned and operated by McKinney Road Water Users Community for the purpose of storage for irrigation. Mr. Henry Mann acted as guide for our inspection and we were accompanied by Mr. Niel Banera, Water Allocation Engineer, and Mr. Ollie Podzun, Dam Inspection Officer from the Penticton Regional Office.

The structure is 35 foot high zoned earthfill dam built in 1981 under the ARDSA program.

The structure was designed and construction was supervised by Mr. Gordon Wilson of Vernon Engineering. Mr. Wilson was not available during our inspection. A recent slough in the downstream toe area near the left abutment had been repaired by placement of a berm across the downstream base of the dam. The left abutment half of the berm was composed of rock material while the right half was composed of local material which was almost impervious.

After placing the stabilizing berm, two french drains were installed on the right side of the berm to allow drainage of the saturated toe area. The drainage had been prevented by the impervious nature of the berm material. The remedial work appeared to be functioning satisfactorily on the left abutment side of the berm where the rock material had been used. Consulting Engineer Herman Fellhauer, has been called in to recommend what further action is required to correct this problem.

2760p

G. F. Cox, Dam Safety Engineer.

G. D. Smith, Dam Inspection Technician.

Gate valve located on upstream face. Note considerable debris in area.





Lower spillway channel on left abutment.

Stabilizing berm placed at downstream toe.



French drains installed through stabilizing berm.

Stabilizing berm from right abutment.



Downstream stabilizing berm including French drains.

MCCUDDIE #2

View of concrete spillway from upstream end. Note fines travelling into upper end of spillway channel.



Upstream face of dam requiring protective log boom.



June 12, 1982

Reservoir site seen from left abutment (note debris).



Reservoir site seen from left abutment (note deb





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MCCUDDIE CREEK #2

June 12, 1982

Downstream area of dam showing sluffs at berm contact.



DDIE CREEK #2

June 12, 1982

stream area of dam showing sluffs at berm contact.



June 12, 1982

Downstream toe and groin areas seen from dam crest.



2 DAM

June 12, 1982

toe and groin areas seen from dam crest.



September 28, 1982 File: 0270545

DAM INSPECTION REPORT

MCCUDDY CREEK DAM

Inspected By: G. D. Smith, O. Podzun and R. J. Bugslag

Inspection Date: September 16, 1982

A reconnaissance inspection was carried out at McCuddy Creek Dam to assess the engineering consultants report for proposed repairs to insure the continuing safety of the structure. The dam was constructed with minimal supervision and the quality of the construction is in doubt. Repairs include the placement of a berm against the downstream face. The berm is to be constructed of well-graded filter material and have a perforated"drainage system incorporated along the toe. The reservoir at the time of inspection was drawn down approximately 15' and the outlet was 3/4 open. The foundation area directly downstream from the dam appears to be very soft and swamplike. The proposed borrow area for the filter material was visited (10 kM from the damsite) and a 50 lb sample was taken so proctor testing can be carried out.

Recommendations:

- The reservoir should be drawndown immediately to facilitate repairs in conditions as dry as possible. A letter instructing the licensee to do this should be forwarded as soon as possible.
- 2. The wet areas in evidence at the downstream face could cause problems during the repairs therefore filter material should be stockpiled at the site prior to removal of the termporary repair berm.
- 3. The waste area for the temporary berm material should be prepared downstream on the left bank of the creek.
- The spillway channel downstream from the concrete control will require upgrading and possible ripraping because of the severe erossive nature of the materials.

. . . 2

McCuddy Creek Dam

 Provision for continuing measurements of seepage (V-notch works) should be provided after the repairs are completed if the seepage volumes are sufficient.

- 2 -

6. Further investigation of a filter material source closer to the damsite should be undertaken.

G. D. Smith, Dam Inspection Technician.

R. J. Bugslag, Dam Inspection Officer.

September 16, 1982

MCCUDDY CREEK #2

View of downstream face of dam showing saturated toe and berm. Note sluffing in lower right groin area.


MCCUDDY CREEK #2

September 16, 1982

McCuddy Creek Reservoir.



MCCUDDY CREEK #2

September 16,

McCuddy Creek Reservoir.



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McCUDDY CREEK #2

September 16, 1982

Close-up view of saturated toe area.





Spillway channel in left embankment.

Seepage at downstream toe.





Saturated berm at downstream toe.

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Saturated downstream toe.

Rock drain from berm.





Sluff from left groin area.

McCUDDIE CREEK #2 DAM November 25, 1982

2

Crest and downstream face with considerable debris at left abutment contact.



November 25, 1982

Empty reservoir seen from dam crest.



Low level outlet intake screen seen from upstream toe area.



Upstream face of dam seen while walking into McCuddie Creek #2 Dam.

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McCUDDIE CREEK #2 DAM

Right downstream abutment contact.

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MCCUDDIE CREEK #2 DAM

November 25, 1982



Left downstream abutment contact area.



Evidence of small slump on upstream face in right abutment area probably occurring during drawdown.

Page 120 FNR-2013-00149 McCuddy Creek Dam

October 4, 1982

On September 16, 1982 a joint inspection of McCuddy Creek Dam was carried out by Messrs. Bugslag and Smith of Power and Special Projects Section and Mr. Podzun of Penticton Regional Office. The engineering consultants report had been received and methods of implementing it were being assessed as well as the report itself. When a discussion of the site inspection requirements ensued Mr. Podgun reiterated that the Regional Office had neither the staff nor the available time to become involved. In subsequent telephone conversations Mr. Podzun reported that he had discussed the idea with Mr. Banera and Mr. Lovdahl who both agreed that there was no possibility of Regional staff involvement. All site supervision duties will therefore have to be taken care of by Power and Special Projects Section personnel.

SI box

G. F. Cox, P. Eng., Dam Safety Engineer.



Province of British Columbia

Ministry of Environment water management BRANCH

File 0270545

Date: February 1, 1983

MEMORANDUM

On an inspection of H. Mann's McCuddy Creek #2 Dam to acquire soil samples, the structure was found to be completely drawn down with its low level outlet gate full open.

Sluffing and beaching was evident on the upstream and downstream faces due to raing runoff.

Some debris and logs were found on the upstream face and will require removal.

No orders were issued regarding maintaining the gate open until repairs were completed as the owner appeared to be complying with previously discussed requirements.

G. D. Smith, Power and Special Projects.



Province of British Columbia Ministry of Transportation and Highways

MEMORANDUM

H118

To: Ministry of Environment, Water Management Branch Dam Inspection Section 818 Fort Street, 3rd Floor, Victoria, B.C. V8W 1H8 Date: April 26, 1983

Headquarters File: 22-21-01 Regional File:

District File:

Attn: Will Jolley

Re: Moisture Density Test

As per your request, samples received by our laboratory April 11, 1983 have been tested for gradation and Moisture Density. Test results are as follows:

Specific Gravity of Oversize Material	2.70
Specific Gravity of Passing 19.0 Retained 4.75 mm	2.71
Specific Gravity of Passing 4.75 mm	2.65
Maximum Dry Density of Passing 19.0 mm Material	2042 kg/m ³
Optimum Moisture Content of Passing 19.0 mm Material	6.5 %
Gradation	Attached

By using the formula recommended by A.S.T.M. Special Technical Publication #523, the theoretical maximum dry density of the total material is 2797 kg/m³ with an optimum moisture content of 5.0 %.

Chair hillion

G.S. Geddes, Supervising Laboratory Technician, for: Director of Geotechnical & Materials Engineering

CH/GSG/mg







H.187 (Rev. __/05)

FNR-2013-00149

TERRY JOHNSON

Willowbrook Construction Ltd.

R.R. No. 2 Oliver, B.C. VOH 1T0

PHONE 498-3044 - 498-3893

File: 02705 June 8, 1983 S

Septic Tanks - installed and cleaned. Bulldozers — Backhoes — Boom Trucks

Mr. Henry Mann, McKinnev Road Water Users Community,

s.22

Dear Mr. Mann:

This letter is to confirm our telephone conversation of June 7, 1983. The inplace compacted filter berm was calculated by end-area method and was found to contain 1371 (one thousand, three hundred and seventy-one) yards of compacted material when the project was halted. A Progress Report is included outlining the problems encountered during construction and how they were handled.

As this repair project is not completed, the Water Management Branch requires that the full pool lake elevation must be at least six (6') feet below the existing spillway sill elevation. This condition must remain in effect until the design improvements by Mr. Fellhauer, P. Eng., are complete.

The options available to you now are:

- 1) Complete the structure as designed.
- Leave the berm as it exists and maintain the 6' lower lake level.
- Partially complete the filter berm as far as funding will allow providing an extra foot of storage for each additinal foot of berm filter placed.

Please inform this office as soon as possible of your intentions before any additional work is carried out.

I plan to be in Oliver on the evening of June 13, 1983, with an instrumentation crew and will contact you at that time. If you have any additional questions please contact myself or Mr. Gerry Cox, Dam Safety Engineer at 387-1181.

Sincerely,

G. D. Smith, Dam Inspection Technician. Power & Special Projects.

Enclosure. 476 SMITH/hjg

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May 22, 1983

MCCUDDY CREEK DAM REHABILITATION

PROGRESS REPORT

CONTRACT REQUIREMENTS

 Remove existing emergency berm and any other unsuitable materials found below the berm until a suitable base is reached.

 Replace a clean filter base and install a performated pipe drain suitable to drain embankment or toe seepages.

3. Expose low level outlet and inspect for any damage or deterioration.

 Place filter blanket across base and up face. (Min. Reg. 2' depth).

5. Place pit run berm (to make a minimum of 20' with filter).

Before the work could be started an amount of preparatory work had to be carried out.

A) An access road to the proposed pit had to be constructed.

B) Test holes at the pit had to be dug to determine the extent of the select filter material.

C) The pit site had to be stripped.

D) A culvert had to be installed in the access road.
E) The equipment and manpower requirement had to be determined and a work schedule established.

Gle . H

2 -

1 & 2 The existing berm was found to be saturated and unstable. Material was placed to protect the low level outlet and provide enough stability to allow removal equipment to excavate the existing berm.

The left abutment area to the low level outlet was excavated. It was found, however, excavation went considerably deeper than anticipated. A heavy seep was isolated to the groin area of the left abutment contact. Stabilizing this area was difficult as the seep was saturating the embankment and causing considerable sluffing. By placement of the filter material in the saturated area the soupy material was forced out. Prompt installation of a perforated pipe controlled the seep. When the toe drain was installed an additional lateral was also installed to assist removal.

As the material was handling the seepage additional lifts were placed and compacted to bring the filter up to the spring line of the low level outlet. The two perforated drain outlets were flowing almost immediately. Compaction and moisture content testing was carried out.

> Page 127 FNR-2013-00149

The right abutment area to the low level outlet pipe was handled with fewer complications. Fractured rock was exposed and a firm base established without going below the spring line of the outlet. Again heavy flows came from the bank at the groin area but the saturation problem of surrounding material was not as intense. The area was bedded and the perforated pipe installed within a few hours.

3. When the low level outlet was exposed for inspection it was found to be leaking at several points. Two of the five joints exposed were found to be leaking with one length cracked. The pipe used was four-foot lengths of 12" concrete. The bell joints had been sealed with rubber rings and grounted. The area exposed was bedded in concrete (about 1/4) and it is assumed the remaining section through the dam had been installed in a similar fashion. Existing backfill was found to include large stones (up to 12") located next to the pipe and a large amount of sticks, branches and debris. The quality control of material placement was found to be totally unacceptable.

It appeared the last three lengths had been installed to replace the P.V.C. pipe used further downstream. (Different grouting methods in bell) and could account for debris in fill in this area but on exposing two further lengths similar

- 3 -

 $\left(\begin{array}{c} & & \\ & & \\ & & \\ & & \end{array} \right)$

conditions existed.

(

On May 21, 1983, the existing outlet pipe was hand scrubbed and all cracks and joints were resealed with expanding grout. The area around the pipe was then formed and a rich concrete mix poured to completely encase the exposed section of pipe.

4 & 5 On May 23, 1983, the forms were stripped and 6" perforated drains placed on either side of the concrete. Placement of bulk filter material was resumed.

Extensions to existing groin area drains (right and left) were carried out.

Random density testing was carried out. About 3:00 p.m. this afternoon pit run placement on the outer face of the berm was started. This material packs considerably harder as there is a larger variety of material (finer fines to coarse gravel). Placement of pit run fill was continued until noon May 24, 1983, when Mr. Mann came onto the site questioning the quality of the material. Although the quality of the material was well within Mr. Fellhauer's design specifications, Mr. Mann felt it was not suitable. To avoid conflict we switched back to placement of the filter material for the remaining lifts.

> Page 129 FNR-2013-00149

A =

An approximate load count showed about 1,800 yards had been placed to date. This was discussed with Mr. Mann and he thought the project should be halted.

On May 25, 1983, the area was dressed and the contractor removed his equipment.

Prepared by: G. D. Smith, Dam Inspection Technician, Power & Special Projects.



McCUDDIE CREEK #2

May, 1983

More deleterious materials exposed while stripping downstream toe area.



McCUDDIE CREEK #2

May, 1983

Heavy moisture content is reduced as drains function.

McCUDDY CREEK #2

May, 1983



Compaction and moisture content monitored regularly.



McCUDDY CREEK #2 Checking berm width. May, 1983

MCCUDDY CREEK #2

July 4, 1983



Minor erosion in filter berm. (Broken line indicates berm shoulder).



View of erosion on shoulder of recently placed filter berm.

McCUDDY CREEK #2 DAM

July 4, 1983

Phreatic line appears to be above the shoulder of the recently placed filter berm.



Soft spot located where top of berm meets downstream dam face.



McCUDDY CREEK #2 DAM

July 4, 1983

View of reservoir from dam crest.

DAM INSTRUMENTATION REPORT

File: D 220 013

McCuddy Creek Dam

Instrumentation Date: November 24, 1983

This was our third instrumentation trip to this dam. Our initial instrumentation was done on June 14, 1983, after a berm was placed on the downstream toe. A subsequent trip was on July 4, 1983. Prior to this (November) trip the berm was raised to its designed height.

Vertical settlement readings have been relatively minor to this point as have the transverse horizontal measurements. The longitudinal horizontal readings with the exception of S.R.P.'s #1 and #5 show little change. S.R.P.#1 indicates an approximate 1 centimetre movement towards the left abutment and S.R.P. #5 shows an approximate 1 centimetre movement towards the right abutment. S.R.P. #5 also appears loose.

The reservoir was empty on this inspection and signs of recent concrete work was evident around the intake for the low level outlet.

Atuant Reynolds

Stuart Reynolds, C.E.T., Dam Safety Technician.

INSTRUMENTATION REPORT

File: D 200 013

McCuddy Creek Dam

Instrumentation Date: March 28, 1984

The reservoir was empty at the time of this inspection and patches of snow were still visible around the site.

Only minor settlement was noted on the S.R.P.s since the November, 1983 readings. A slight downstream movement was recorded in the transverse horizontal plane. The longitudinal horizontal measurements were within the normal expected range with the exception of S.R.P. #4 which indicates a movement towards the left abutment.

Flows recorded from the toe drains were only minor at this time due to the reservoir being empty and the flows recorded were probably the result of the surficial snow-melt.

Stuart Reynolds

Stuart Reynolds, C.E.T., Dam Safety Technician. McCUDDY #1 DAM

March 28, 1984



Upstream face of drawn down dam recently cleared.



Fog moving down valley after recently completed instrumentation measurements.





March, 1984

G. D. Smith measuring deformation of surface monuments on the stabilizing berm.

Downstream face of dam with stabilizing berm in place.



McCUDDY #1 DAM March 28, 1984 Lake drawn down and clearing completed.

MCCUDDY CREEK DAM

March, 1984



View of dewatered concrete intake structure.



Downstream valve arrangement.



View of dewatered upstream face. Note: Armco sloping gate stem and intake. MCCUDDY CREEK DAM

March, 1984
File: D220-013

INSTRUMENTATION REPORT

McCuddy Creek Dam

Instrumentation Date: August 16, 1984

The reservoir was filled to 0.6 meters below the spillway crest. At this level there weren't any seepage areas visible on the downstream face of the dam. A wet spot was noticed, however, near the right abutment contact at the toe near the low level outlet valves.

Little settlement was noted on the crest S.R.P.'s and about 2mm on the berm S.R.P.'s. The transverse horizontal readings show a general downstream movement. The longitudinal horizontal readings are within their normal expected range with the exception of #4 which has a change of 3cm towards the right abutment and 6mm downstream. This point may have been hit or may indicate a localized movement.

All of the downstream relief drains show an increased flow with the higher reservoir level.

Stuart Reynolds

Stuart Reynolds, C.E.T., Dam Safety Section.



Filter blanket and berm at downstream dry and free of growth.



Minor ravelling on upstream face.

McCUDDIE CREEK #2

August 16, 1984



Pipe drains at downstream toe indicating minor flows.



Damp area noted in original ground downstream of dam in left embankment.

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DAM INSTRUMENTATION REPORT

McCuddy Creek Dam

File: D 220-013

Instrumentation Date: November 7, 1984

A continued settlement was noted on the crest S.R.P.'s while a slight upward movement was seen on the berm points.

The transverse horizontal readings show only minor changes and the longitudinal horizontal readings are within the normal expected range.

The reservoir level was only 45cm lower than that of August and 1 metre below the spillway sill.and The low level outlet was open. The toe and abutment drains were all flowing clear at this time.

Stuart Reynolds

Stuart Reynolds, C.E.T., Dam Safety Technician.

DAM INSTRUMENTATION REPORT

McCuddy Creek Dam

File: D-220-013

Inspection Date: March 26, 1985

Upon arrival at the site it was noted that Surface Reference Points #1 and #2 had been run over by a vehicle and bent over. Repairs were made by cutting off the bars 10cm down and the points were re-punched on the new surface. Initial readings were taken at the two re-set points and deformation results will be calculated after the next inspection.

Instrumentation readings at the other 3 points shows a resumption of the minor settlement pattern and only a minimum amount of horizontal movement.

At the time of inspection the reservoir was half full and the low level outlet was closed. Two drainage pipes, numbers 1 and 5, were flowing at about one half the flow recorded when the reservoir is full and the other drains were dripping. Drain pipe number 1 had been damaged but was repaired by the inspection staff.

William Jolley, \bigcirc Dam Safety Technician.

DAM INSPECTION REPORT

Oct. 22/85

McCuddie Creek #2 Dam

Inspected by: G. F. Cox & G. D. Smith Inspection Date: June 10, 1985

McCuddie Creek #2 Dam is owned and operated by McKinney Road Water Users Community located about 20 miles west of Oliver. It was built in 1981 by ARDSA. Remedial repairs were carried out in 1983 by this office to eliminate a heavy seepage problem by placement of a filter berm at the downstream toe. An extensive system of horizontal drains was incorporated to control the embankment seepage encountered. An allignment monitoring system was installed to identify any settlement or transverse movement.

The dam is an earthfill structure with only minimal growth noted on the downstream face. The berm appears to be operating effectively with no wet areas noted. Only minimal seepage is exiting from the horizontal drainage system with all seepage clear.

The low level outlet includes an unlocked sloping gate valve which is closed at the time of inspection. The lake is at full pool elevation with the spillway flow about 3" deep at the concrete sill. Downstream of the spillway sill, the channel has eroded from its designed course and cut heavily into the natural embankment. It is anticipated this washout will be repaired this season. The owner should be requested to forward a schedule of repairs and a progress report to myself or:

> G. F. Cox, Dam Safety Engineer, Ministry of Environment, Water Management Branch 765 Broughton Street, VICTORIA, British Columbia. V8V 1X5

This erosion occurred during the first significant seasonal runoff flow which passed over the spillway. All remedial work must be monitored closely to be sure that additional erosion does not occur.

Recommendations:

 Spillway washout occurred last spring. Remedial repairs should be completed prior to next spring's freshet.

\$3600

G. F. Cox, Dam Safety Engineer.

G. D. Smith, Dam Inspection Technician.



DAM INSPECTION REPORT

Province	of	E	Iriti	ish	Co	lum	bia
Ministr	v c	of	En	viro	onn	nen	t

McCuddy Creek #2	.RESERVOIR DA	ATE June 26, 1986
54570/1	FILE NO. D.2	20013
LICENCEE Henry Mann		
WATERSHED AND RESERVOIR CONDITIONS 1. Saturated	 Outlet Discharge Spillway Discharge Reservoir Debris Reservoir Bank Sta 	m3/s m3/s MML ability HML
<u>NOTE</u> : Items marked X require	attention - See Remarks	5
EMBANKMENTS	OUTLET WORKS	
<pre>10. Growth</pre>	 Gate Sluice Submerged Walls Stilling Basin Toe Drain Channel Weir Erosion Seepage 	
GATE WORKS	SPILLWAY	
20. Accessibility	 Boom Entrance Walls Spill Apron Channel Growth Erosion Seepage Debris 	

REMARKS: (Refer Above)

5. Reservoir level approx. 1 ft. below spillway.

- 11. Surface erosion continuing.
- 15. No rip-rap on upstream side.
- 16. Seepage in drain pipes only.

20. Gate valve wheel is not locked.

40. No boom in reservoir.

41. Some infilling at upstream end of spillway channel.

44, 45, 47.

An increasing problem of erosion at the downstream end of the spillway was noted in 1985, and has not yet been repaired.

The spillway flow will soon begin to erode into the left abutment of the dam if repairs are not made soon. A channel (ditch), should be dug along the left abutment at the constant grade, to allow the spillway to operate without erosion problems.

INSPECTED	WITH <u>R.J.</u>	Bugslao		SIGNED_	ω_{c}	Jolley.
		J.	jų.		Dam	Inspector

1 1

<u>NOTE TO LICENSEE</u>: Section 18(1) of the Water Act states: "Every licensee and person who has obtained approval under Section 7 shall exercise reasonable care to avoid damaging any land, works, trees, or other property, and shall make full compensation to the owners for any damage or loss resulting from the construction, maintenance, use of operation of the licensee's works." FNR-2013-00149



Spillway exit heavily eroded downstream of box culvert.



Circle indicates eroded area.



Downstream face and stabilizing berm.

MCCUDDIE CREEK #2

MCCUDDY CREEK #2

June 10, 1985



Crest of upstream face (lake spilling on inspection.)



W/L approximately 3" in concrete. Concrete box culvert spillway.

DAM INSTRUMENTATION REPORT

File: D 220 013

McCuddy Creek Dam

Instrumentation Date: August 22, 1985 & November 8, 1985.

There has been a very slight settlement of the Surface Reference Points since the last set of readings with the exception of point #5 which indicates an upward movement. This point is loose and may have moved.

The transverse horizontal readings show an upstream movement for the crest points and a downstream movement for the points of the lower berm. The longitudinal horizontal measurements appear to be within the normal expected range with perhaps the exception of S.R.P.#1 which indicates a 1 cm. movement towards the right abutment but, irregular readings are fairly common with this type of measurement.

Stuart Reynolds

S. G. Reynolds, A.Sc.T., Dam Safety Technician.

Mr G.F. Cox, Dam Safety Engineer, Ministry of Environment, Water Management Branch, 765 Broughton Street, Victoria, B.C. V8V 1X5

Re: McKinney Rd. Water Users Community File: 0270545 McCuddy Creek #2 Dam

Dear Mr Cox:

Because of severe financial losses to the farming operation, the repairs to the overflow spillway have not as yet been accomplished.

s.22

It is, therefore, our intention not to fill the dam until this work has been completed.

Yours truly,

December 15/85

0270545

Henry Mann, Manager, McKinney Rd Water Users/Community

s.22

s.22

File: 0270545 February 3, 1986

Mr. H. Mann, Manager, McKinney Road Water Users Community,

s.22

Dear Mr. Mann:

Thank you for your letter of December 15, 1985 in which you notify me that spillway repairs have not been carried out and therefore the reservoir will not be filled.

I am sorry to hear that your farming operation has incurred financial losses and hope that the situation changes for the better in 1986. Your program of keeping the reservoir low to ensure no spilling is acceptable and I trust will only be necessary for 1986.

Yours truly,

\$7600

G. F. Cox, P. Eng., Dam Safety Engineer, Power & Special Projects.

COX/hjg



DAM INSPECTION REPORT

Province	of	British	Columbia
Ministr	v c	of Envir	onment

McCuddy Creek	#2	. RESEF	RVOIR	DATE_	June 26, I	L986
EVIL 54570/1			FILE NO.	D 2200	13	
LICENCEE Henry Mann						
WATERSHED AND RESERVOIR 1. Saturated 2. Wet 3. Dry 4. Freeboard 5. Water Level	<u>CONDITIONS</u>	6. 7. 8. 9.	Outlet Dischar Spillway Disch Reservoir Debr Reservoir Bank	ge arge is Stabil	0m3/s m3/s H(M)L ityH(M)L	
<u>NOTE</u> : Items man	rked X require	atter	ntion - See Rem	arks		
EMBANKMENTS		<u>outl</u>	ET WORKS		• •	
 Growth Upstream Slope Crest Downstream Slope Downstream Toe Rip Rap Seepage Erosion Sloughing Boils 		30. 31. 32. 33. 34. 35. 36. 37. 38. 39.	Gate Sluice Submerged Walls Stilling Basi Toe Drain Channel Weir Erosion Seepage	n		· · · · · · · · · · · · · · · · · · ·
GATE WORKS		<u>SPIL</u>	LWAY			
 Accessibility Wheel Threads Pedestral Stem Guides Stem Gate Grill Boom Gauge 		40. 41. 42. 43. 44. 45. 45. 46. 47. 48. 49.	Boom Entrance Walls Spill Apron Channel Growth Erosion Seepage Debris		X -X -/ -/ X -X -/ -X -/ -X -/ -/ -/ -/ -/ -/ -/ -/ -/ -/	

REMARKS: (Refer Above)

5. Reservoir level approx. 1 ft. below spillway.

11. Surface erosion continuing.

- 15. No rip-rap on upstream side.
- 16. Seepage in drain pipes only.

20. Gate valve wheel is not locked.

40. No boom in reservoir.

41. Some infilling at upstream end of spillway channel.

44, 45, 47.

An increasing problem of erosion at the downstream end of the spillway was noted in 1985, and has not yet been repaired.

The spillway flow will soon begin to erode into the left abutment of the dam if repairs are not made soon. A channel (ditch), should be dug along the left abutment at the constant grade, to allow the spillway to operate without erosion problems.

INSPECTED	WITH R.J. Bugslag	SIGNED W. Jolley.
		Dam Inspector

<u>NOTE TO LICENSEE</u>: Section 18(1) of the Water Act states:

"Every licensee and person who has obtained approval under Section 7 shall exercise reasonable care to avoid damaging any land, works, trees, or other property, and shall make full compensation to the owners for any damage or loss resulting from the construction, maintenance, use of Page 159 operation of the licensee's works."

June 16, 1987

DAM INSPECTION REPORT

McCuddie Creek #2 Dam Inspected by: S. Reynolds, W. Jolley and G. D. Smith Inspection Date: June 12, 1986

McCuddie Creek #2 Dam is owned and operated by the McKinney Road Water Users Community.

The overall condition of the dam appears stable with only minor evidence of growth on the downstream face.

The seepage collection system in the downstream toe area is draining satisfactorily in varying clear amounts.

The poor condition of the spillway channel has not been up-graded since the October inspection. The spillway remains very eroded in the downstream portion. Maintenance was requested February 3, 1986 to be completed prior to further water storage. The lake level, however, was noted almost full at the time of inspection.

Recommendations:

- The lake level should be drawn down until improvements have been completed.
- The washed out section of the spillway channel must be repaired if storage is to be considered.
- 3. L.L.O. gate be locked to avoid vandalism.

L- Reynolds

S.Reynolds, Dam Inspection Technician.

W. Jolley

W.Jolley, Dam Inspection Technician.

G.D.Smith, Dam Inspection Technician.

MCCUDDIE CREEK #2

June 12, 1986



Spillway embankment still overtopped since 1985 season. Arrow indicates overcut channel route.



Lake level almost full pool at time of inspection.



MCCUDDY CREEK #2

June 10, 1986

Overview from downstream.



MCCUDDY CREEK #2 Upstream face of dam. June 10, 1986



MCCUDDY CREEK #2

June 10, 1986

Spillway erosion shown in relation to stabilization berm.



McCUDDY CREEK #2

June 10, 1986

Heavy erosion at spillway outlet.

Page 165 FNR-2013-00149 MCCUDDY CREEK #2

June 30, 1988



Erosion at spillway outlet.



Concrete spillway outlet with access bridge.

Page 166 FNR-2013-00149 MCCUDDY CREEK #2



Irrigation control valves at downstream face.

MCCUDDIE CREEK #2



July 11, 1988

Growth in spillway entrance located on left abutment. Upstream gate open for irrigation.



Stabilizing berm.

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McCuddie Creek #2

July 11, 1988

Downstream face of dam from right abutment.

MCCUDDIE CREEK #2

July 11, 1988



Close-up of spillway growth.



Concrete spillway channel flowing into recently repaired exit channel.

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McCUDDIE CREEK #2



Material replaced in spillway embankment at outlet. Initial erosion beginning at spillway exit.



Improvements to downstream works outlet control.

OKANAGAN DAMS DAM ASSESSMENT SUMMARY

Abbreviations: Heavy - H, Moderate - M, Low - L Flight Date: June 20, 1990

Not Responsive

	Spillway		MO	σ			
DAM	Debris	Erosion	Flow cfs	Outlet Flo cfs	Freeboar	Boom	COMMENTS
McCuddy Dam	М	L	0	?	О.К.	N	Spillway entrance partially blocked with gravel.

Not Responsive

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Ministry of Environment and Parks

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45	DAM IN	NSF	PECTION REI	PORT		. ş
DAM McCuddy	Creek Da	m	N	S	STATUS	
DESCRIPTION						
LICENSEE McKinney	v Road Wa	ater	Users Commun	itv		
				DAMEN	D 220 (112
FWL/CWL	FILE NO	•		. DAM FIL	,E No D 220 (
DATE INSPECTED June 1	9, 1990		LAST INSPEC	CTED		
TYPE OF INSPECTION: REGULATORY	<u></u>	_ IN	CIDENT-RELATED .	Flood	FOLLOW-UP	
WATERSHED AND RESEI	RVOIR CONI	DITI	ONS			t w
 Saturated Wet Dry Freeboard Water Level 		6. 7. 8. 9.	Outlet Discharge Spillway Discharge Reservoir Debris Reservoir Bank Stability		see $\underline{over_{m3/s}}_{H M L}$ H M L H M L	5 1
EMBANKMENTS			OUTLET WORKS			
 Growth Upstream Slope Crest Downstream Slope Downstream Toe Rip Rap Seepage Erosion Sloughing Boils 	$ \frac{\sqrt{\frac{\text{see ov}}{\frac{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt$	 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 	Gate Sluice Submerged Walls Stilling Basin Toe Drain Channel Weir Erosion Seepage		$\frac{U/W}{N/A}$ $\frac{N/A}{\sqrt{A}}$ $\frac{\sqrt{A}}{\sqrt{A}}$	
GATE WORKS			SPILLWAY			
 Accessibility Wheel Threads Pedestal Stem Guides Stem Gate Grill Boom Gauge 	$\sqrt{\frac{1}{\sqrt{1}{\sqrt$	 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 	Boom Entrance Walls Sill Apron Channel Growth Erosion Seepage Debris	r H B	none see over $\sqrt[]{}$ $\sqrt[]{}$ <u>see over</u> <u>some b</u> us $\sqrt[]{}$ $\sqrt[]{}$	hes
Inspected No. Inspected, requiring attention (see	remarks over	page	e) x			

See video tape

INSPECTED WITH _

R.J. Bugslag, W. Jolley

SIGNED DATE

Section 18 (1) of the *Water Act* states: "Every licensee and person who has obtained approval under Section 7 shall exercise reasonable care to avoid damaging any land, works, trees, or other property, and shall make full compensation to the owners for any damage or loss resulting from the construction, maintenance, use of operation of the licensee's works."

MR-1295

. . /2 (Tumble) Page 174 FNR-2013-00149

- 5-7. The reservoir was full, there was a small amount of flow in the spillway channel.
 - 11. No rip-rap minor erosion continuing.
 - 16. All of the toe drains were running. Appears to be normal for full reservoir condition.
 - 21. Wheel removed for security.
 - 41. Spillway entrance blocked by 0.4m of sand and gravel. There is also some floating debris and bushes at the entrance.
 - 45. The channel has been repaired and is now functioning as it was when constructed. There is no guarantee that it won't erode again like it did 4 years ago.



View of the spillway bridge looking downstream.



View under the spillway bridge. Note the large amount of sand and gravel that has accumulated in the spillway channel.



View under the bridge that crosses the spillway looking upstream towards the reservoir.



Downstream toe.



Erosion along right abutment groin area.

DAM INSPECTION REPORT

McCuddy Creek Dam #2

File: D 220013

Inspection Date: November 28, 1991

Inspected by: S. G. Reynolds, and W. Jolley

McCuddy Creek Dam #2 is operated and maintained by the McKinney Road Water Users' Community. This unscheduled inspection was undertaken to determine whether the previously reported spillway blockage had been cleaned out.

At the time of inspection, the reservoir level was approximately 2 meters below the full supply level and the low level outlet gate was closed. We did not drive down to the far end of the reservoir to determine whether any water was being diverted into the reservoir via the diversion ditch.

The earth-fill embankment was snow covered at the time of inspection. The erosion of the surface material on the downstream face is continuing. There are 2 erosion gullies on the toe berm and one along the right abutment groin area. If grass cover could be established on the slope, the erosion problem would probably be controlled.

Sand and gravel has been washed down into the concrete spillway channel causing partial blockage (see photographs). This material should be removed before the 1992 spring runoff. The trees and bushes in the earthen spillway channel and spillway entrance should be removed to allow unrestricted spillway flow.

There is a large amount of floating debris at the high water level near the spillway entrance. This debris should be removed from the reservoir so that it won't block the spillway during high flow conditions. A log boom should be constructed across the entrance to keep debris away from the spillway.

W Jolley.

William Jolley, A. Sc. T. Dam Inspection Officer

slj



Sand and gravel accumulation on the sill of the spillway at the downstream end of the bridge is 0.15 m deep.



Sand and gravel accumulation on the sill of the spillway at the upstream end of the bridge is 0.20 m deep. The accumulation is about twice as deep on the left side.


November 28, 1991

Mc Cuddy Creek Dam #2

Sand and gravel accumulation on the downstream end of the sill of the spillway is 0.10 m deep.



View looking up the spillway channel towards the reservoir. The bushes in the channel should be removed to allow unrestricted spillway flow. Mc Cuddy Creek Dam #2

November 28, 1991



View of the upstream slope of the dam and spillway entrance (left side). Note the logs and other floating debris around the reservoir perimeter. Also note the bushes growing in the spillway entrance.





Province of British Columbia Ministry of

Environment,

Lands and Parks

nbia

BC and Environment

Water Management Division 765 Broughton Street Victoria British Columbia V8V 1X4

DAM INSPECTION REPORT

McCUDDY CREEK DAM D220013

INSPECTED BY: W. Jolley, S. Morgan

INSPECTION DATE: June 15, 1993

McCuddy Creek Dam was constructed in 1981 for the McKinney Road Water Users Community who currently operate and maintain it. In 1983 a stabilizing berm was constructed at the toe of the dam. The dam is a 35 foot high earthfilled structure which stores approximately 77 acre feet of water with the aid of a smaller earthfilled saddle dam located at the north end of the reservoir.

The crest and upstream embankment appear satisfactory. There is vegetation growing at the toe of the downstream embankment in an area that is saturated. This saturation may be due to plugged drainage pipes. All the drainage pipes have some flow through them except for the two that are emerging from the saturated area.

There is a high level of floating debris in the reservoir, some of which is resting against the upstream embankment. There is no log boom across the spillway entrance or intake. There is thick vegetation growing in the spillway entrance and the concrete box culvert spillway channel is partially blocked with a sandy material that is being washed down from a side hill. The spillway channel downstream of the box culvert is overgrown but appears stable. There was flow through the spillway at the time of the inspection.

The saddle dam located at the north end of the reservoir appears in satisfactory condition. The area downstream of the toe is saturated but poses no threat to the dams integrity.

Recommendations:

- 1. Remove the vegetation that is growing on the downstream embankment and at the entrance to the spillway channel.
- 2. Clean out all material and debris from the concrete spillway channel and spillway entrance.

... 2

- 3. Stabilize side hill located left of the spillway channel. Seeding the hillside with grass may work for the short term, however, in the long term, this side hill should be cut back.
- 4. Clean out blocked drains on downstream embankment.
- 5. Construct a log boom across the spillway entrance.

Scott Morgan, A.Sc.T. Dam Safety Officer

McCuddy Creek Dam



View of partially blaked spillway channel entrance.



View upstream of partially blocked spillway channel.

McCuddy Creek Dam



Steve Rowe, Dam Safety Officer, Penticton, indicating location of wet area on downstream slope of toe berm.



Another view of the wet area (indicated by the vegetation) on the downstream slope of the toe berm. Page 18

Page 187 FNR-2013-00149 McCuddy Creek Dam



View of sloughing side hill above the spillway channel (along left abutment)

PHOTO FILE

Film Roll: Date:

File: D220013 Date: May 5, 1994 Project: McCuddy Dam Sheet:

Photo 1: View of the crest and the upstream face looking towards the spillway entrance.



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PIT PUN SAND & GRAVEL (MAY BE SLIGTLY DIRTY) è - FILTER OF SELECT BORROW MATERIAL, SEE GRAPH FIG.1 IN REPORT G PERFORATED PVC OR AC DRAIN PIPE 6" CLOSED DISCHARGE PIPE-> DIS FACE OF DAM 1.4 B^a MIN Qez COARSE SAND -DRAIN PIPE FILTER) 8" STRIPPED FOLINDATION AREA DETAIL "X" SCALE I'= 2' 1 NOTES THIS DRAWING ACCOMPANIES MY REPORT MCKLDDY DAM - DRAINAGE IMPROVEMENT WORKS, DATED AUGUST 24, 1982 AND SHOULD BE READ IN CONJUNCTION WITH THE REPORT. SPRING WATER WHERE IN CONTACT WITH NATURAL GROLIND WRAP DRAIN PIPE FILTER IN FILTER FABRIC MCKINNEY ROAD WATER USERS COMMUNITY MCKUDDY DAM CALE AS SHOWN H. Tenhaner. AUG 24/82 H: FELLHAUER ENGINEERING CONSULTANT DRAINAGE IMPROVE MENT WORKS 146+1 FNR-2013-00149

Note to File: 0270545

McCuddy Creek Dam

October 4, 1982

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On September 16, 1982 a joint inspection of McCuddy Creek Dam was carried out by Messrs. Budslag and Smith of Power and Special Projects Section and Mr. Podzun of Penticton Regional Office. The engineering consultants report had been received and methods of implementing it were being assessed as well as the report itself. When a discussion of the site inspection requirements ensued Mr. Podgun reiterated that the Regional Office had neither the staff nor the available time to become involved. In subsequent telephone conversations Mr. Podzun reported that he had discussed the idea with Mr. Banera and Mr. Lovdahl who both agreed that there was no possibility of Regional staff involvement. All site supervision duties will therefore have to be taken care of by Power and Special Projects Section personnel.

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G. F. Cox, P. Eng., Dam Safety Engineer.

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∦]File 0270545

Date: February 1, 1983

MEMORANDUM

On an inspection of H. Mann's McCuddy Creek #2 Dam to acquire soil samples, the structure was found to be completely drawn down with its low level outlet gate full open.

Sluffing and beaching was evident on the upstream and downstream faces due to raing runoff.

Some debris and logs were found on the upstream face and will require removal.

No orders were issued regarding maintaining the gate open until repairs were completed as the owner appeared to be complying with previously discussed requirements.

G. D. Smith, Power and Special Projects.

File: 0270545 June 8, 1983

Mr. Henry Mann, McKinnev Road Water Users Community,

s.22

Dear Mr. Mann:

This letter is to confirm our telephone conversation of June 7, 1983. The inplace compacted filter berm was calculated by end-area method and was found to contain 1371 (one thousand, three hundred and seventy-one) yards of compacted material when the project was halted. A Progress Report is included outlining the problems encountered during construction and how they were handled.

As this repair project is not completed, the Water Management Branch requires that the full pool lake elevation must be at least six (6') feet below the existing spillway sill elevation. This condition must remain in effect until the design improvements by Mr. Fellhauer, P. Eng., are complete.

The options available to you now are:

1) Complete the structure as designed.

- 2) Leave the berm as it exists and maintain the 6' lower lake level.
- 3) Partially complete the filter berm as far as fundingwill allow providing an extra foot of storage for each additinal foot of berm filter placed.

Please inform this office as soon as possible of your intentions before any additional work is carried out.

I plan to be in Oliver on the evening of June 13, 1983, with an instrumentation crew and will contact you at that time. If you have any additional questions please contact myself or Mr. Gerry Cox, Dam Safety Engineer at 387-1181.

Sincerely,

G. D. Smith, Dam Inspection Technician. Power & Special Projects.

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Enclosure. 14 SMITH/hjg

May 22, 1983

MCCUDDY CREEK DAM REHABILITATION

PROGRESS REPORT

CONTRACT REQUIREMENTS

Remove existing emergency berm and any other
unsuitable materials found below the berm until a suitable base
is reached.

2. Replace a clean filter base and install a performated pipe drain suitable to drain embankment or toe seepages.

3. Expose low level outlet and inspect for any damage or deterioration.

4. Place filter blanket across base and up face. (Min. keq. 2' depth).

5. Place pit run berm (to make a minimum of 20' with filter).

Before the work could be started an amount of preparatory work had to be carried out.

A) An access road to the proposed pit had to be constructed.

B) Test holes at the pit had to be dug to determine the extent of the select filter material.

C) The pit site had to be stripped.

D) A culvert had to be installed in the access road.
E) The equipment and manpower requirement had to be determined and a work schedule established.

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1 & 2 The existing berm was found to be saturated and unstable. Material was placed to protect the low level outlet and provide enough stability to allow removal equipment to excavate the existing berm.

The left abutment area to the low level outlet was excavated. It was found, however, excavation went considerably deeper than anticipated. A heavy seep was isolated to the groin area of the left abutment contact. Stabilizing this area was difficult as the seep was saturating the embankment and causing considerable sluffing. By placement of the filter material in the saturated area the soupy material was forced out. Prompt installation of a perforated pipe controlled the seep. When the toe drain was installed an additional lateral was also installed to assist removal.

As the material was handling the seepage additional lifts were placed and compacted to bring the filter up to the spring line of the low level outlet. The two perforated drain outlets were flowing almost immediately. Compaction and moisture content testing was carried out.

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The right abutment area to the low level outlet pipe was handled with fewer complications. Fractured rock was exposed and a firm base established without going below the spring line of the outlet. Again heavy flows came from the bank at the groin area but the saturation problem of surrounding material was not as intense. The area was bedded and the perforated pipe installed within a few hours.

3. When the low level outlet was exposed for inspection it was found to be leaking at several points. Two of the five joints exposed were found to be leaking with one length cracked. The pipe used was four-foot lengths of 12" concrete. The bell joints had been sealed with rubber rings and grounted. The area exposed was bedded in concrete (about 1/4) and it is assumed the remaining section through the dam had been installed in a similar fashion. Existing backfill was found to include large stones (up to 12") located next to the pipe and a large amount of sticks, branches and debris. The quality control of material placement was found to be totally unacceptable.

It appeared the last three lengths had been installed to replace the P.V.C. pipe used further downstream. (Different grouting methods in bell) and could account for debris in fill in this area but on exposing two further lengths similar

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- 3 -

conditions existed.

On May 21, 1983, the existing outlet pipe was hand scrubbed and all cracks and joints were resealed with expanding grout. The area around the pipe was then formed and a rich concrete mix poured to completely encase the exposed section of pipe.

4 & 5 On May 23, 1983, the forms were stripped and 6" perforated drains placed on either side of the concrete. Placement of bulk filter material was resumed.

Extensions to existing groin area drains (right and left) were carried out.

Random density testing was carried out. About 3:00 p.m. this afternoon pit run placement on the outer face of the berm was started. This material packs considerably harder as there is a larger variety of material (finer fines to coarse gravel). Placement of pit run fill was continued until noon May 24, 1983, when Mr. Mann came onto the site questioning the quality of the material. Although the quality of the material was well within Mr. Fellhauer's design specifications, Mr. Mann felt it was not suitable. To avoid conflict we switched back to placement of the filter material for the remaining lifts.

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- 4 --

An approximate load count showed about 1,800 yards had been placed to date. This was discussed with Mr. Mann and he thought the project should be halted.

On May 25, 1983, the area was dressed and the contractor removed his equipment.

Prepared by:

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G. D. Smith,

Dam Inspection Technician,

Power & Special Projects.

ASOT

May 17, 1983



Initial stripping of saturated downstream toe area.



Preparation of haul road.



May 18, 1983

Large quantity of debris appearing in downstream toe area. This material is unsuitable and must be removed prior to placement of berm material.



May 18, 1983

Totally saturated with exception of right abutment contact.

May 18, 1983



Large boulder in fill on left abutment. Also, filter cloth is located above the seepage path.



Stabilizing saturated base with coarse granular filter material.



DIE CREEK #2

May, 1983

ng wet material away from the site.



McCUDDIE CREEK #2 Working wet material away from the site.

Land and

May, 19

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v area pripr to stripping.





May, 1983

Initial compaction begins to form a stable base.



May, 1983

Begin placement of granular base.

May, 1983



Center drain functioning with a minimal flow.



Left toe drain functioning on completion.



May, 1983

Vibrator on drum roller gives good compaction results as shown by nuclear densometer.

May, 1983



Damaged perforated pipe exposed and replaced.



Existing perforated toe drain in place with rocks and roots exposed beneath.

May, 1983



Existing groin area drain with filter clothe exposed (right side).





May, 1983

Vibratory packer on filter rover right abutment drain.


E CREEK #2 ion of stripping.

May, 1983



McCUDDIE CREEK #2 Completion of stripping. May, 1983

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May, 1983



Granular fill material exposed at borrow site.

May, 1983



Embankment seepage evident after a few scoops.

May, 1983



Typical x-heads marking top of berm.



Contractors level used to establish berm crest.

May, 1983



Branches and sticks in bedding.



Boulder on top of concrete pipe.

MCCUDDIE CREEK #2

May, 1983



Crack in concrete low level outlet pipe.



Debris in fill.

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MCCUDDIE #2 DAM

June 12, 1982

Downstream face of dam including spillway and stabilizing berm.



May, 1983



Boulder and sticks on leaking concrete pipe.



Removal of boulder.

May, 1983

Six foot lengths of concrete pipe bedded in concrete.





Exposure to low level outlet pipe.

May, 1983







Existing low level outlet exposed and cleaned.

May, 1983



Some joints round packed with concrete, others with none.



All joints hand cleaned.

May, 1983



Borrow material quality remains high.



Minor roots and growth near pipe.

May, 1983



Interested observers.



W/L leawing site.

May, 1983

#17

Expanding grout used before concrete placement to seal existing cracks.





Concrete placement.

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May, 1983



Concrete checked a day later.



Hand mixed concrete in-place.

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Stripped forms.



4" perforated drains placed on either side of concrete encased low level outlet.

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Extension of perforated 4" drains.

May, 1983





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May, 1983



Saddle Dam.



View of reservoir from saddle dam.



Access road through reservoir. (Note debris)



Contained seepage in right abutment area.



May, 1983

Sloping gate stem and considerable debris on upstream face.



McCuddy Creek #2

May, 1983

Downstream face.



DY CREEK #2

May, 1983

w Area.



May, 1983

Borrow Area.

May, 1983



Begin placement of trenching for right abutment drain.

Installation of 6"

perforated rain from groin area.

May, 1983



Same as above.

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Two 4" lines are pick-ups on either side of low level outlet.



The flowing 6" line is carrying water from right abutment groin area.



May, 1983

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Replacement berm approaching original slope.

May, 1983

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May, 1983



Dumping.

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May, 1983



Spreading.

May, 1983



Continual dumping, spreading and packing in 4-5" lifts.

May, 1983





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an

May, 1983



Oversize truck placing final load.



May 18, 1983

Initial stripping.

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May, 1983

Packing.
McCUDDY CREEK #2







McCUDDY CREEK #2



McCUDDY CREEK #2

May, 1983



Circuled x-head indicates design elevation of berm when project was halted. (about 6' low).

Spillway outlet appears to be in fill.



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MCCUDDY CREEK #2

May, 1983



Coarse grained sand to l&l/2" gravel typical of placed berm material.



Compaction of berm material 95% proctor+.



McCUDDY CREEK #2 May, 1983 Clean-up of surrounding area prior to equipment removal.



DDY CREEK #2

May, 1983

of project and downstream area.



McCUDDY CREEK #2 View of project and downstream area.

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DDY CREEK #2 ect incomplete.



McCUDDY CREEK #2 Project incomplete.

May, 1983

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