

003442

PROGRESS REPORT NO.1

CURRAGH RESOURCES INC.
FARO MINE
TAILINGS STUDY

DECEMBER, 1990

Prepared By:

KILBORN INC.
2200 Lake Shore Blvd. West
Toronto, Ontario
M8V 1A4

PROGRESS REPORT NO.1
CURRAGH RESOURCES INC.

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CONFERENCE REPORT NO.1 - REV.1 January 3, 1991

FINAL REPORT INDEX - Draft for Discussion

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SECTION 1.0

INTRODUCTION

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1.0 INTRODUCTION

Kilborn Inc. was authorized on the basis of their revised proposal dated December 7th, 1990 to proceed with the study of tailings disposal at the Faro mine division of Curragh Resources Inc. The terms of reference are as detailed in Curragh Resources Inc.'s letter dated October 29, 1990 with modifications in a letter dated November 29, 1990.

The study encompasses engineering services including the disciplines of metallurgy, hydraulics and civil engineering by Kilborn Inc., with environmental input including tailings area decommissioning plans provided by Steffen, Robertson and Kirsten (B.C.) Inc. (SRK), and geotechnical input from Golder Associates Ltd. (Golder). New, September 1990, mapping is being supplied by the Orthoshop for the Down Valley tailings area and the Faro Pit area.

Work on the project commenced on December 17, 1990 with a meeting in Vancouver to review scope and budget at the offices of SRK. This was followed by a similar meeting with Golder in Calgary on December 18, and a brief meeting with Orthoshop. Notes of the meetings are included in the Appendix of this report as Conference Report No.1. A revised issue, dated January 3, 1991, incorporates some clarification as requested by Golder Associates and Curragh Resources.

Work during this period was restricted to essentially 1 week prior to the Christmas-New Year's holiday period. For convenience, the work carried out during the first few days in January 1991 is included in this December 1990 report.

SECTION 2.0

PROGRESS

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2.0 PROGRESS

2.1 GENERAL

In the past four weeks commencing December 10, 1990, work has been limited on the tailings study due to two factors: (a) the Christmas - New Year holiday period, and (b) the lack of new mapping for the Down Valley tailings area.

During the first week of this period, Mr. John Wells of Kilborn was at the Faro mine and acquired water quality monthly reports for 1989 - 1990, first hand Vangorda ore trial test information, and developed initial concepts for water recycling possibilities.

In the second week, meetings with SRK and Golder Associates established contacts with the principal contributors and firmed up and clarified details on the work scope as noted in Conference Report No. 1 in the Appendix. During the last week of December and early January work by Kilborn included a first look at Faro pit infilling volumes, preliminary water recycle block diagram flowsheets for discussion at the January 11th progress review meeting, and preliminary reprocessing concepts including order of magnitude cost estimates for economic evaluation purposes. A total of 74 ½ hours was expended by Kilborn in December 1990.

Work by SRK, which commenced December 17th, was limited to a total of 60 ½ hours in the month of December. The main activities for the month included meeting with Kilborn, review of existing data base on water quality information, and development of scenarios related to the decommissioning of the Down Valley tailings area applicable to this study.

Golder work in December 1990 was limited to a total of 5 hours. Beginning December 18th with the meeting with Kilborn, they made arrangements with Curragh for receiving a Vangorda tailings sample for laboratory testing, commenced a review of their files for construction records, and earthworks cost information, and reviewed requirements (requiring clarification) for decommissioning stability analyses.

2.2 TASK I - TAILINGS DISPOSAL OPTION - CURRENT FACILITY

In the absence of mapping (expected mid January) little work could be carried out of a quantitative nature for short term infilling of the existing Down Valley tailings area.

Some general consensus of opinion type observations did come out of the kick-off meetings held December 17 and 18th regarding the various options. These are listed as follows:

- (a) In view of the short construction season, cost of mobilization/demobilization and length of time to span, it would appear a full 5 metre raising of the Intermediate Dam is preferable to individual 1 or 2 metre lifts.
- (b) Bathymetric soundings of the area in front of the Intermediate Dam will not be possible until spring, after the study due date. Therefore any discharge location movement options will be difficult to quantify.
- (c) In accordance with the current 1 metre minimum water cover plan for decommissioning, any thoughts of installing plug dams should consider whether or not they will ultimately be submerged.
- (d) Infilling the Cross Valley pond with tailings should be the course of last resort, as it would require the construction of a new polishing pond and the inherent timing problems of submission to the Water Board.
- (e) Tailings thickening may be a viable option and will be pursued by Kilborn.
- (f) Sand/Slimes tailings split will lend itself well to SRK plans for decommissioning, with a slimes cover of the original tailings one consideration for abandonment.
- (g) There may be some benefit for a partial reclamation of tailings to allow a deeper water cover in the Down Valley area.

2.3 TASK 2 - VOLUME DETERMINATIONS

Both Kilborn and Golder are currently reviewing their records, and will compare information mid-January subsequent to the January 11th site meeting. The review information will include forecasted future tailings volumes of Faro and Vangorda ore and thickened and conventional slurry tailings densities.

A very preliminary Faro Pit volume was determined from new 10 foot contour mapping and a total capacity (less any waste rock storage) calculation made.

How much?

2.4 TASK 3 - RECYCLE OF PROCESS WATER

The majority of office work carried out by Kilborn on the study was the development of a number of recycle water concepts. A total of 8 block diagrams have been prepared showing the various water reclaim and tailings disposal options. A sample of one of the diagrams is included in the Appendix. All of these concepts will be available for the January 11th review meeting.

2.5 TASK 4 - FARO PIT FILLING

A set of nine mylars map sheets was made available to Kilborn, and prints subsequently issued by Kilborn to SRK for Faro pit infilling. No hydrogeological, or water quality review work has yet started.

A very preliminary first pit volume was established by planimeter. No consideration has yet been made for in-pit mine waste volumes, mining since September 1990 mapping, or consideration of any underground mine volumes.

2.6 TASK 5 - REPROCESSING OF EXISTING TAILINGS

A study is underway at present on options for reclamation and reprocessing of tailings. Both seasonal monitoring, and year round mechanical excavation techniques are being assessed. An order of magnitude capital and operating cost evaluation is in progress.

2.7 TASK 6 - MINE CLOSURE IMPLICATIONS

Little work has started on this task other than reviewing with SRK their plans developing for decommissioning.

SECTION 3.0
BUDGET EXPENDITURES

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3.0 BUDGET EXPENDITURES

An approximate estimate of expenditures is given below for each firm to the end of December 1990:

<u>Firm</u>	<u>Manhours</u>	<u>Engineering</u>	<u>Disbursements</u>	<u>Total</u>
Kilborn	74.5	\$ 6,000 ±	\$2,000 ±	\$ 8,000
SRK	60.5	\$ 4,600 ±	\$ 90 ±	\$ 4,690
Golder	<u>4.0</u>	<u>\$ 360 ±</u>	<u>--</u>	<u>\$ 360</u>
Total	134.0	\$10,960 ±	\$2,090	\$13,050 ±

SECTION 4.0
SCHEDULED REMAINING WORK

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4.0 SCHEDULED REMAINING WORK

For reasons mentioned previously most of the tasks are just underway. The greatest progress to date has been made on Tasks 3 and 5 and probably about 50% completed as of this report issue. Full concept drawings and text details will be ready for the first review meeting at Faro on January 11, 1991.

Tailings area mapping delivery is expected mid-January such that active work can begin on Tasks 1 and 2 in particular.

APPENDIX 1

CONFERENCE REPORT NO: 1 REV. 1 JANUARY 3, 1991

CONFERENCE REPORT No: 1
Rev: 1 - January 3, 1991

Client: Curragh Resources Inc.

Page: 1

Project: Faro - Tailings Disposal

Proj.No: 3509 Sub: 28

Conference
Held At: SRK Office - Vancouver
Golder Office - Calgary

Conference
Date: Dec. 17 & 18/90

File No: By: E.I. Jurgens

Date: December 21, 1990

Meetings were held December 17 and 18, 1990 with both John Wells and Ted Jurgens of Kilborn Inc. meeting Steffen Robertson and Kirsten (B.C.) Inc. (S.R.K.) in Vancouver, and Golder Associates (Golder) in Calgary. The purpose of the meetings was to review the proposed scope and budgets from each firm addressed to Kilborn and to establish an integration of the respective input from each consultant into a single tailings disposal study report. Also discussed were the aspects of providing engineering input from this study into SRK's Down Valley tailings decommissioning plans, a separate study proceeding in parallel.

A brief meeting was also held in Calgary on December 18th at the office of Orthoshop to check on the timing and format for new (Sept. 1990) mapping of the tailings area and Faro Pit.

A summary of the discussions held at each office are given below:

A. MEETING - SRK OFFICE DECEMBER 17, 1990

Present: SRK - David Harpley	Kilborn - John Wells
Peter Healey	Ted Jurgens
Rod Olausen	

Discussion:

After an introductory general technical discussion, a review was made of each task in the SRK proposal letters to Kilborn. The review was made in close conjunction with the Golder Associates proposal letter. An action list follows each task for immediate work in the period up to mid January 1991 corresponding to the first progress review meetings.

STANDARD DISTRIBUTION: CAF - WR - All present at the conference

ADDITIONAL DISTRIBUTION:

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Task 1 - Tailings Disposal Options for Current Facility

It was agreed that SRK will assess the effect of each option of the four itemized in the Curragh letter of October 29, 1990 Section 1.1, and the three itemized in Section 1.2 on discharge water quality, and determine if water treatment is required. Kilborn will determine all capital and operating costs associated with adopting any of the options.

SRK described their present design concepts for decommissioning the tailings facility. One option for a tailings cover design is to use tailings slimes for the original tailings area, and a minimum one metre water cover over the tailings retained by the Intermediate Dam. It was agreed that Kilborn would provide the sand/slime split that could be used from both Faro and Vangorda ore types. Golder Associates would provide geotechnical test results such as stabilized density parameters from laboratory testing.

Action by:

Kilborn - will provide sand-slime split and further details on the Vangorda tailings metallurgy as it becomes available from the trial currently in progress.

Golder - will examine the stability of the Cross Valley and the Intermediate Dam and advise as to whether the structures will be acceptable for decommissioning without any major modifications.

Note: Subsequent to the meeting, a memorandum was prepared by SRK on the subject of stability of the two dams. A copy of the memorandum is attached. Clarification will be sought from Curragh at the first progress review meeting on the extent of work expected from Golder for the subject study, distinct from the requirements of SRK for their decommissioning study, and invoicing arrangements.

SRK - will provide criteria and a basic definition of their anticipated decommissioning plans in terms of slimes or till depths, spillway modifications, etc. for Kilborn and Golder.

Task 2 - Volume Determination

The majority of the work on volume determination will be undertaken by Kilborn with input from Golder Associates on settled densities. It is important that the recent mapping is available to accurately determine the infilling of the tailings area.

SRK will supply information on the groundwater and surface water inflows to the Faro pit to assist Kilborn with the prediction of pit overflow timing as tailings are discharged to the pit.

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Action By:

SRK -Supply Kilborn with inflow information to the Faro pit and existing climatic data.

Kilborn -provide SRK with the plans for infilling and schedules for when the Faro pit will be available after meeting in January with the Steering Committee.

Task 3 - Recycling of Process Water

Kilborn will carry out a comprehensive review of the current water balance and offer recommendations for reduction in water. SRK will provide available background water quality and quantity information to assist Kilborn in identifying and evaluating available options for recycling process water. They will evaluate the effect of each recycling option on the discharge water quality.

It was considered by SRK and Kilborn that the recycle pickup wells noted by Golder, to perhaps avoid the berming requirement for the Cross Valley Dam, while attractive in principle, was not likely an option to pursue any further. The reasons being that:

- (a) It would be very difficult to change a directive of the Water Board.
- (b) The evaluation of the potential of the wells may require field work such that there is a scheduling problem.
- (c) There is a good possibility of reclaiming water with lead and zinc metal levels which may not be suitable in the process.

Action by:

Kilborn - will supply flowsheets to SRK in December

SRK - will provide available background water quality and quantity data as soon as possible

Task 4 - Faro Pit Filling

SRK indicated that based on the issues identified in the Curragh Resources letter of October 29, they were best equipped to provide the necessary input to the four items noted in terms of hydrology, water quality and predictions on acid mine drainage (AMD) mitigation. They are currently involved with design details for the temporary dewatering of the Zone II pit and the implications with respect to water quality with the adjoining North Fork Rose Creek.

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form KE 24-2

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Kilborn's efforts for the Faro Pit filling would be directed to the engineering aspects including costing for pumping and moving of the discharge pipeline.

At this meeting it was considered that Golder Associates involvement would be minimal with respect to the Faro pit in accordance with the items identified in the October 29th letter. It was generally agreed that it was imperative to firm up the timing with the Steering Committee exactly when the pit would be available to receive tailings.

General Discussion Items

1. Kilborn would investigate and assess the possibility of reprocessing the current tailings in terms of gold and copper values recovery and determine if the revenues from this would offset the cost of relocating the tailings into the Faro pit. No involvement required from either SRK or Golder.
2. John Wells described the latest requirements for cyanide in the process, and the use of 40% SD200 as a replacement for treating Faro ore. He noted the cyanide requirements may go up to treat Vangorda Ore. The final Vangorda ore grind may be 75% less than 325 mesh or 85% less than 200 mesh. Some cyanide substitution by zinc sulphate may be possible. The affect of cyanide substitutes on water quality will be determined in the final report.
3. The existing water quality measured at sampling points was discussed. Metals are continuing to be below limits. The ammonia levels are marginal, and cyanide is occasionally over the limit. There did not seem to be any pattern to the cyanide levels despite reductions in its use with SD200 substitution.
4. SRK described some of the details of the options being evaluated for their tailings decommissioning plan including:
 - (a) The variety of saturated covers that could be used for the old tailings area including, slimes only, slimes/till, and till only.
 - (b) The six areas where simulation modeling tests are being carried out, and groundwater and surface water quality testing is performed.
 - (c) The plans to either leave the area as a wetlands retaining the diversion channel or divert Rose Creek back to its original position and over the tailings retained by the Intermediate Dam.
 - (d) The need for greater than 1 in 500 year spillway (1/2 PMF?) and erosion prevention requirements.

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(e) The likelihood that the Cross Valley Dam will be breached.

(f) The long term stability of the Intermediate Dam.

5. Dave Harpley noted the concerns for copper mobilization with a drop in pH after shutdown.
6. Ted Jurgens requested that SRK provide a weekly fax with man-hours worked on the study, and to which task. This was required for progress reports to Curragh.
7. All communications between SRK and Golder will be directed through Kilborn.

B. MEETING - ORTHOSHOP - DECEMBER 18, 1990

A brief meeting was held at the office of the Orthoshop with Allen Riley and Camal Daramdial. The status of mapping was discussed. The Faro pit mapping is complete, and mylars of nine sheets were available to Kilborn. A request was made to Orthoshop for all mapping to be provided as well on floppy discs formatted for Intergraph system.

The mapping for the Down Valley tailings area had not yet started and awaited Curragh Faro instructions regarding resolution of discrepancies between UTM and mine site elevations. Subject to resolving this problem immediately, Orthoshop indicated the mapping, requiring about 7 - 8 sheets, would not be ready until about January 15, 1991.

The mapping will be prepared with 1.0 meter contour intervals. The high level photography (10,000ft) does not allow plotting 0.5 m contour intervals. Orthophoto contour drawings will be prepared (scale 1:5,000).

Immediately after the meeting with Golder Associates, a set of aerial photographs of the Rose Creek Valley area were made available to Kilborn. A verbal request was made for a set for both SRK and Golder.

C. MEETING - GOLDER ASSOCIATES - DECEMBER 18, 1990

<p>Present: Golder - Glen Gilchrist Peter Wheeler (part-time)</p>	<p>Kilborn - John Wells Ted Jurgens</p>
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Discussion

Following a general introductory technical discussion, a review was made of each task in the Golder proposal letters to Kilborn. An action list follows each task for immediate work in the periods up to mid January 1991 corresponding to the first progress review meetings and the availability of new mapping.

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Task 1 - Tailings Disposal Options for Current Facility

It was agreed that the main contribution that Golder would provide to the study are construction records including earthworks quantities and costs, and stabilizing berm concepts if deemed absolutely needed for the Intermediate and Cross Valley retention dams. Full design details suitable for tendering and construction are not required.

Golder would also provide settled density parameters from previous test work and contribute to Kilborn's work of volumetric determinations and pipeline movements. It was agreed that little work could be done on the latter without the topographic maps.

Some of the information that Golder has to contribute to this task include:

- (a) Recent earthwork quantities and tendered prices for the Cross Valley dam berm construction from contractors bids. Golder has access to this information from Curragh.
- (b) Earthwork quantities and costing for the last raising of the Intermediate Dam from the summer of 1989. The five metre raising was entirely in the downstream direction.
- (c) Underhill surveyors had been on site earlier this year and were best equipped to carry out bathymetric surveys close to the Intermediate Dam. It would be impossible to do this work until next summer when the ice is gone.
- (d) In terms of scheduling for dam raising construction, the earliest start is usually July, when there is adequate thaw of borrow material sources.

Action by: (see also corresponding list SRK meeting)

- Kilborn - will provide sand-slime split and further details on the Vangorda tailings metallurgy as it becomes available from the trial
- will provide aerial photographs as soon as they are available to Golder (and SRK)
 - will provide monthly tonnage records for the last 3 years. The last accurate survey was reportedly carried out in June 1988
- Golder - will provide Kilborn with construction records and earthworks cost information
- subject to clarification with Curragh Resources at the first progress review meeting, will commence stability analyses

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- SRK - provide requirements through Kilborn for slope stability analysis as appropriate to the decommissioning plan.
- will provide decommissioning criteria

Task 2 - Volume Determination

In order to assist with future forecasting of volume determination, Golder will carry out testing on sand/slime densities. During the meeting, a phone call was made to the mine site. John Wells requested that a minimum 20 lb sample of Vangorda tailings from the trial be shipped to Golder for testing.

Action by:

Golder -immediately carry out density testing on samples when received for information required for Task 1 and 2, and report to Kilborn/SRK

Kilborn -provide sand/slime splits and Vangorda metallurgy

Task 3 - Recycling of Process Water

It was agreed that, for the reason discussed at SRK office (see Task 3), the possibility of pursuing the options of wells downstream of the Cross Valley dam, in lieu of berming, was remote. Therefore this task would be excluded from the study. Little or no involvement from Golder will be required for this task.

Task 4 - Faro Pit Filling

As presently requested, the Faro pit filling study will be generally concepts only with hydrogeological and water quality aspects addressed by SRK and infilling and water reclaim engineering concepts and costs by Kilborn.

Glen Gilchrist did point out however, the fact that they had submitted a proposal to Curragh for a dam separating Zone I and Zone II pits and there was active discussions at Faro in June 1990 on this matter. It was agreed this subject would be brought up at the first progress meeting with Curragh. Also the matter of stability of the east wall of the pit upon infilling would be discussed as well with Curragh. Ted Jurgens noted that it was a judgement call as to whether to indicate to the Water Board that these two subjects would be "engineered" after acceptance in principle of the Faro pit for tailings, or to proceed with the designs before this summer.

General Technical Discussion

1. From a quick look at the Faro pit topographic maps, it appeared that there was little chance for infilling the bottom of the pit while underground mining was still continuing. The capacity was minimal to the portal. This will be discussed at the January site meeting.
2. Valuable tailings density information was available from Jack Bowers.

End of Document



STEFFEN ROBERTSON AND KIRSTEN (B.C.) INC.
Suite 800, 580 Hornby Street, Vancouver, B.C. Canada V6C 3B6
Phone: (604) 681-4196 Fax: (604) 687-5632

FAX TRANSMITTAL

PAGE 1 OF 7
(Including transmittal)

PROJECT NO. 81703
DATE Dec 19 1991
TIME _____

HARD COPY TO BE MAILED YES NO

SEND TO Ted Ingens FAX NO. 1416 231 5356
COMPANY/LOCATION Kilbourn - Toronto
FROM Dave Hampley
RE: Firo project

COMMENTS

As discussed, please find enclosed details of stability analyses we believe Golder's should conduct as per specified terms of reference.

I trust you will forward these to Golder's.

Regards.



STEFFEN ROBERTSON AND KIRSTEN (B.C.) INC. Consulting Engineers
Suite 800, 580 Hornby Street, Vancouver, B.C., Canada V6C 3B9
Phone: (604) 681-4196 Fax: (604) 687-5532

MEMORANDUM

TO: Ted Jurgens, Kilbom Engineering DATE: December 18, 1990
FROM: Dave Hurpley, Rod Olauson PROJECT NO: 81703
RE: Faro Tailings Impoundment, Stability of Intermediate and Cross-Valley Dams

I refer to the meeting in our offices in Vancouver with yourself and John Wells on Monday, December 17, 1990. It was agreed at the meeting that one of the issues requiring immediate attention is the stability of the Cross Valley and Intermediate Dams, and whether the structures will be acceptable for decommissioning without any major modifications. Golder Associates were responsible for the design and construction supervision of the dams, and consequently retain data and knowledge of the structures. Curragh Resources Inc., in their letter to Kilbom dated October 29, 1990, indicate that Golders should be consulted with respect to engineering details of the dams. As discussed, we have identified a number of scenarios which require examination in terms of embankment stability and design. These are discussed below.

Stability of Intermediate Dam at Current Ultimate Design Height (1083 m Crest Elevation)

SRK and Kilbom are in agreement that the placement of tailings in the Retention Pond behind the Cross Valley Dam is undesirable, and should not be considered in detail if sufficient storage capacity can be defined in the Intermediate Dam Pond. Therefore, stability assessments should concentrate on the Intermediate Dam.

The Intermediate Dam currently has a crest elevation of 1078 m (mine datum), but was designed for an ultimate crest elevation of 1083 m. Further raises above elevation 1083 m would require drainage of the Retention Pond and extension of the base of the dam. This would be costly and therefore undesirable, particularly if raising of the Intermediate Dam crest to 1083 m provides sufficient capacity for Curragh's immediate needs.

Uncertainty remains regarding the current design of the dam at elevation 1083 m in terms of adequate factors of safety for decommissioning. To initially address this uncertainty, the Intermediate Dam should be analyzed for the following conditions:



MEM/111

the dam constructed to elevation 1083 m, with 2:1 (horizontal:vertical) slopes, as per their original design;

an Intermediate Dam pond water level at elevation 1081.5 m;

a tailings surface elevation at the upstream face of 1078.5 m (leaving allowance for water cover at decommissioning) and of 1081 m (without allowance for water cover);

a Retention Pond water level at 1062 m (current operating level), and with a fully drained pond (to simulate the possible implementation of breaching of the Cross Valley Dam at decommissioning).

The above conditions result in four different sets of geometry, as illustrated in Figures 1, 2, 3 and 4. Static conditions, and dynamic conditions created by earthquake accelerations induced by the 475-year recurrence interval event, should both be addressed. The possibility of liquefaction in the tailings should also be considered, as well as the potential for piping failure through the dam or in the foundation, particularly with the Retention Pond fully drained. The above analyses should assume piezometric levels appropriate for long-term conditions.

We are in possession of a seismic hazard calculation performed recently by the Pacific Geoscience Centre for the Faro Mine site. A copy is enclosed which should be of assistance in conducting stability analyses.

It is assumed that the analyses described above will be conducted by Golder Associates and will address the immediate concerns regarding embankment stability in terms of increasing the storage capacity of the Intermediate Dam Impoundment. Further work may be required, but should not be undertaken until the 1990 topography is available, and the remaining storage capacity has been determined. It would be appreciated if the results of the analyses described above could be supplied to SRK as soon as possible to enable our studies to continue efficiently. Results would be reviewed in the context of our studies before any further requests for input regarding geotechnical aspects of the Intermediate Dam are made. Please note that our present commission with Curragh includes flood estimation and freeboard requirements with respect to the entire Down Valley Impoundment.

If Kilborn or Golder Associates have any questions regarding the stability analyses, we will be happy to discuss them.

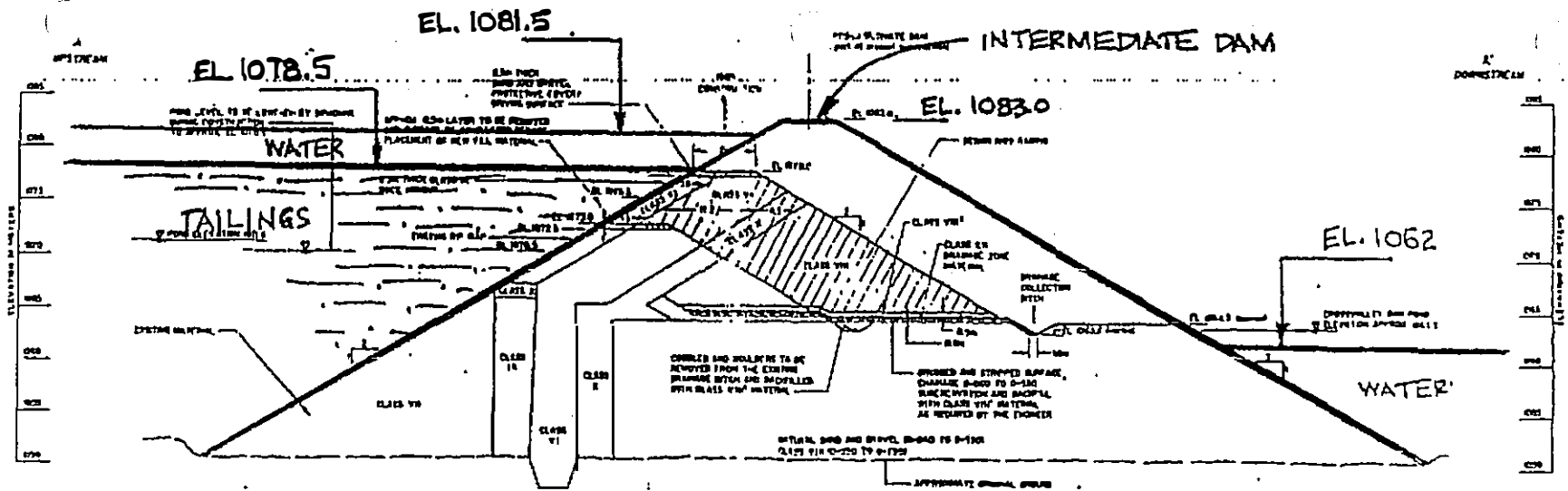


FIGURE 1. WATER COVER ON TAILINGS ; RETENTION POND FULL

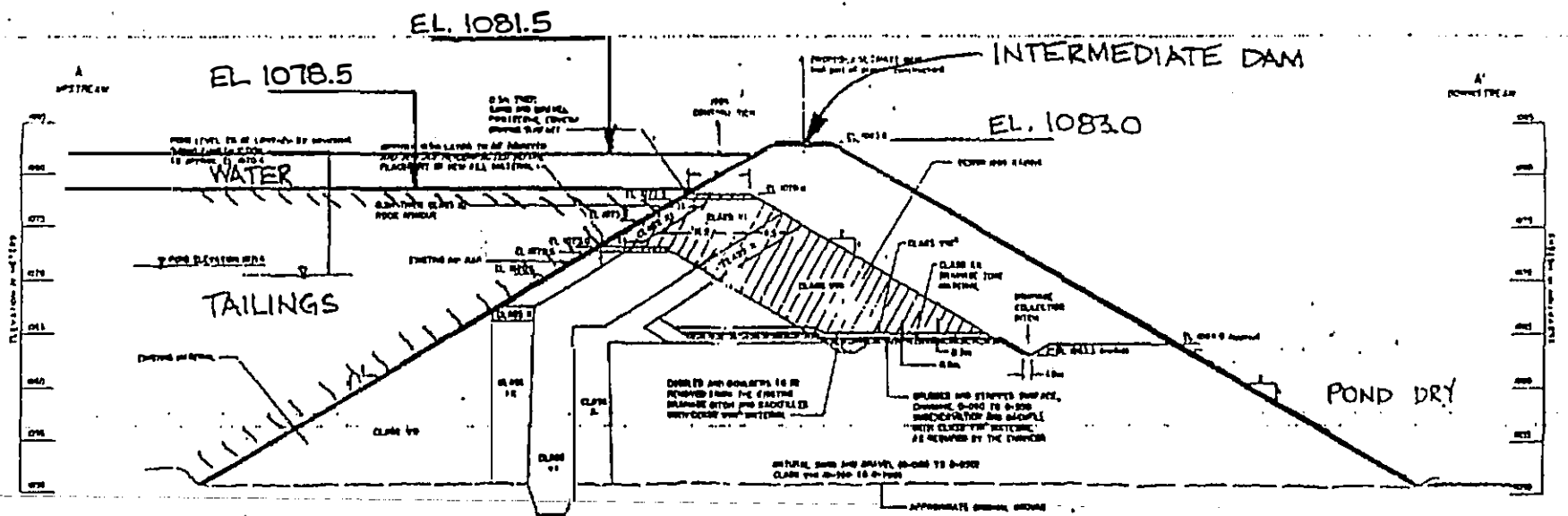


FIGURE 2. WATER COVER ON TAILINGS ; RETENTION POND EMPTY

96 12/19 11:47

N 604 687 5532

SPK UCP

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ENERGY, MINES AND
RESOURCES CANADA
GEOLOGICAL SURVEY OF CANADA

ENERGIE, MINES ET
RESSOURCES CANADA
COMMISSION GEOLOGIQUE DU CANADA

SEISMIC HAZARD CALCULATION *

CALCUL DE PERIL SEISMIQUE *

REQUESTED BY/ DEMANDE PAR Rod Olafson / Steffen Robertson & Kirsten (B.

SITE Faro, Yukon.

LOCATED AT/ SITUE AU 62.87 NORTH/NORD 133.42 WEST/OUEST

PROBABILITY OF EXCEEDENCE PER ANNUM/ PROBABILITE DE DEPASSEMENT PAR ANNEE	0.010	0.005	0.0021	0.001
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PROBABILITY OF EXCEEDENCE IN 50 YEARS/ PROBABILITE DE DEPASSEMENT EN 50 ANS	40 %	22 %	10 %	5 %
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PEAK HORIZONTAL GROUND ACCELERATION (G)	0.038	0.047	0.063	0.080
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ACCELERATION HORIZONTALE
MAXIMALE DU SOL (G)

PEAK HORIZONTAL GROUND VELOCITY (M/SEC)	0.083	0.102	0.132	0.164
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VITESSE HORIZONTALE
MAXIMALE DU SOL (M/SEC)

* REFERENCES

NEW PROBABILISTIC STRONG SEISMIC GROUND MOTION MAPS
OF CANADA: A COMPILATION OF EARTHQUAKE SOURCE ZONES, METHODS AND RESULTS.
P.W. BASHAM, D.H. WEICHERT, F.M. ANGLIN, AND M.J. BERRY
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THE SEISMOLOGICAL SOCIETY OF AMERICA, VOL. 75, NO. 2, P. 563-595, 1985.

SUPPLEMENT TO THE NATIONAL BUILDING CODE OF CANADA 1985, NRCC NO. 23178.
CHAPTER 1: CLIMATIC INFORMATION FOR BUILDING DESIGN IN CANADA.
CHAPTER 4: COMMENTARY J: EFFECTS OF EARTHQUAKES.

SUPPLEMENT DU CODE NATIONAL DU BATIMENT DU CANADA 1985, CNRC NO 23178F.
CHAPITRE 1: DONNEES CLIMATIQUES POUR LE CALCUL DES BATIMENTS AU CANADA.
CHAPITRE 4: COMMENTAIRE J: EFFETS DES SEISMES.

(2)

SITE

Faro, Yukon.

ZONING FOR ABOVE SITE/ ZONAGE DU SITE CI-DESSUS

** 1985 NBCC/CNBC: $Z_a = 1$; $Z_v = 3$

ACCELERATION ZONE/ ZONE D'ACCELERATION $Z_a = 1$
 ZONAL ACCELERATION/ ACCELERATION ZONALE $a = 0.05 G$

** VELOCITY ZONE/ ZONE DE VITESSE $Z_v = 3$
 ** ZONAL VELOCITY/ VITESSE ZONALE $v = 0.15 M/S$

1985 NBCC/CNBC

SEISMIC ZONING MAPS/ CARTES DU ZONAGE SEISMIQUE

PROBABILITY LEVEL: 10% IN 50 YEARS
 NIVEAU DE PROBABILITE: 10% EN 50 ANNEES

G OR M/S	ZONE	ZONAL VALUE/ VALEUR ZONALE
0.00	0	0.00
0.04	1	0.05
0.08	2	0.10
0.11	3	0.15
0.16	4	0.20
0.23	5	0.30
0.32	6*	0.40

* ZONE 6: NOMINAL VALUE/ VALEUR NOMINALE 0.40;
 SITE-SPECIFIC STUDIES SUGGESTED FOR IMPORTANT PROJECTS/
 ETUDES COMPLEMENTAIRES SUGGEREES POUR DES PROJETS D'IMPORTANCE.

** For NBCC applications, when $Z_v=0$ and $Z_a>0$, the values of
 Z_v and v should be taken as 1 and 0.05, respectively.
 See NBCC 1985, Sentence 4.1.9.1 (4).

Pour applications selon le CNBC, lorsque $Z_v=0$ et $Z_a>0$, les
 valeurs Z_v et v deviendraient 1 et 0.05, respectivement.
 Voir CNBC 1985, paragraphe 4.1.9.1 (4).

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APPENDIX 2

FINAL REPORT INDEX - DRAFT FOR DISCUSSION

Alternate Report Titles

1. "Short and Long Term Management Plan - Tailings Disposal and Water Recycle".
2. "Tailings Disposal and Water Recycle Options".
3. "Plans for Future Tailings and Water Management".

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APPENDIX 3

TYPICAL BLOCK DIAGRAM - WATER RECYCLE

