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CONSOLIDATED STIKINE SILVER LTD.
ESKAY CREEK PROSPECT

Proposal for Continuation of Metallurgical Testing

Prepared by

Coastech Research Inc.
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Prepared by:

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President

1.0 TERMS OF REFERENCE

Preliminary metallurgical testing conducted todate on two samples of Eskay Creek ore has indicated that the material is potentially refractory in cyanidation for gold and silver extraction. Where the refractory nature is significant (high As/Sb content), sulphide oxidation effectively enhanced cyanidation response. Testwork conducted at Coastech todate was on behalf of Mingold Resources Ltd. Batch tank biooxidation testing is in progress on a single sample of Eskay Creek ore.

The proposal presented herein is for continuation of the metallurgical scoping testwork to further define an operating flowsheet to treat Eskay Creek material. The proposal is based on discussions held with H. Giegerich on July 20 and includes detailed task descriptions for sample preparation, flotation testing, and biooxidation flowsheet development. The primary objectives of the testwork as outlined are:

(i) evaluation of froth flotation for production of a base metal concentrate for market and/or a bulk sulphide concentrate for oxidative pretreatment prior to cyanidation,

(ii) flowsheet definition and design criteria development for continuous biological sulphide oxidation and definition of related downstream processing and environmental indicators,

(iii) provide an indication of flowsheet flexibility, during continuous operation, for a variety of feed types.

This proposal provides details of the testwork tasks proposed, sample requirements, schedule and cost estimation, and the proposed project organization and personnel.

2.0 DESCRIPTION OF TASKS

2.1 General

Batch amenability testing is currently in progress which has involved diagnostic leaching, baseline cyanidation, and biomass development in shakeflasks. A single batch biooxidation tank is in progress to establish the degree of sulphide oxidation required for enhanced cyanidation response. The continuation of tasks defined below assume that the data and biomass from batch amenability testing is available for continued metallurgical testing.

The metallurgical testing proposed herein is divided into distinct tasks:

Sample Preparation
Composite Baseline Data
Flotation Scoping
Continuous Biooxidation
Prefeasibility

These tasks are detailed below:

2.2 Sample Preparation

Based on discussions with H. Giegerich, it was assumed that three distinct bulk samples would be prepared from dry, minus 1/4 inch drill core reject. At least 100 kilograms of each sample would be available. A weighted composite sample would be prepared from the three bulk samples for the testwork proposed.

Each of the three oretype samples:

(i) High As/Sb ore
(ii) Main Zone ore
(iii) North ore

would be prepared separately to provide representative bulk samples of each primary ore sample. The bulk samples will be prepared by riffle splitting a sample of each core reject bag, weighted by core length ratios, to provide a weighted bulk sample representative of the core. Remaining samples, maintained in their original bags, will be stored in plastic buckets.

Each of the bulk samples will be crushed further to minus 1/8 inch and a weighted composite sample for testing prepared, based on orebody ratios. Each bulk sample will be riffle sampled to provide a representative subsample of each for compositing. The composite sample will be coned and quartered for mixing and subsamples riffled for testing purposes. Remaining bulk sample and composite sample will be stored in plastic and frozen to maintain the metallurgical integrity.

Core length ratios and bulk sample ratios will be provided by the client.

2.3 Composite Baseline Data

Baseline metallurgical data will be derived for comparative purposes. Testing includes a detailed head assay, baseline cyanidation, acid/base accounting, and shakeflask biomass development.

2.4 Flotation Scoping

Batch bench scale flotation testing will be conducted to determine the response of the composite to froth flotation. Reagent scoping will be conducted, four tests, to indicate the merits of bulk sulphide flotation versus differential flotation to produce a separate base metal concentrate for market as well as a gold-silver bulk concentrate for biooxidation and cyanidation.

Following reagent scoping a brief study of the effect of grind on grade and recovery will be conducted. Three different grinds will be tested. A Bond work index test is optional at this stage for grinding power determination.

A five cycle locked cycle test will be conducted to determine the effect of solution/reagent recycle on flotation as well as indicate the effect of circulating loads on recovery and grade of the concentrate(s).

2.5 Biooxidation

<u>Phase 3A</u>

Objective: to utilize bacterial cultures developed in Phase 1 to initiate a steady state, multi-stage, mini-pilot continuous biooxidation circuit to determine the effect of particle size (grind), pulp density, residence time, water source,

reactor configuration, bioleachate recycle and solution control, and reagents on subsequent gold extraction from the bioleach residue; to precisely define the relationship between sulphide oxidation and gold extraction; to determine the fate of other soluble metals in bioleaching; using the best steady state conditions, provide sufficient bioleach product for preliminary bioleach downstream process testing and environmental scoping testwork.

Scale: 15-30 litre multi-stage bioreactor

Duration: 13 weeks

Sample: up to 150 kg total, composite sample

Activities: continuous multi-stage mini-pilot operations complete with product cyanidation, inter-stage sampling, gold and sulphide balancing, and automatic feeding and process control.

Report: interim data summaries as the variables are changed including all critical bioleach operating variables and operating conditions.

Phase 3B

Objective: to continue locked cycle bioleaching, neutralization and cyanidation; to introduce a variety of feed grades to the continuous bioleach circuit to indicate feed type flexibility and process control constraints, for feasibility analysis and pilot circuit design.

Scale: similar to 3A

Duration: 4 weeks

Sample: 10 kg each of up three distinct feed types.

Activities: similar to Phase 3A

Report: detailed report of all relevant bioleach and downstream processing operating conditions for each feed type and composite testing (from 3A).

2.6 Prefeasibility

The scope of this phase of work has not been defined and

therefore is not described in detail or costed in this proposal. Briefly, services available include process engineering liaison services during bioleach process feasibility analysis, for reactor configuration optimization, aeration requirements, detailed heat balances, and process specification to assist in evaluation of the bioleach alternative.

2.7 Incremental Testwork

Should a base metal concentrate prove technically feasible, additional testing will be required to optimize the flotation conditions as well as provide thickening and filtration design data. Should bulk flotation be employed prior to bioleaching, a laboratory bulk float will be required to supply sufficient bioleach feed.

3.0 SAMPLE

It is assumed approximately 100 kilograms each of three sample types:

(i) High As/Sb ore
(ii) Main Zone ore
(iii) North ore

is available for the testwork proposed. Sample procurement is the responsibility of the client. Unused sample will be returned to the client.

4.0 SCHEDULE AND COSTS

4.1 Schedule

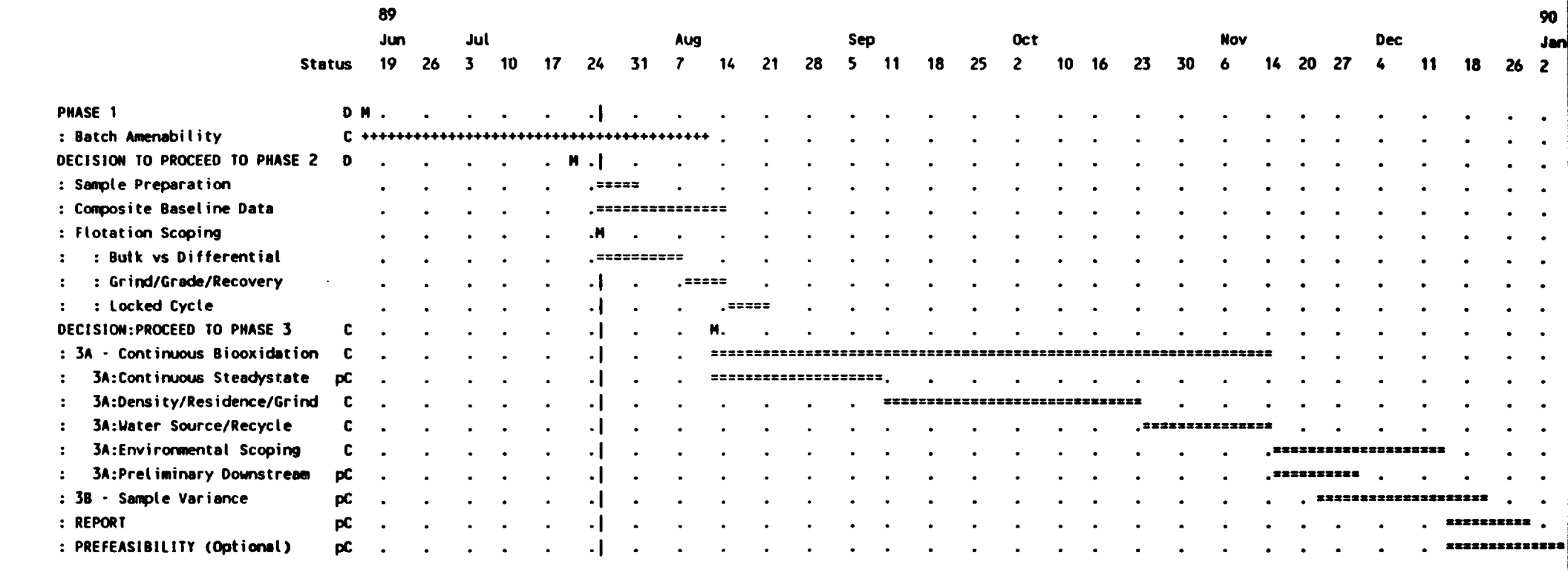
A detailed project schedule and task table is included overleaf. The schedule indicates a start date of 24 July for the continuation of testwork, Phase 2. Any change to this start date will modify the overall schedule accordingly. Equipment and personnel to conduct the program as outlined are available immediately.

4.2 Costs

An estimate of project costs is included overleaf, by task and by period for the scope of work described herein.

Schedule Name: CONSOLIDATED STIKINE - ESKAY CREEK PROSPECT
Project Manager: Coastech Research Inc
As of date: 24-Jul-89 8:00pm Schedule File: A:\ESKAY2

Schedule and cost details for metallurgical testing for bulk sample
preparation, flotation scoping, and bioleach continuous process scoping.



D Done === Task - Slack time (==---), or
C Critical +++ Started task Resource delay (---==)
R Resource conflict M Milestone > Conflict
p Partial dependency
Scale: Each character equals 1 day

Schedule Name: CONSOLIDATED STIKINE - ESKAY CREEK PROSPECT
Project Manager: Coastech Research Inc
As of date: 24-Jul-89 8:00pm Schedule File: A:\ESKAY2

Schedule and cost details for metallurgical testing for bulk sample preparation, flotation scoping, and bioleach continuous process scoping.

Task	How Long	Early Start	Early End
PHASE 1	0 days	15-Jun-89 8:00am	15-Jun-89 8:00am
: Batch Amenability	8 weeks	15-Jun-89 8:00am	10-Aug-89 5:00pm
DECISION TO PROCEED TO PHASE 2	0 days	20-Jul-89 8:00am	20-Jul-89 8:00am
: Sample Preparation	1 week	25-Jul-89 8:00am	31-Jul-89 5:00pm
: Composite Baseline Data	3 weeks	25-Jul-89 8:00am	14-Aug-89 5:00pm
: Flotation Scoping	0 weeks	25-Jul-89 8:00am	25-Jul-89 8:00am
: : Bulk vs Differential	2 weeks	25-Jul-89 8:00am	7-Aug-89 5:00pm
: : Grind/Grade/Recovery	1 week	8-Aug-89 8:00am	14-Aug-89 5:00pm
: : Locked Cycle	1 week	15-Aug-89 8:00am	21-Aug-89 5:00pm
DECISION:PROCEED TO PHASE 3	0 days	11-Aug-89 8:00am	11-Aug-89 8:00am
: 3A - Continuous Biooxidation	13 weeks	11-Aug-89 8:00am	14-Nov-89 5:00pm
: 3A:Continuous Steadystate	4 weeks	11-Aug-89 8:00am	8-Sep-89 5:00pm
: 3A:Density/Residence/Grind	6 weeks	11-Sep-89 8:00am	23-Oct-89 5:00pm
: 3A:Water Source/Recycle	3 weeks	24-Oct-89 8:00am	14-Nov-89 5:00pm
: 3A:Environmental Scoping	4 weeks	15-Nov-89 8:00am	13-Dec-89 5:00pm
: 3A:Preliminary Downstream	2 weeks	15-Nov-89 8:00am	29-Nov-89 5:00pm
: 3B - Sample Variance	4 weeks	22-Nov-89 8:00am	20-Dec-89 5:00pm
: REPORT	2 weeks	14-Dec-89 8:00am	28-Dec-89 5:00pm
: PREFEASIBILITY (Optional)	3 weeks	14-Dec-89 8:00am	5-Jan-90 5:00pm

Schedule Name: CONSOLIDATED STIKINE - ESKAY CREEK PROSPECT
Project Manager: Coastech Research Inc
As of date: 24-Jul-89 8:01pm Schedule File: A:\ESKAY2

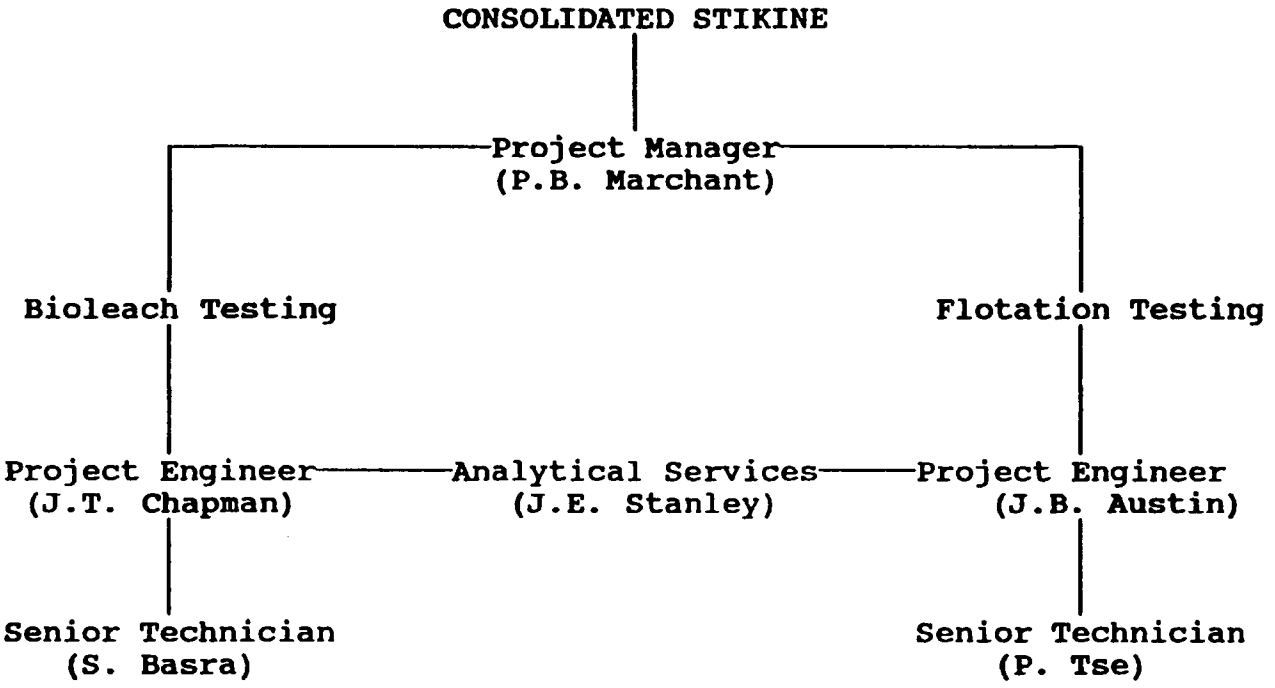
Schedule and cost details for metallurgical testing for bulk sample preparation, flotation scoping, and bioleach continuous process scoping.

TASK	1-Jun-89 30-Jun-89	3-Jul-89 31-Jul-89	1-Aug-89 31-Aug-89	1-Sep-89 29-Sep-89	2-Oct-89 31-Oct-89	1-Nov-89 30-Nov-89	1-Dec-89 29-Dec-89	2-Jan-90 31-Jan-90	TOTAL
PHASE 1	0	0	0	0	0	0	0	0	0
: Batch Amenability	0	0	0	0	0	0	0	0	0
DECISION TO PROCEED TO PHASE 2	0	0	0	0	0	0	0	0	0
: Sample Preparation	0	936	0	0	0	0	0	0	936
: Composite Baseline Data	0	533	1,067	0	0	0	0	0	1,600
: Flotation Scoping	0	0	0	0	0	0	0	0	0
: : Bulk vs Differential	0	800	800	0	0	0	0	0	1,600
: : Grind/Grade/Recovery	0	0	1,200	0	0	0	0	0	1,200
: : Locked Cycle	0	0	2,400	0	0	0	0	0	2,400
DECISION:PROCEED TO PHASE 3	0	0	0	0	0	0	0	0	0
: 3A - Continuous Biooxidation	0	0	10,339	13,785	14,474	13,903	0	0	52,502
: 3A:Continuous Steadystate	0	0	0	0	0	0	0	0	0
: 3A:Density/Residence/Grind	0	0	0	0	0	0	0	0	0
: 3A:Water Source/Recycle	0	0	0	0	0	0	0	0	0
: 3A:Environmental Scoping	0	0	0	0	0	2,010	1,645	0	3,655
: 3A:Preliminary Downstream	0	0	0	0	0	6,895	0	0	6,895
: 3B - Sample Variance	0	0	0	0	0	2,520	5,880	0	8,400
: REPORT	0	0	0	0	0	0	4,580	0	4,580
: PREFEASIBILITY (Optional)	0	0	0	0	0	0	0	0	0
TOTALS	0	2,269	15,806	13,785	14,474	25,329	12,105	0	83,768

5.0 PROJECT ORGANIZATION AND QUALIFICATIONS

5.1 Project Organization

The project organization illustrated below is proposed:



Brief synopses of key personnel are provided below:

Mr. P. Brad Marchant is proposed as Project Manager. Mr. Marchant, President of Coastech Research, has twelve years experience in various aspects of mineral processing and extractive metallurgical operations, pilot circuits, and process research and development. Designed and operated two tonnes per day bioleach pilot circuit in 1984-5 while with Equity Silver Mines. Nine years experience in bioleaching technology. Holds the degrees of B.Sc. (Biochemistry) University of New Brunswick, M.A.Sc. (Mineral Processing) University of British Columbia.

As Project Manager, Mr. Marchant will have overall responsibility for technical quality of laboratory work and pilot operations, and overall budget control, and will provide the primary liaison with the contractor.

Dr. Richard W. Lawrence is Vice President, Technical , Coastech Research, and will act as Research Director for the project. As such, Dr. Lawrence will be responsible for laboratory process development, bioleach process operation at the pilot plant scale and for biomass development, and will assist in process design. Dr. Lawrence, B.Sc. (Mining Engineering), Ph.D. (Extractive Metallurgy/Bioleaching), Cardiff University, U.K., has fifteen years experience in process research and development in various aspects of extractive metallurgical operations and pilot circuits. Eighteen years experience in bioleaching technology with over twenty five publications In this field.

Mr. John T. Chapman, B.Sc. (Chemical Engineering), Pretoria, has five years experience in bioleach research and design including process scale-up and mass transfer engineering specific to bioleach circuits. Bioleach process research, testing, piloting, and engineering experience was obtained at MINTEK, Johannesburg. Mr. Chapman will have responsibility for daily operation of the bioleach test program.

Mr. Jeffrey B. Austin holds a B.A.Sc. (Mineral Process Engineering), University of British Columbia and is a Professional Engineer in the Province of British Columbia. Has six years experience in mineral process operations and piloting while employed with Highland Valley Copper, Esso Minerals, Brenda Mines, and the University of British Columbia. At Coastech, Mr. Austin has been involved in a variety of metallurgical test programs and piloting, as well as bioleach applications. Mr. Austin specializes in flotation testing and piloting and will supervise this stage of the testwork.

Mr. Jack E. Stanley is a Certified Assayer. Has twenty-five years experience in mineral processing and metallurgical analysis, consulting, laboratory management, laboratory design and commissioning, metallurgy, and sampling. Mr. Stanley will direct the daily analysis of test products. Mr. Stanley gained considerable operating experience while with United Keno Hill, Similkameen, Afton, and Mascot Mines

5.2 Statement of Corporate Qualification

Coastech Research maintains complete metallurgical research and testing facilities with complimentary pilot plant operations and environmental research and testing capabilities for complete flowsheet development and servicing.

Coastech has extensive experience in testing, development, and piloting of both refractory and non-refractory sulphidic gold ores, including base metal polymetallic deposits where multiple

market products are produced. Our capabilities for refractory sulphide gold ore treatment include, roasting, bioleaching, pressure oxidation and ultra fine grinding.

The bioleach project proposed herein will be managed by Coastech Research personnel according to objectives provided by Consolidated Stikine. Coastech personnel have extensive backgrounds in the development, scale-up, piloting, and engineering of bioleach process circuits to enhance precious metal extraction by cyanidation. Coastech maintains complete biohydrometallurgical research, testing, and pilot facilities, including reactor piloting up to ten tonnes per day throughput, for detailed reactor scale-up and design studies, at our North Vancouver facility. In addition, Coastech maintains mobile pilot facilities, including bioleaching, consisting of 25 tpd mineral processing capacity and up to 5 tpd bioleaching capacity. Coastech provides bioleach process engineering as required, depending on client requirements.

Coastech has been contracted to perform over forty bioleach projects for mining company clients since 1985 ranging from bench scale batch and continuous testing for process design, through pilot plant demonstration runs, to process engineering and feasibility studies. Some of the projects in which Coastech personnel have been involved include:

- conception, laboratory development, design, and operation of a 2 tonne per day bioleach circuit operated at Equity Silver Mines, B.C. in 1984-5.
- testing and design of a commercial bioleach plant under construction at Vaal Reefs South in South Africa.
- all process testing and design criteria for Tonkin Springs; a 1500 tpd ore pretreatment bioleach plant scheduled for 1989 start-up.
- testing, piloting and process design liaison for a commercial concentrate bioleach plant retrofit at an existing operation at Austin, Nevada that is producing a refractory concentrate, presently shipped to a smelter.
- provided laboratory testing and design services for pilot operations currently in operation at Campbell Red Lake Mine.

A list of recent publications and presentations by Coastech staff is provided overleaf.

COASTECH RESEARCH INC

RECENT PUBLICATIONS AND PRESENTATIONS BY STAFF

Marchant, P.B., 1985. Continuous vat biooxidation of a refractory arsenical sulphide concentrate. Proc. 17th Canadian Mineral Processors Congress, Ottawa, January.

Lawrence, R.W., 1985. Biological preoxidation leaching for refractory gold and silver, Proc. 17th Canadian Mineral Processors Congress, Ottawa, January, 1985.

Lawrence, R.W., 1985. Biooxidation of refractory sulphide gold ores: principles and frontiers. Randol Forum 85, Gold and Silver Recovery, Santa Fe, New Mexico, 14-15 October.

Marchant, P.B., 1985. Continuous biooxidation of refractory arsenical sulphide concentrates:scaleup and plant scale design considerations. Randol Forum 85, Gold and Silver Recovery, Santa Fe, New Mexico, 14-15 October, 1985.

Marchant, P.B., 1985. Plant scale design and economic considerations for biooxidation of an arsenical sulphide concentrate. Intl. Symp. on Complex Sulphides, CIM-AIME, San Diego, November.

Lawrence, R.W., Branion, R.M.R. (Univ. of British Columbia) and Ebner, H.G. (Bergbau-Forschung, FRG), Eds. 1986. Fundamental and Applied Biohydrometallurgy, Elsevier Science Publishers, Amsterdam.

Marchant, P.B., 1986. Commercial application of biotechnology to enhance gold extraction from complex sulphides. Proc. 18th Canadian Mineral Processors Congress, Ottawa, January.

Marchant, P.B., 1986. Commercial piloting and the economic feasibility of plant scale continuous biological tank leaching at Equity Silver Mines Limited. In: Fundamental and Applied Biohydrometallurgy, Lawrence, R.W., Branion, R.M.R. and Ebner, H.G. (Eds). Elsevier Science Publishers, Amsterdam, 53-76.

Marchant, P.B., 1986. Innovations and new frontiers in gold biohydrometallurgy. Randol Gold and Silver Recovery Forum 86, Vail, Colorado, June 1-4.

Marchant, P.B. and Lawrence, R.W., 1986. Flowsheet design, process control and operating strategies in the biooxidation of refractory gold ores. 25th. Conf. of Metallurgists, CIM, Toronto, August 17-20, In: Proc. 3rd Annual Meeting of BIOMINET, R.G.L McCready (Ed), CANMET Special Pub. SP86-9, Ottawa, 39-51.

Lawrence, R.W. and Marchant, P.B. 1987. Comparison of mesophilic and thermophilic oxidation systems for the treatment of refractory gold ores and concentrates. In: Biohydrometallurgy 1987, P.R. Norris and D.P. Kelly (Eds), Science and Technology Letters, Kew, U.K., in print.

Marchant, P.B. 1987. Cation precipitation from complex acidic sulphate solutions using lime. Intl. Symp. Crystallization and Precipitation, Saskatoon, Saskatchewan, October 4-9.

Lawrence, R.W. and Marchant, P.B. 1987. Environmental considerations in gold flowsheet development. In: Proc. International Symposium on Gold Metallurgy, R.S. Salter, D.M. Wyslouzil and G.W. McDonald (Eds) Pergamon Press, New York, 201-213.

Lawrence, R.W. 1987. The potential of thermophilic biohydrometallurgy for the treatment of refractory gold ores. In: Proc. BIOMINET 4th Annual Meeting, Sudbury, Ontario, Nov 3, R.G.L. McCready (Ed), CANMET Special Pub. SP87-10, Ottawa, 75-102.

Marchant, P.B., Broughton, L.M. and Lake, M.J. (Kilborn Engineering), 1987. Comparative analysis of cyanidation and thioureation. 89th CIM Annual Meeting, May 3-7, Toronto, Canada.

Marchant, P.B. and Lawrence, R.W. 1988. Biohydrometallurgy: state of art and new advances. Keynote Paper, Randol Gold and Silver Forum 88, Scottsdale, Arizona, January 23-24.

Lawrence, R.W. and Marchant, P.B. 1988. Biochemical pretreatment in arsenical gold ore processing. In: Arsenic Metallurgy - Fundamentals and Applications, R. Reddy, J.L. Hendrix and P.B. Queneau (Eds), TMS-AIME, Warrendale, PA, 199-211.

Lawrence, R.W. 1988. Opportunities for enhanced recovery using bacteria. Symposium on Heap Leaching in a Canadian Environment, Timmins, Ontario, May 24-26.

Austin, J.A. and Jones, D.L. (Cominco Engineering Services Ltd), 1988. Flowsheet design and development : Houston Metals Corporation Silver Queen Mine. CIM District 6 Annual Meeting, Fernie, B.C. September 29-30.

Marchant, P.B. 1988. Summary of biological oxidation plants under design, pilot testing or construction. Randol Perth International Gold Conference, Perth, Western Australia, 28 October - 1 November.

Marchant, P.B. 1988. Biooxidation of refractory gold ores. 9 t h Annual Convention, Northwest Mining Association, Spokane, WA, 30 November - 3 December.

Marchant, P.B., Lawrence, R.W., Chapman, J.T., Brooks, W. (Westgold), and Kuipers, J. (Austin Gold Venture). 1989. Austin Gold Venture bioleaching: project summary. 21st Annual Meeting Canadian Mineral Processors, Ottawa, Canada, Jan 17-20.

Marchant, P.B. 1989. Treatment system design considerations in British Columbia. Gold Mining Effluent Treatment Seminar, Vancouver, B.C., February 15-16.

Marchant, P.B. 1989. Biological treatment of gold mill effluents. Gold Mining Effluent Treatment Seminar, Vancouver, B.C., February 15-16.

Marchant, P.B., Lawrence, R.W., Chapman, J.T., Brooks, W. (Westgold), and Kuipers, J. (Austin Gold Venture). 1989. Bioleaching at Austin Gold Venture as an alternative to smelting. AIME Annual Meeting, Las Vegas, Nevada, 27 February - 2 March.

Marchant, P.B., Lawrence, R.W., Chapman, J.T., Brooks, W. (Westgold), and Kuipers, J. (Austin Gold Venture). 1989. Bioleaching at Austin Gold Venture as an alternative to smelting. AIME Annual Meeting, Las Vegas, Nevada, 27 February - 2 March.

Lawrence, R.W. 1989. Biotreatment of gold ores. In: Mineral Microbial Recovery. C.L. Brierley, J.A. Brierley and H.L. Ehrlich (Eds). To be published by McGraw-Hill, New York in 1989. 34pp.

Lawrence, R.W., Poling, G.W., Ritcey, G.M. 1989. Strategies for the prediction of acid mine drainage. To be presented at the 13th Annual Mine Reclamation Symposium, June 7-9, Vernon, B.C.

Marchant, P.B. and Lawrence, R.W. 1989. Keynote Paper on leaching case studies. To be presented at the Biohydrometallury 89 Symposium, Jackson Hole, Wyoming, August 13-18.

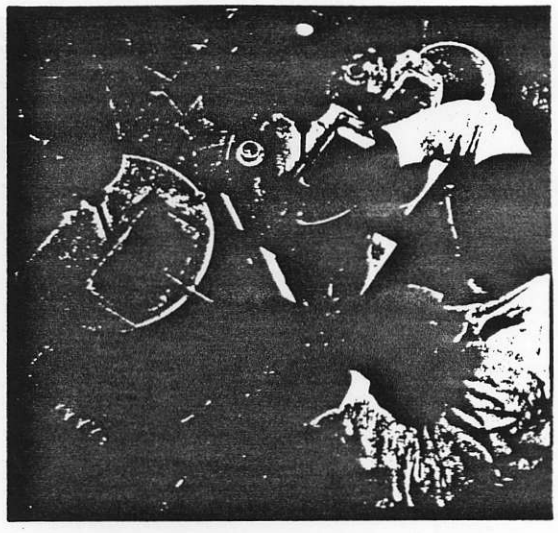
Marchant, P.B., Lawrence, R.W., Dods, D., Maree, J.P. 1989. Integrated biological process for complex sulphides. To be presented at 28th CIM Conference of Metallurgists, Halifax, Nova Scotia, August 20 -24.

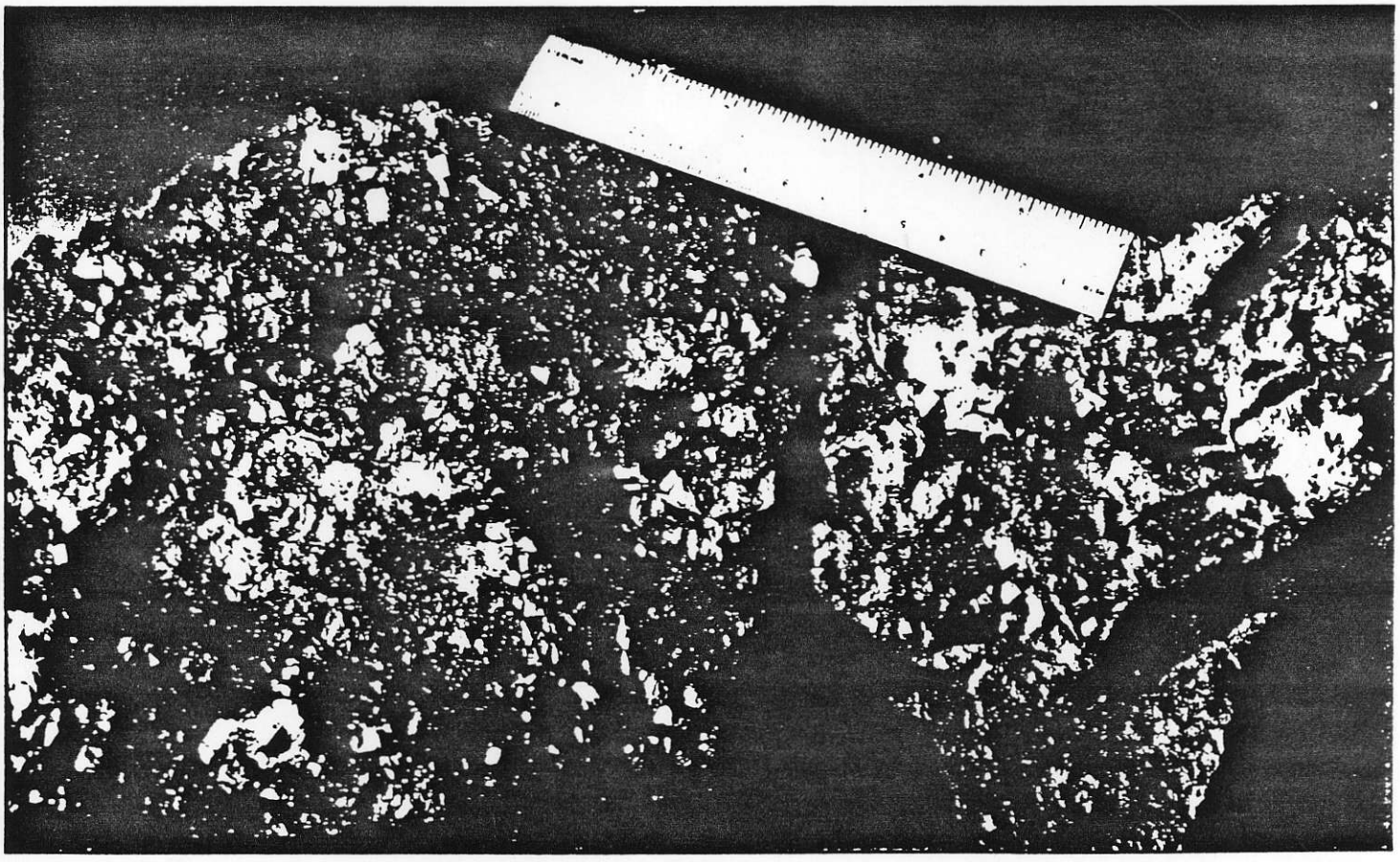
Lawrence, R.W., Poling, G.W., Ritcey, G.M., Marchant, P.B. 1989. Assessment of prediction methods for the determination of acid mine drainage potential in mine tailings and waste rock. To be presented at the Tailings and Effluent Management Symposium, 28th CIM Conference of Metallurgists, Halifax, Nova Scotia, August 20-24.

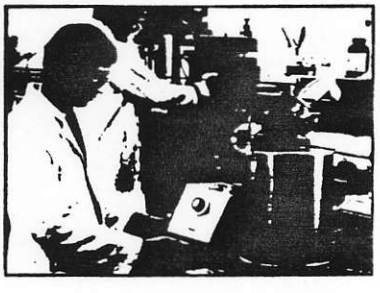
REFRACTORY GOLD TREATMENT

Many gold ores do not respond to conventional gravity, flotation and/or cyanidation recovery due to the precious metal being locked within other minerals. Such ores need to be pretreated to liberate the gold for conventional recovery. We have considerable experience and expertise in the evaluation and testing of refractory ores. We can assist you in choosing the most appropriate pretreatment method and flowsheet for your ore or concentrate.

- *Process Research and Flowsheet Development*
- *Bioleaching*
- *Ultra Fine Grinding*
- *Pressure Oxidation*
- *Roasting*
- *Diagnostic Leaching*
- *Process Piloting*







CALL COASTECH
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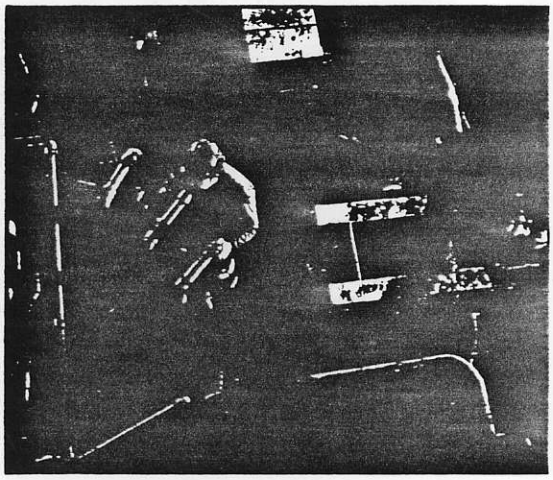
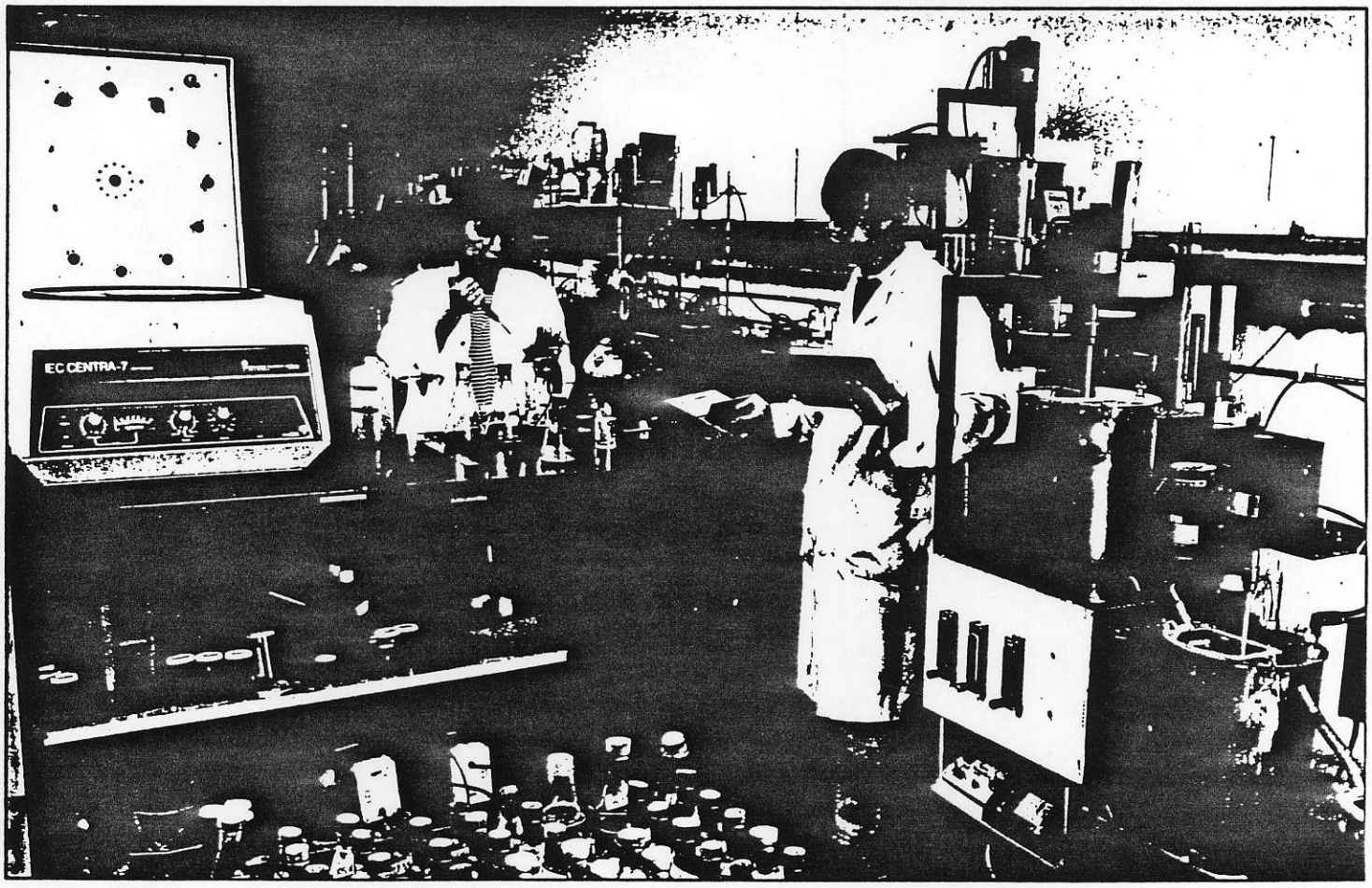
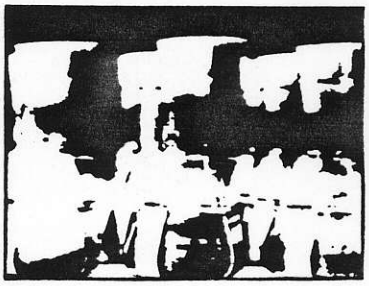
BIOLEACHING

The use of microorganisms for extraction and recovery of metals from ores, concentrates, wastes and tailings has been gaining acceptance as a viable technology for the mining industry. Coastech Research maintains an international reputation in this field, particularly for its work in the development of treatment processes for refractory gold ores and concentrates, and continues to research and develop other biological process possibilities.

- *Process Research and Flowsheet Development*
- *Process Engineering and Optimization*
- *Refractory Gold Pretreatment*
- *Copper Heap and Dump Leaching*
- *Process Piloting*







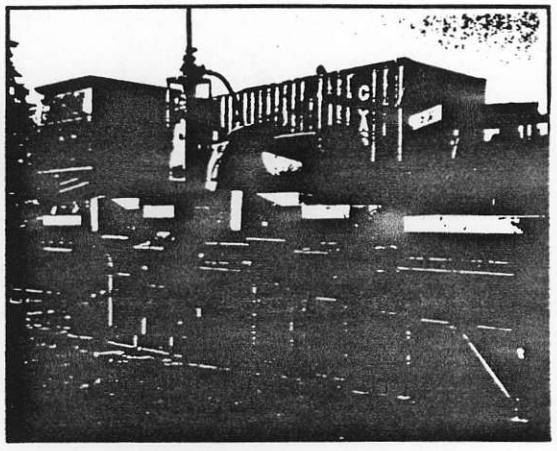
CALL COASTECH
(604) 980-5992
OR FAX (604) 980-2737

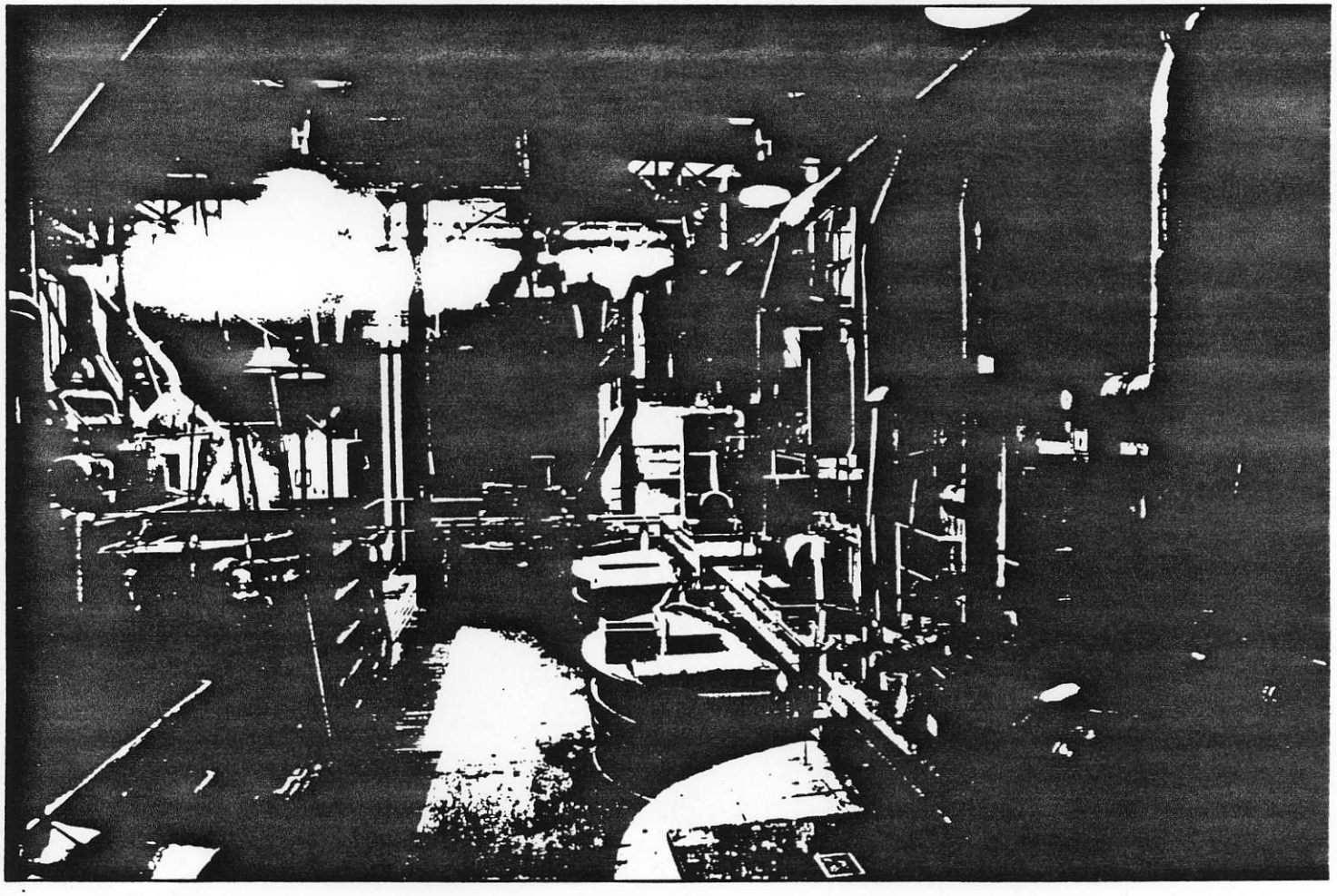
Coastech Research Inc.
80 Niobe Street, North Vancouver, B.C., Canada V7J 2C9

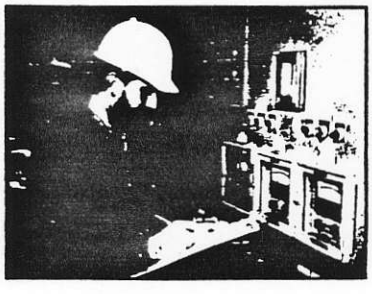
PILOT TESTING

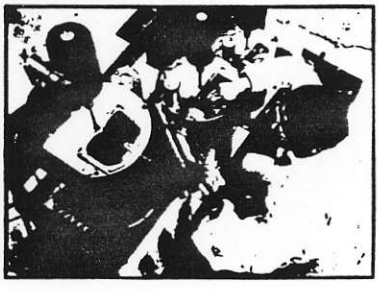
Piloting of a process is required to confirm scale-up and fully integrated operation. For new processes, piloting is essential. All pilot test programs conducted at Coastech are carried out from an operations viewpoint, calling on the expertise and experience of our personnel gained in mine/mill design, start-up, operations and management.

- *Mineral Process Piloting*
- *Bulk Sampling*
- *Hydrometallurgical Piloting*
- *Bioleach Processing and Design*
- *Equipment Testing and Evaluation*
- *Specialty Process Research and Evaluation*









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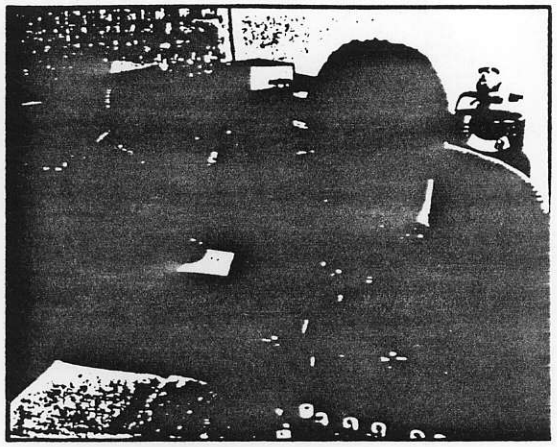
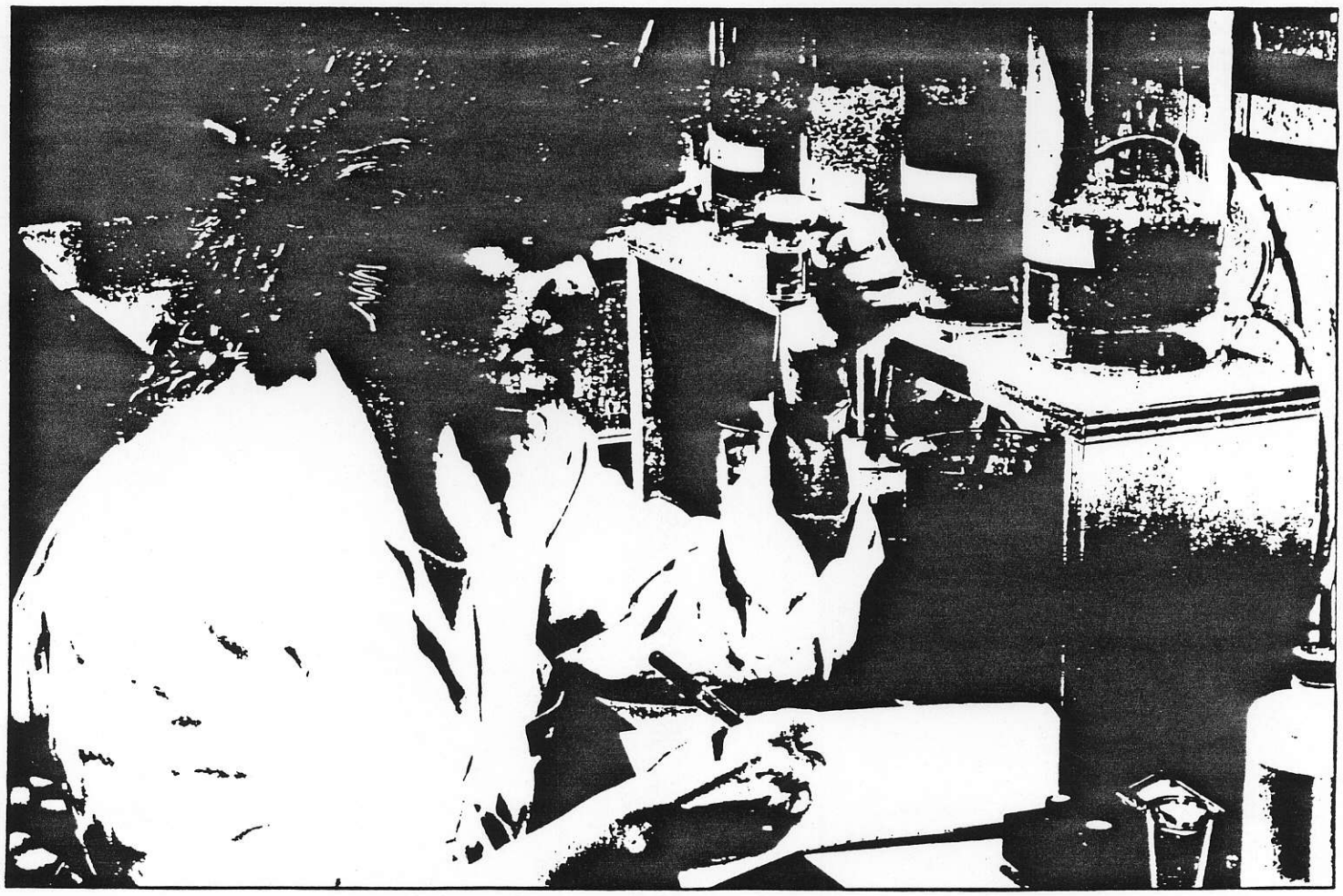
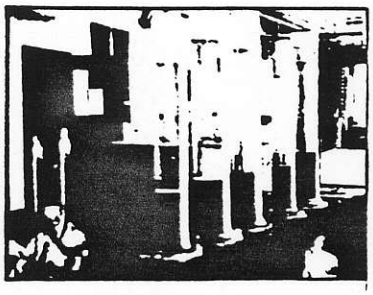
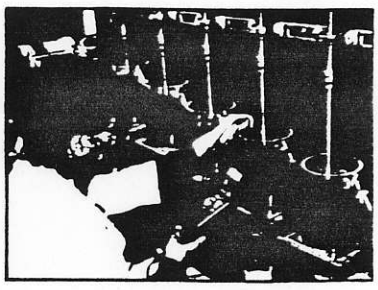
- *Acid Mine Drainage*
- *Special Waste Classification*
- *Cyanide Detoxification*
- *Long Term Weathering Studies*
- *Waste Treatment Studies*









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