

## **Table of Content**

Resumen .....	i
Abstract.....	ii
Acknowledgements.....	iii
<i>Table of Content</i> .....	iv
<i>Equations</i> .....	vi
<i>Figures</i> .....	vii
<i>Tables</i> .....	ix
Introduction on work thesis .....	1
Paper 1: Statistical analyses of wet muck at Diablo Regimiento sector at El Teniente ´s Mine.....	2
Abstract.....	2
1 Introduction .....	2
2 Economic potential of RSO .....	4
3 General analysis of mud occurrence at Diablo Regimiento .....	4
3.1 Closure grades .....	4
3.2 Drawn heights .....	5
3.3 Closure Sequence.....	5
3.4 Drawn heights at closed drawpoints .....	6
4 Determining the probability of mud entrance .....	8
5 Conclusions.....	9
6 Acknowledgement.....	10
7 Bibliography.....	10
Paper 2: Predictive models to estimate mud entry in Cave Mining - Diablo Regimiento Sector, El Teniente Mine.....	12
Abstract.....	12
1 Introduction .....	12
2 Case Study .....	14
3 Methodology used to build the predictive model .....	16

3.1	Retro-analysis of relevant variables.....	16
3.2	Choice of Logistic Regression as a predictive technique .....	17
3.2.1	Generalities .....	17
3.2.2	Parameter estimation.....	18
3.2.3	Model quality .....	19
3.3	Construction of database for logistic regression.....	20
3.3.1	Generalities in the construction of databases .....	20
3.3.2	Causal factors for mud-water ingress .....	21
3.3.3	Database to determine mud-water entering .....	26
4	Results and discussion .....	27
4.1	Univariate Tests .....	27
4.2	Logistic regression.....	28
4.3	Implementations .....	35
5	Conclusion .....	38
6	Bibliography .....	38
	Paper 3: Predictive models of wet muck entry for caving mining: application for the determination of dry reserves in the Andesita Project .....	41
	Abstract.....	41
1	Introduction .....	41
2	Objective .....	42
3	Andesita Project description .....	42
4	Methodology .....	43
4.1	Step 1 Collection and analysis of historical databases .....	44
4.2	Step 2 Formulation of a wet muck entry model .....	44
4.3	Step 3 Evaluation of long-term mining plan reserves .....	45
5	Andesita sector analysis.....	46
5.1	Predictive model of mud water input North Pipe and Suapi Sectors 48	
5.2	Evaluation of long-term mining plans in the Andesita sector ....	50
5.2.1	Initial Considerations .....	51
5.2.2	Northern Resources exploitation sequence .....	51

5.2.3	Flow rates of water for the Andesita project .....	53
5.2.4	Andesita Evaluation of long-term mining plans for the Andesita project	56
6	Conclusions.....	63
7	Bibliography.....	65

**Equations**

Equation 1:	Multivariable logistic regression equation. ....	17
Equation 2:	Logit function.....	18
Equation 3:	probability of occurrence of a dichotomous event. ....	18
Equation 4:	Maximum Likelihood function to be maximized.....	18
Equation 5:	Modified Maximum Likelihood function to be maximized. ..	18