BOTTLE ROLL
3/8" VS 1" OXIDE

BOTTLE ROLL RECOVERY

Barren Solution

Au (opt)	.004
NaCN (lb/ton)	.80
pH	10.23

Sample I.D. D-16-2 - #124

FA Head	Au (opt)	.0332	
FA Tail	Au (opt)	.0116	
		.025	24 hr
AA Soln	Au (opt)	.030	48 hr
Calc Head	Au (opt)	.0416	

NaCN (lb/ton) final	1.96
NaCN Consumption (lb/ton)	.84
pH (initial)	11.6
pH (final)	9.7
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	65.06
% Recovery Au (opt) (AA Soln/Calc Head)	72.12

BOTTLE ROLL RECOVERY

Barren Solution

Au (opt)	.004
NaCN (lb/ton)	.80
pH	10.23

Sample I.D. D-16-2 - #534

FA Head	Au (opt)	.0202	
FA Tail	Au (opt)	.0068	
		.016	24 hr
AA Soln	Au (opt)	.019	48 hr
Calc Head	Au (opt)	.0258	

NaCN (lb/ton) final	2.45
NaCN Consumption (lb/ton)	.35
pH (initial)	12.3
pH (final)	10.8
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	66.34
% Recovery Au (opt) (AA Soln/Calc Head)	73.64

BOTTLE ROLL RECOVERY

Barren Solution

Au (opt)	.004
NaCN (lb/ton)	.80
pH	10.23

Sample I.D. D-16-2 - #863

FA Head	Au (opt)	.1548	
FA Tail	Au (opt)	.0440	
		.129	24 hr
AA Soln	Au (opt)	.137	48 hr
Calc Head	Au (opt)	.1810	

NaCN (lb/ton) final	2.22
NaCN Consumption (lb/ton)	.58
pH (initial)	12.0
pH (final)	10.5
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	71.58
% Recovery Au (opt) (AA Soln/Calc Head)	75.69

BOTTLE ROLL RECOVERY - 3/8" vs 1" #1

Barren Solution

Au (opt)	.002
Ag (opt)	.001
NaCN (lb/ton)	.78
pH	10.84

Sample I.D.		5440 DM 01 - 3/8"
FA Head	Au (opt)	.1072
FA Head	Ag (opt)	.3188
FA Tail	Au (opt)	.0294
FA Tail	Ag (opt)	.2326
AA Soln	Au (opt)	.074
AA Soln	Ag (opt)	.049
Calc Head	Au (opt)	.1034
Calc Head	Ag (opt)	.2816
NaCN (lb/ton) final		.64
NaCN Consumption (lb/ton)		.14
pH (initial)		11.0
pH (final)		10.3
Lime Added (lb/ton)		2.6
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		72.57
% Recovery Ag (opt) (FA Head - FA Tail/FA Head)		27.04
% Recovery Au (opt) (AA Soln/Calc Head)		71.57
% Recovery Ag (opt) (AA Soln/Calc Head)		17.40

Sample I.D.		5440 DM 01 - 1"
FA Head	Au (opt)	.1072
FA Head	Ag (opt)	.3188
FA Tail	Au (opt)	.0536
FA Tail	Ag (opt)	.2424
AA Soln	Au (opt)	.061
AA Soln	Ag (opt)	.030
Calc Head	Au (opt)	.1146
Calc Head	Ag (opt)	.2724
NaCN (lb/ton) final		.65
NaCN Consumption (lb/ton)		.13
pH (initial)		11.0
pH (final)		10.4
Lime Added (lb/ton)		1.8
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		50.00
% Recovery Ag (opt) (FA Head - FA Tail/FA Head)		23.96
% Recovery Au (opt) (AA Soln/Calc Head)		53.23
% Recovery Ag (opt) (AA Soln/Calc Head)		11.01

BOTTLE ROLL RECOVERY - 3/8" vs 1" #3

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.78
pH	10.65

Sample I.D.		5440 #3 - 3/8"
FA Head	Au (opt)	.0920
FA Tail	Au (opt)	.0444
AA Soln	Au (opt)	.068
Calc Head	Au (opt)	.1124
NaCN (lb/ton) final		.58
NaCN Consumption (lb/ton)		.20
pH (initial)		11.4
pH (final)		9.9
Lime Added (lb/ton)		2.5
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	51.74
% Recovery (AA Soln/Calc Head)	Au (opt)	60.50

Sample I.D.		5440 #3 - 1"
FA Head	Au (opt)	.0920
FA Tail	Au (opt)	.0604
AA Soln	Au (opt)	.054
Calc Head	Au (opt)	.1144
NaCN (lb/ton) final		.63
NaCN Consumption (lb/ton)		.15
pH (initial)		11.2
pH (final)		10.5
Lime Added (lb/ton)		2.5
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	34.35
% Recovery (AA Soln/Calc Head)	Au (opt)	47.20

BOTTLE ROLL RECOVERY - 3/8" vs 1" #4

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.78
pH	10.65

Sample I.D.		5440 #4 - 3/8"
FA Head	Au (opt)	.1608
FA Tail	Au (opt)	.0781
AA Soln	Au (opt)	.101
Calc Head	Au (opt)	.1791
NaCN (lb/ton) final		.60
NaCN Consumption (lb/ton)		.18
pH (initial)		11.5
pH (final)		10.0
Lime Added (lb/ton)		2.5
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		51.43
% Recovery Au (opt) (AA Soln/Calc Head)		56.39

Sample I.D.		5440 #4 - 1"
FA Head	Au (opt)	.1608
FA Tail	Au (opt)	.1097
AA Soln	Au (opt)	.096
Calc Head	Au (opt)	.2057
NaCN (lb/ton) final		.70
NaCN Consumption (lb/ton)		.08
pH (initial)		11.4
pH (final)		10.6
Lime Added (lb/ton)		2.5
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		31.78
% Recovery Au (opt) (AA Soln/Calc Head)		46.67

BOTTLE ROLL RECOVERY - MIXED ORE

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.75
pH	10.86

Sample I.D. 5440 MIX #1

FA Head	Au (opt)	.0492
FA Tail	Au (opt)	.0304
AA Soln	Au (opt)	.022
Calc Head	Au (opt)	.0524
NaCN (lb/ton) final		1.5
NaCN Consumption (lb/ton)		1.25
pH (initial)		10.9
pH (final)		9.1
Lime Added (lb/ton)		6.0
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	38.21
% Recovery (AA Soln/Calc Head)	Au (opt)	41.98

BOTTLE ROLL RECOVERY - SULFIDE ORE

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.78
pH	10.84

Sample I.D. 5440 Sulf-DM-1

FA Head	Au (opt)	.315
FA Tail	Au (opt)	.281
AA Soln	Au (opt)	.038
Calc Head	Au (opt)	.319
NaCN (lb/ton) final		.03
NaCN Consumption (lb/ton)		.75
pH (initial)		11.4
pH (final)		10.9
Lime Added (lb/ton)		6.6
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	10.79
% Recovery (AA Soln/Calc Head)	Au (opt)	11.91

BOTTLE ROLL RECOVERY - 3/8" vs 1"

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.75
pH	10.86

Sample I.D.		5-5420 - 3/8"
FA Head	Au (opt)	.0122
FA Tail	Au (opt)	.0053
AA Soln	Au (opt)	.009
Calc Head	Au (opt)	.0143
NaCN (lb/ton) final		2.5
NaCN Consumption (lb/ton)		.25
pH (initial)		11.0
pH (final)		10.6
Lime Added (lb/ton)		5.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		56.56
% Recovery Au (opt) (AA Soln/Calc Head)		62.94

Sample I.D.		5-5420 - 1"
FA Head	Au (opt)	.0122
FA Tail	Au (opt)	.0085
AA Soln	Au (opt)	.006
Calc Head	Au (opt)	.0145
NaCN (lb/ton) final		2.6
NaCN Consumption (lb/ton)		.15
pH (initial)		11.2
pH (final)		11.0
Lime Added (lb/ton)		5.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		30.33
% Recovery Au (opt) (AA Soln/Calc Head)		41.38

BOTTLE ROLL RECOVERY - 3/8" vs 1"

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.75
pH	10.86

Sample I.D.		5-5420 - 3/8"
FA Head	Au (opt)	.0122
FA Tail	Au (opt)	.0053
AA Soln	Au (opt)	.009
Calc Head	Au (opt)	.0143
NaCN (lb/ton) final		2.5
NaCN Consumption (lb/ton)		.25
pH (initial)		11.0
pH (final)		10.6
Lime Added (lb/ton)		5.0
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	56.56
% Recovery (AA Soln/Calc Head)	Au (opt)	62.94

Sample I.D.		5-5420 - 1"
FA Head	Au (opt)	.0122
FA Tail	Au (opt)	.0085
AA Soln	Au (opt)	.006
Calc Head	Au (opt)	.0145
NaCN (lb/ton) final		2.6
NaCN Consumption (lb/ton)		.15
pH (initial)		11.2
pH (final)		11.0
Lime Added (lb/ton)		5.0
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	30.33
% Recovery (AA Soln/Calc Head)	Au (opt)	41.38

BOTTLE ROLL RECOVERY - MIXED ORE

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.75
pH	10.86

Sample I.D. 5440 MIX #1

FA Head	Au (opt)	.0492
FA Tail	Au (opt)	.0304
AA Soln	Au (opt)	.022
Calc Head	Au (opt)	.0524
NaCN (lb/ton) final		1.5
NaCN Consumption (lb/ton)		1.25
pH (initial)		10.9
pH (final)		9.1
Lime Added (lb/ton)		6.0
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	38.21
% Recovery (AA Soln/Calc Head)	Au (opt)	41.98

BOTTLE ROLL RECOVERY - SULFIDE ORE

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.78
pH	10.84

Sample I.D. 5440 Sulf-DM-1

FA Head	Au (opt)	.315
FA Tail	Au (opt)	.281
AA Soln	Au (opt)	.038
Calc Head	Au (opt)	.319
NaCN (lb/ton) final		.03
NaCN Consumption (lb/ton)		.75
pH (initial)		11.4
pH (final)		10.9
Lime Added (lb/ton)		6.6
% Recovery (FA Head - FA Tail/FA Head)	Au (opt)	10.79
% Recovery (AA Soln/Calc Head)	Au (opt)	11.91

BOTTLE ROLL RECOVERY - 3/8" vs 1" #4

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.78
pH	10.65

Sample I.D.		5440 #4 - 3/8"
FA Head	Au (opt)	.1608
FA Tail	Au (opt)	.0781
AA Soln	Au (opt)	.101
Calc Head	Au (opt)	.1791
NaCN (lb/ton) final		.60
NaCN Consumption (lb/ton)		.18
pH (initial)		11.5
pH (final)		10.0
Lime Added (lb/ton)		2.5
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		51.43
% Recovery Au (opt) (AA Soln/Calc Head)		56.39

Sample I.D.		5440 #4 - 1"
FA Head	Au (opt)	.1608
FA Tail	Au (opt)	.1097
AA Soln	Au (opt)	.096
Calc Head	Au (opt)	.2057
NaCN (lb/ton) final		.70
NaCN Consumption (lb/ton)		.08
pH (initial)		11.4
pH (final)		10.6
Lime Added (lb/ton)		2.5
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		31.78
% Recovery Au (opt) (AA Soln/Calc Head)		46.67

BOTTLE ROLL RECOVERY - 3/8" vs 1" #3

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.78
pH	10.65

Sample I.D.		5440 #3 - 3/8"
FA Head	Au (opt)	.0920
FA Tail	Au (opt)	.0444
AA Soln	Au (opt)	.068
Calc Head	Au (opt)	.1124
NaCN (lb/ton) final		.58
NaCN Consumption (lb/ton)		.20
pH (initial)		11.4
pH (final)		9.9
Lime Added (lb/ton)		2.5
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		51.74
% Recovery Au (opt) (AA Soln/Calc Head)		60.50

Sample I.D.		5440 #3 - 1"
FA Head	Au (opt)	.0920
FA Tail	Au (opt)	.0604
AA Soln	Au (opt)	.054
Calc Head	Au (opt)	.1144
NaCN (lb/ton) final		.63
NaCN Consumption (lb/ton)		.15
pH (initial)		11.2
pH (final)		10.5
Lime Added (lb/ton)		2.5
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		34.35
% Recovery Au (opt) (AA Soln/Calc Head)		47.20

BOTTLE ROLL RECOVERY - 3/8" vs 1" #1

Barren Solution

Au (opt)	.002
Ag (opt)	.001
NaCN (lb/ton)	.78
pH	10.84

Sample I.D.		5440 DM 01 - 3/8"
FA Head	Au (opt)	.1072
FA Head	Ag (opt)	.3188
FA Tail	Au (opt)	.0294
FA Tail	Ag (opt)	.2326
AA Soln	Au (opt)	.074
AA Soln	Ag (opt)	.049
Calc Head	Au (opt)	.1034
Calc Head	Ag (opt)	.2816
NaCN (lb/ton) final		.64
NaCN Consumption (lb/ton)		.14
pH (initial)		11.0
pH (final)		10.3
Lime Added (lb/ton)		2.6
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		72.57
% Recovery Ag (opt) (FA Head - FA Tail/FA Head)		27.04
% Recovery Au (opt) (AA Soln/Calc Head)		71.57
% Recovery Ag (opt) (AA Soln/Calc Head)		17.40

Sample I.D.		5440 DM 01 - 1"
FA Head	Au (opt)	.1072
FA Head	Ag (opt)	.3188
FA Tail	Au (opt)	.0536
FA Tail	Ag (opt)	.2424
AA Soln	Au (opt)	.061
AA Soln	Ag (opt)	.030
Calc Head	Au (opt)	.1146
Calc Head	Ag (opt)	.2724
NaCN (lb/ton) final		.65
NaCN Consumption (lb/ton)		.13
pH (initial)		11.0
pH (final)		10.4
Lime Added (lb/ton)		1.8
% Recovery Au (opt) (FA Head - FA Tail/FA Head)		50.00
% Recovery Ag (opt) (FA Head - FA Tail/FA Head)		23.96
% Recovery Au (opt) (AA Soln/Calc Head)		53.23
% Recovery Ag (opt) (AA Soln/Calc Head)		11.01

BOTTLE ROLL RECOVERY - 3/8" vs 1"

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.63
pH	10.49

Sample I.D.	5440-1DM - 3/8"
FA Head Au (opt)	.5514
FA Tail Au (opt)	.2620
AA Soln Au (opt)	.285
Calc Head Au (opt)	.5470
NaCN (lb/ton) final	1.9
NaCN Consumption (lb/ton)	.71
pH (initial)	11.7
pH (final)	9.6
Lime Added (lb/ton)	4.0
% Recover Au (opt) (FA Head - FA Tail/FA Head)	52.48
% Recover Au (opt) (AA Soln/Calc Head)	52.10

Sample I.D.	5440-1DM - 1"
FA Head Au (opt)	.5514
FA Tail Au (opt)	.4114
AA Soln Au (opt)	.308
Calc Head Au (opt)	.7194
NaCN (lb/ton) final	2.2
NaCN Consumption (lb/ton)	.41
pH (initial)	11.6
pH (final)	9.9
Lime Added (lb/ton)	4.0
% Recover Au (opt) (FA Head - FA Tail/FA Head)	25.39
% Recover Au (opt) (AA Soln/Calc Head)	42.81

BOTTLE ROLL RECOVERY - 3/8" vs 1"

Barren Solution

Au (opt)	.002
NaCN (lb/ton)	.63
pH	10.49

Sample I.D.	5440-2DM - 3/8"
FA Head Au (opt)	.0478
FA Tail Au (opt)	.0082
AA Soln Au (opt)	.032
Calc Head Au (opt)	.0402
NaCN (lb/ton) final	2.0
NaCN Consumption (lb/ton)	.61
pH (initial)	11.5
pH (final)	9.6
Lime Added (lb/ton)	4.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	82.85
% Recovery Au (opt) (AA Soln/Calc Head)	79.60

Sample I.D.	5440-2DM - 1"
FA Head Au (opt)	.0478
FA Tail Au (opt)	.0119
AA Soln Au (opt)	.028
Calc Head Au (opt)	.0399
NaCN (lb/ton) final	2.1
NaCN Consumption (lb/ton)	.55
pH (initial)	11.3
pH (final)	9.7
Lime Added (lb/ton)	4.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	75.10
% Recovery Au (opt) (AA Soln/Calc Head)	70.18

BOTTLE ROLL RECOVERY - MIXED ORE

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.84
pH	10.82

Sample I.D. DM-5 - 1"

FA Head Au (opt)	.0516
FA Tail Au (opt)	.0238
AA Soln Au (opt)	.029
Calc Head Au (opt)	.0528
NaCN (lb/ton) final	3.00
NaCN Consumption (lb/ton)	.84
pH (initial)	12.3
pH (final)	12.1
Lime Added (lb/ton)	8.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	53.88
% Recovery Au (opt) (AA Soln/Calc Head)	54.92

BOTTLE ROLL RECOVERY - 3/8" vs 1"

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.84
pH	10.82

Sample I.D.	DM-4 - 3/8"
FA Head Au (opt)	.0963
FA Tail Au (opt)	.0482
AA Soln Au (opt)	.059
Calc Head Au (opt)	.1072
NaCN (lb/ton) final	2.63
NaCN Consumption (lb/ton)	.21
pH (initial)	12.3
pH (final)	11.7
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	49.92
% Recovery Au (opt) (AA Soln/Calc Head)	55.04

Sample I.D.	DM-4 - 1"
FA Head Au (opt)	.0963
FA Tail Au (opt)	.0570
AA Soln Au (opt)	.063
Calc Head Au (opt)	.1200
NaCN (lb/ton) final	2.67
NaCN Consumption (lb/ton)	.17
pH (initial)	12.3
pH (final)	11.8
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	40.78
% Recovery Au (opt) (AA Soln/Calc Head)	52.50

BOTTLE ROLL RECOVERY - 3/8" vs 1"

Barren Solution

Au (opt)	.003
NaCN (lb/ton)	.84
pH	10.82

Sample I.D.	DM-3 - 3/8"
FA Head Au (opt)	.8164
FA Tail Au (opt)	.4399
AA Soln Au (opt)	.440
Calc Head Au (opt)	.8799
NaCN (lb/ton) final	2.65
NaCN Consumption (lb/ton)	.19
pH (initial)	12.4
pH (final)	11.3
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	46.12
% Recovery Au (opt) (AA Soln/Calc Head)	50.01

Sample I.D.	DM-3 - 1"
FA Head Au (opt)	.8164
FA Tail Au (opt)	.4560
AA Soln Au (opt)	.223
Calc Head Au (opt)	.6790
NaCN (lb/ton) final	2.83
NaCN Consumption (lb/ton)	.01
pH (initial)	12.4
pH (final)	12.0
Lime Added (lb/ton)	6.0
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	44.15
% Recovery Au (opt) (AA Soln/Calc Head)	32.84

[illegible] GOLD RECOVERY

Barren Solution

Au (opt)	.008
NaCN (lb/ton)	.87
pH	10.58

Sample I.D.	DM 6	
FA Head Au (opt)	.0870	
FA Tail Au (opt)	.0174	
	.021	24 hr
AA Soln Au (opt)	.026	48 hr
Calc Head Au (opt)	.0434	
NaCN (lb/ton) (final)	0.81	
NaCN Consumption (lb/ton)	.05	
pH (initial)	12.0	
pH (final)	12.1	
Lime Added (lb/ton)	6.0	
% Recovery Au (opt) (FA Head - FA Tail/FA Head)	81.07	
% Recovery Au (opt) (AA Soln/Calc Head)	59.9%	