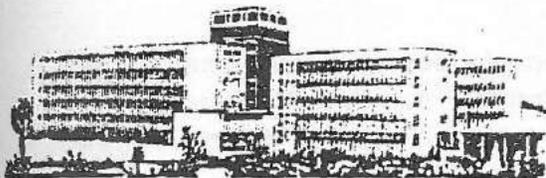




समुदाय बायुर्विज्ञान केन्द्र  
अभिलषित भारतीय बायुर्विज्ञान संस्थान  
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The results of the biological monitoring were presented. These in brief are as follows:

1. Individuals with urine level over 100 $\mu$ g/L over a lifetime of their working in this unit were rare. In accordance with the existing practice they were given a rotation posting to a mercury free environment, whenever found. This was in conformity with WHO recommendations of dealing with individuals with urinary mercury values of > 100  $\mu$ g/L.
2. Group Mean urine mercury levels were below 27  $\mu$ g/L for all the years from 1988 except for the years 1991( 31.9  $\mu$ g/L) and 1996 (31.8  $\mu$ g/L) [as compared with a WHO recommendation of group mean of 50  $\mu$ g/L].
3. Data on annual clinical examinations of all employees carried regularly over a period of more than 12 years did not reveal anybody having clinical or biochemical manifestations attributable to mercury exposure .
4. Records of all individual biological and clinical monitoring are available at the unit for all these years.

C) Comments/ Suggestions:

1. To explore the possibility of neutralizing the mercury before it was released into the environment from the room.
2. To explore the possibility of exposure to mercury from other sources:
  - Thermal power plant emissions
  - Dental fillings
  - Sindoor/ vermilion among females
3. To carry out analysis of individual level data looking at their accumulated exposure over the years and correlating them with biochemical markers like Blood urea/ creatinine.
4. To carry out an exploratory analysis, to determine the effects of some individual characteristics e.g. Age, Gender, food habits on the urinary mercury levels given a similar amount of environmental exposure.
5. To compare the mercury levels in nearby population which is not exposed to mercury.

Review of HLL's Medical Surveillance Program by TNO, All India Inst.  
of Medical Sciences and Indian Association of Occupational Health



समुदाय आयुर्विज्ञान केन्द्र  
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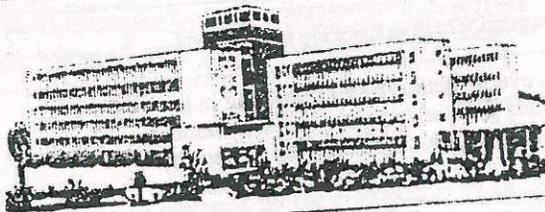
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6. In view of the systematic and scientific approach followed to address the occupational health issue of the employees, the group requested Dr. Rajgopal to prepare a report and explore the possibility of submitting the same for publication in international peer reviewed journals.

D| Conclusions:

The Occupational Health and Safety measures in place at the Kodaikanal Factory have succeeded in keeping the exposure of the factory employees to Hg to consistently acceptable low levels. In view of the comprehensive occupational health surveillance carried out over a period of more than 12 years, specially keeping in view the monthly biological monitoring of Hg in urine (as compared with the WHO recommended 6mthly to yearly evaluations) and detailed individual annual clinical and biochemical records of the employees and the recently (March 2001 and May 2001) carried out comprehensive Clinical-epidemiological and environmental study, there is no evidence to suggest any adverse health effects that can be attributed to mercury exposure.

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Datum  
28 May 2001

Nummer  
01/05/201

Uw brief

Onderwerp

A Review of the Occupational Health Surveillance of employees of the  
Kodaikanal Thermometer plant of Hindustan Lever Limited.

Geachte

Dear Sirs,

A comprehensive Occupational Health Surveillance of 255 employees [ 194 current and contract employees, 55 ex-employees and 6 scrap dealer employees] was conducted by Hindustan Lever Limited in March 2001. The health surveillance was based on a clinical protocol devised by the US Dept. of Mines to monitor health of workers exposed to mercury. This protocol was supplemented by biological monitoring to assess the levels of mercury in blood and urine as well as relevant blood tests to assess renal functions. The clinical examination laid special emphasis on evaluation of psychomotor, central nervous system and eyes and was conducted by a team of doctors, which included three independent doctors from Kodaikanal. The results of the clinical evaluation as well as biological monitoring do not reveal any abnormality in the health of the employees.

To validate the sampling techniques and analysis I had asked for certain additional sampling and analysis to be carried out. I have now seen the results of this validation exercise and am satisfied with the procedures in place for biological monitoring of mercury.

A repeat examination of current employees [130] has indicated that the levels of mercury in urine have further dropped down to a mean level of around 10 mcg/Lit [since the operation at the factory have been discontinued since the first week of March], as compared with the accepted upper limit of 100 mcg/lit as laid down by the WHO.

My conclusion on a thorough review of the clinical protocol, the clinical evaluation as well as the methodology and results of the biological monitoring is that there is no mercury related health risk to the employees. I have however recommended a follow up study of those employees who have shown elevated levels of mercury compared to the mean. This is recommended to ensure if there are other sources of mercury exposure, which could explain these deviations. However, it must be noted that even these results are still well below the WHO recommendations of an upper limit of 100 mcg/L.

Sincerely

  
drs. Tom van Teunenbroek

*Some soil sample numbers in the Laboratory Certificates contain a depth identifier, eg. CM1-05, CM1-20, where CM1 is the location identifier and 05, 20 are depth (in centimetres) identifiers. These depth identifiers have been omitted from the sample locations given in the Tables in the Report where the sample depths have been listed in a separate column. The depth identifier is also not shown on the Figures, only the location identifier is shown.*

*Similarly, most sample numbers in the Laboratory Certificates also contain testing laboratory identifiers following the location identifier. eg. A for MGT, B for TNO, D for HLRC etc. These too are not shown in the Tables and in the Figures in the Report.*

*Some sample numbers in the Laboratory Certificates also contain either an S, W, L or B at the end of their identifiers (S = Soil, W = Water, L = Lichen, B = Bark). These too are omitted from the sample identification numbers in the Tables and Figures. In the Tables, the sample type is shown in a separate column.*

*Table F-1 in Appendix F is provided to assist in the identification of sample references in the Tables and Figures in the Report with those in the Laboratory Certificates.*

**Table F-1**  
**Total Mercury Concentrations in Soil/Sediment/Water Samples from On Site**  
**Locations**  
*(Refer Table 5 in Main Report)*

Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Depth (cm)	Hg in mg/kg	
				HLRC	MGT
			40	6.7	-
AGS 1	AGS 1-40-B	Soil	30	3.1	-
AGS 2	AGS 2-30-B	Soil	20	79.4	-
AGS 3	AGS 3-20-B	Soil	50	50.60	-
AGS 3	AGS 3-50	Soil	40	12.5	-
AGS 4	AGS 4-40-B	Soil	40	22.3	-
AGS 5	AGS 5-40-B	Soil	20	15.9	-
AGS 6	AGS 6-20-B	Soil	20	8.6	-
AGS 7	AGS 7-20-B	Soil	40	6.1	-
AGS 8	AGS 8-40-B	Soil	40	3.5	-
AGS 9	AGS 9-40-B	Soil	10	28.5	-
AGS 10	AGS 10D	Soil	40	0.9	-
AGS 10	AGS 10D 40	Soil	10	10.3	-
AGS 11	AGS 11D	Soil	40	2.9	-
AGS 11	AGS 11D 40	Soil	10	6.4	-
AGS 12	AGS 12D	Soil	40	2.6	-
AGS 12	AGS 12D 40	Soil	10	22.5	-
AGS 13	AGS 13D	Soil	40	19.2	-
AGS 13	AGS 13D 40	Soil	10	177.3	-
AS 1	AS 1/10	Soil	40	22.6	-
AS 1	AS 1/40	Soil	10	136.3	-
AS 2	AS 2/10	Soil	25	77.8	-
AS 2	AS 2/25	Soil	10	72.3	-
AS 3	AS 3/10	Soil	20	6.7	-
AS 3	AS 3/20	Soil	10	1.5	-
AS 4	AS 4/10	Soil	10	2.2	-
AS 5	AS 5/10	Soil	25	1.5	-
AS 5	AS 5/25	Soil	10	10.1	-
AS 6	AS 6/10	Soil	15	4.4	-
AS 6	AS 6/15	Soil	10	85.5	-
AS 7	AS 7/10	Soil	10	25.4	-
AS 8	AS 8/10	Soil	10	9.5	-
AS 9	AS 9/10	Soil	40	1.1	-
AS 9	AS 9/40	Soil	10	16.0	-
AS 10	AS 10/10	Soil	10	3.5	-
AS 11	AS 11/10	Soil	25	0.5	-
AS 11	AS 11/25	Soil	10	5.8	-
AS 12	AS 12/10	Soil	25	0.7	-
AS 12	AS 12/25	Soil	10	11.4	-
AS 13	AS 13/10	Soil	10	54.6	-
AS 14	AS 14/10	Soil	20	22.9	-
AS 14	AS 14/20	Soil	10	6.0	-
AS 15	AS 15/10	Soil	10	14.4	-
AS 16	AS 16/10	Soil	40	2.2	-
AS 16	AS 16/40	Soil	10	3.3	-
AS 17	AS 17/10	Soil	10	7.9	-
AS 18	AS 18/10	Soil	10	215.7	-
AS 19	AS 19/10	Soil	25	21.7	-
AS 19	AS 19/25	Soil	10	37.5	-
AS 20	AS 20/10	Soil	30	37.5	-
AS 20	AS 20/30	Soil	10	0.8	-
AS 21	AS 21/10	Soil	20	21.6	-
AS 21	AS 21/20	Soil	10	5286.0	-
AS 22	AS 22/10	Soil	40	32.8	-
	AS 22/40	Soil			

from On Site

**Table F-1**  
**Total Mercury Concentrations in Soil/Sediment/Water Samples from On Site**  
**Locations**

(Refer Table 5 in Main Report)

mg/kg	MGT	Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Depth (cm)	Hg in mg/kg	
						HLRC	MGT
-	-	AS 23	AS 23/10	Soil	10	37.2	-
-	-	AS 23	AS 23/40	Soil	40	2.1	-
-	-	AS 24	AS 24/10	Soil	10	5.4	-
-	-	AS 24	AS 24/20	Soil	20	12.3	-
-	-	AS 25	AS 25/5	Soil	5	3.2	-
-	-	AS 26 (not sampled)	-	-	-	-	-
-	-	AS 27	AS 27/10	Soil	10	71.1	-
-	-	AS 28	AS 28/10	Soil	10	36.0	-
-	-	AS 28	AS 28/20	Soil	20	49.4	-
-	-	AS 29	AS 29/10	Soil	10	9.0	-
-	-	AS 30	AS 30/10	Soil	10	3.1	-
-	-	AS 30	AS 30/20	Soil	20	4.4	-
-	-	AS 31	AS 31/10	Soil	10	6.2	-
-	-	AS 31	AS 31/25	Soil	25	0.6	-
-	-	AS 32	AS 32/10	Soil	10	0.7	-
-	-	AS 32	AS 32/35	Soil	35	2.4	-
-	-	AS 33	AS 33/10	Soil	10	27.3	-
-	-	AS 33	AS 33/20	Soil	20	32.0	-
-	-	AS 34	AS 34/10	Soil	10	151.4	-
-	-	AS 34	AS 34/35	Soil	35	4.3	-
-	-	AS 35	AS 35/10	Soil	10	66.6	-
-	-	AS 35	AS 35/35	Soil	35	38.0	-
-	-	AS 36	AS 36/10	Soil	10	21.4	-
-	-	AS 36	AS 36/35	Soil	35	0.6	-
-	-	AS 37	AS 37/10	Soil	10	5.1	-
-	-	AS 38	AS 38/10	Soil	10	1.2	-
-	-	AS 38	AS 38/10	Soil	30	0.8	-
-	-	BE	BE-05A	Soil	5	65.2	59
-	-	BE 1	BE-1	Soil	10	2.5	0.51, 0.50
-	-	BE 2	BE-2	Soil	10	1.6	0.13
-	-	BE 3	BE-3	Soil	10	2.0	0.26
-	-	BGE	BGE-05A	Soil	5	4.5	22, 24
-	-	BGW	BGW-05A	Soil	5	2.5	2.5
-	-	BN 1	BN-1-A, BN-1	Soil	10	33.3	35
-	-	BN 1	BN-1-40	Soil	40	8.4	6.7
-	-	BRW*	BRW-A, BRW	Water**	-	24.0	0.085 (mg/L)
-	-	BS 1	BS-1	Soil	10	0.6	0.14
-	-	BS 2	BS-2	Soil	10	1.1	< 0.1
-	-	BS 3	BS-3	Soil	10	9.9	6.2
-	-	BS 4	BS-4	Soil	10	2.3	2.7
-	-	BS 5	BS-5	Soil	10	1.2	0.99
-	-	BW	BW-05A	Soil	5	34.3	9.4
-	-	CCT 1	CCT1D	Soil	10	18.3	-
-	-	CCT 1	CCT1D 40	Soil	40	26.6	-
-	-	CCT 2	CCT2D	Soil	10	25.6	-
-	-	CCT 2	CCT2D 40	Soil	40	3.1	-
-	-	CD	CD-05A	Soil	5	67.8	14
-	-	CD	CD-50A	Soil	50	60.8	71
-	-	CT 1	CT1-A	Soil	10	108.0	330
-	-	CT 1	CT1-80-A, CT1-80	Soil	80	5.9	47
-	-	CT 1	CT1-130-A, CT1-130	Soil	130	3.7	14
-	-	DD	DD-A, DD	Sediment	Stream bed	73.0	270
-	-	DD	DD-40-A	Soil	40	9.1	25
-	-	DP	DP-05A	Soil	5	123	40

**Table F-1**  
**Total Mercury Concentrations in Soil/Sediment/Water Samples from On Site**  
**Locations**  
*(Refer Table 5 in Main Report)*

Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Depth (cm)	Hg in mg/kg	
				HLRC	MGT
DP	DP-50A	Soil	50		20
DP 1	DP-1-10-A	Soil	10	18.8	36
DP 1	DP-1-40-A	Soil	40	31.0	155
DP 2	DP-2-A, DP-2	Soil	10	5.3	5.9
DP 2	DP-2-A, DP-2	Soil	10	1.4	3.2
DP 3	DP-3-A, DP-3	Soil	10	1.4	5.9
DP 4	DP-4-A, DP-4	Soil	10	2.4	3.8
DP 4	DP4-50-A, DP4-50	Soil	50	-	40
DP 5	DP5-A	Soil	10	-	20
DP 6	DP6-A	Soil	10	-	20
ES	ES-GWA	Water **	-	-	<0.0003 (mg/L)
FC 1	FC-1	Soil	10	1.6	1.7
FC 2	FC-2	Soil	10	1.3	1.3
FC 3	FC-3	Soil	10	1.5	1.7
FC 4	FC-4	Soil	10	8.9	16
FC 5	FC-5	Soil	10	1.8	3.2
FN 1	FN1-A, FN-1	Soil	10	0.9	2.5
FN 2	FN2-A, FN-2	Soil	10	0.8	1.0
FN 3	FN3-A, FN-3	Soil	10	0.6	0.75
FN 4	FN4-A, FN-4	Soil	10	62.8	60
FN 4	FN4-80-A	Soil	80	4.0	10
FN 5	FN5-A	Soil	10	171.0	240
FS 1	FS 1-10-B	Soil	10	68.5	-
FS 1	FS 1-40-B	Soil	40	7.7	-
FS 2	FS 2-10-B	Soil	10	7.7	-
FS 2	FS 2-40-B	Soil	40	27.6	-
FS 2	FS 2-70	Soil	70	25.4	-
FS 2	FS 2-100	Soil	100	57.5	-
FS 3	FS 3-40-B	Soil	40	2.3	-
FS 4	FS 4-40-B	Soil	40	43.7	-
FS 5	FS 5-40-B	Soil	40	15.9	-
FS 5	FS 5-70	Soil	70	74.9	-
FS 5	FS 5-85	Soil	85	315.1	-
FS 6	FS 6-40-B	Soil	40	76.7	-
FS 6	FS 6-70	Soil	70	83.5	-
FS 6	FS 6-100-B	Soil	100	19.8	-
FS 7	FS 7-40-B	Soil	40	7.8	-
FS 8	FS 8-40-B	Soil	40	118.4	-
FS 8	FS 8-70	Soil	70	46.1	-
FS 8	FS 8-100	Soil	100	1011	-
FS 9	FS 9-D	Soil	10	114.9	-
FS 9	FS 9-D-40	Soil	40	2.1	-
FS 10	Fs 10 D 40	Soil	40	28.1	-
FS 10	Fs 10 D	Soil	10.0	68.5	-
FS 11	Fs 11D	Soil	10	12.6	-
FS 11	Fs 11D 40	Soil	40	1.0	-
FS 12	Fs 12D	Soil	10	5.4	-
FS 12	Fs 12D 40	Soil	40	2.4	-
FS 13	Fs 13D	Soil	10	6.9	-
FS 13	Fs 13 D 40	Soil	40	2.3	-
FS 14	Fs 14D	Soil	10	3	-
FS 14	Fs 14D 40	Soil	40	2.8	-
FS 15	Fs 15D	Soil	10	9.3	-
FS 15	Fs 15D 40	Soil	40	3.7	-
FS 16	Fs 16D	Soil	10	95.6	-



**Table F-1**  
**Total Mercury Concentrations in Soil/Sediment/Water Samples from On Site**  
**Locations**  
*(Refer Table 5 in Main Report)*

Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Depth (cm)	Hg in mg/kg	
				HLRC	MGT
GS 21	GS 21D	Soil	10	87.8	-
GS 21	GS 21D 40	Soil	40	3.8	-
GS 22 (not sampled)		-	-	-	-
GS 23	GS23-20	Soil	20	-	23
GS 23	GS23-40	Soil	40	10.0	-
GS 24	GS24-20	Soil	20	-	120
GS 25	GS25-30	Soil	30	-	60
GS 26	GS26-30	Soil	30	-	2800
GS 26	GS-26-40	Soil	40	-	75, 71
GS 26	GS26-60	Soil	60	-	31
GS 27	GS27-10	Soil	10	-	410
GS 28	GS28-20	Soil	20	-	74
GS 28	GS28-20	Soil	20	-	100
GS 29	GS29-20	Soil	20	7.6	34
GS 30	GS30-20	Soil	20	-	35
GS 31	GS31-30	Soil	30	-	7.3
HL 1	HL-1-A, HL-1	Soil	10	8.3	2.9
HL 1	HL-1-80-A	Soil	80	1.6	-
IF 1A (not sampled)		-	-	-	-
IF 2A	IF2A-30	Soil	30	-	2.0, 2.2
IF 2A	IF-2A-60	Soil	60	-	1.1
IF 2B	IF-2B-30	Soil	30	-	3.5
IF 3A	IF3A-30	Soil	30	-	0.81
IF 3A	IF3A-50	Soil	50	-	0.48
IF 3A	IF3A-50	Soil	50	-	3.1
IF 4A	IF4A-30	Soil	30	-	0.78
IF 4A	IF4A-60	Soil	60	-	5.0
IF 5A	IF5A-30	Soil	30	-	0.58
IF 5A	IF5A-60	Soil	60	-	1.2
IF 5B	IF5B-20	Soil	20	-	0.80
IF 5B	IF5B-40	Soil	40	-	0.70
IF 7A	IF7A-30	Soil	30	-	0.68, 0.7
IF 8A	IF8A-30	Soil	30	-	0.63
IF 8A	IF8A-50	Soil	50	-	0.73
IF 8B	IF8B-30	Soil	30	-	0.73
IF 8B	IF8B-50	Soil	50	-	0.70
IF 9A	IF9A-20	Soil	20	-	0.53
IF 10A	IF10A-30	Soil	30	-	0.55
IF 10A	IF10A-50	Soil	50	-	0.74
IF 10B	IF10B-30	Soil	30	-	0.43
IF 10B	IF10B-50	Soil	50	-	23
IF 13A	IF13A-30	Soil	30	-	0.91
IF 13A	IF13A-50	Soil	50	-	0.58
IF 13B	IF13B-30	Soil	30	-	0.51
IF 13B	IF13B-50	Soil	50	-	0.53
IF 14A	IF14A-30	Soil	30	-	3.6
IF 14A	IF14A-50	Soil	50	-	2.4
IF 14A	IF14A-60	Soil	60	-	20
MD	MD-05A	Soil	5	1.0	11
MD	MD-50A	Soil	50	3.1	0.031(mg/L)
MDRW*	MDRW-A	Water**	-	-	4.5
NS	NS-05A	Soil	5	3.0	23
OFN 1	OFN1-0.5	Soil	5	-	1.9, 2.3
OFN 1	OFN1-3.0	Soil	30	-	14
OFN 2	OFN2-0.5	Soil	5	-	0.3
OFN 2	OFN2-3.0	Soil	30	-	-

om On Site

**Table F-1**  
**Total Mercury Concentrations in Soil/Sediment/Water Samples from On Site**  
**Locations**

(Refer Table 5 in Main Report)

g/kg
MGT
-
-
-
23
-
120
60
2800
75, 71
31
410
74
100
34
35
7.3
2.9
-
2.0, 2.2
1.1
3.5
0.81
0.48
3.1
0.78
5.0
0.58
1.2
0.80
0.70
0.68, 0.7
0.63
0.73
0.73
0.70
0.53
0.55
0.74
0.43
23
0.91
0.58
0.51
0.53
3.6
2.4
20
11
11(mg/L)
4.5
23
9, 2.3
14
0.3

Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Depth (cm)	Hg in mg/kg	
				HLRC	MGT
OFN 3	OFN3-0.5	Soil	5	-	16
OFN 3	OFN3-3.0	Soil	30	-	0.44
P 1	P1-05A, P1S-10	Soil	5	9.7	20
P 1S	P15-10-A	Soil	10	2.2	1.9
P 1S	P15-40-A, P1S-40	Soil	40	1.2	0.59
P 2	P2-05A	Soil	5	21.0	62
P 2S	P25-10-A, P2S-10	Soil	10	3.5	4.1
P 2S	P25-40-A	Soil	40	17.1	5.3
P 3	P3-05A	Soil	10	13.0	25
P 3S	P35-10-A, P3S-10	Soil	10	0.8	4.7
P 3S	P35-30-A, P3S-30	Soil	30	3.4	5.7, 5.7
P 4	P4-05A	Soil	5	10.1	9.4
P 4E	P4E-10-A, P4E-10	Soil	10	11.9	20
P 4E	P4E-80-A, P4E-80	Soil	80	1.5	5.0
P 4S	P4S-A, P4S	Soil	10	22.9	31
P 4SE	P4SE-A, P4SE	Soil	10	6.2	10
PPE	PPE-05A	Soil	5	2.2	4.6
PPS	PPS-A, PPS	Soil	10	3.7	32
PPS 1	PPS-1-A, PPS-1	Soil	10	2.7	6.7
PPS 2	PPS-2	Soil	10	2.8	0.35
PPS 3	PPS-3-A	Soil	10	3.0	3.0
PPW	PPW-05A	Soil	5	5.8	13, 13
S 1	S1-10	Soil	10	4.1	-
S 1	S1-40	Soil	40	10.2	-
S 2	S2-10	Soil	10	16.2	-
S 2	S2-40	Soil	40	2.8	-
S 3	S3-10	Soil	10	2.0	-
S 3	S3-30	Soil	30	0.8	-
S 4	S4-10	Soil	10	0.9	-
S 4	S4-40	Soil	40	0.9	-
S 5	S5-5	Soil	5	8.4	-
S 6	S6-10	Soil	10	44.6	-
S 6	S6-40	Soil	40	1.0	-
S 7	S7-10	Soil	10	7.9	-
S 7	S7-40	Soil	40	2.0	-
S 8	S8-10	Soil	10	16.8	-
S 9	S9-10	Soil	10	178.8	-
S 9	S9-20	Soil	20	51.8	-
S 10	S10-10	Soil	10	2.6	-
S 10	S10-15	Soil	15	2.9	-
S 11	S11-10	Soil	10	5.7	-
S 11	S11-25	Soil	25	0.7	-
S 12	S12-5	Soil	5	8.0	-
S 13	S13-10	Soil	10	1.5	-
S 13	S13-40	Soil	40	0.6	-
S 14	S14-10	Soil	10	6.5	-
S 14	S14-15	Soil	15	4.0	-
S 14	S14-25	Soil	25	4.0	-
S 15	S15-10	Soil	10	2.4	-
S 16	S16-10	Soil	10	1.2	-
S 17	S17-10	Soil	10	1.2	-
S 18	S18-10	Soil	10	4.4	-
S 19	S19-10	Soil	10	5.1	-
S 20	S20-10	Soil	10	3.0	-

**Table F-1**  
**Total Mercury Concentrations in Soil/Sediment/Water Samples from On Site**  
**Locations**  
*(Refer Table 5 in Main Report)*

Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Depth (cm)	Hg in mg/kg	
				HLRC	MGT
S 21	S21-10	Soil	10	0.7	-
SA 1	SA1-10	Soil	10	22.0	-
SA 2	SA2-10	Soil	10	28.8	-
SA 2	SA2-40	Soil	40	153.7	-
SA 3	SA3-10	Soil	10	30.8	-
SA 4	SA4-10	Soil	10	57.6	-
SA 4	SA4-25	Soil	25	2.6	-
SA 5	SA5-10	Soil	10	4.0	-
SA 5	SA5-25	Soil	25	0.3	-
SA 6	SA6-10	Soil	10	12.8	-
SA 7	SA7-10	Soil	10	20.9	-
SA 7	SA7-40	Soil	40	2.9	-
SA 8	SA8-10	Soil	10	5.9	-
SA 8	SA8-35	Soil	35	0.9	-
SA 9	SA9-10	Soil	10	3.9	-
SA 10	SA10-10	Soil	10	42.8	-
SA 10	SA10-40	Soil	40	0.6	-
SA 11	SA11-10	Soil	10	2.8	-
SA 11	SA11-40	Soil	40	0.5	-
SA 12	SA12-10	Soil	10	4.3	-
SA 12	SA12-25	Soil	25	13.0	-
SA 12	SA12-40	Soil	40	236.1	-
SA 13	SA13-10	Soil	10	1.2	-
SA 14	SA14-10	Soil	10	0.4	-
SA 14	SA14-25	Soil	25	0.4	-
SS	SS-05A	Soil	5	2.0	6.6
SS 1	SS-1-A	Soil	10	-	3.5
SS 2	SS-2-A	Soil	10	-	2.6
SW	SW-A	Water **	-	-	<0.0003 (mg/L)
TB	TB-05A	Soil	5	12.5	31
TBD	TBA-A	Sediment	Stream Bed	41.9	110
VE 1	VE-1	Soil	10	-	1.1
WS	WS-GWA	Water **	-	-	<0.0003 (mg/L), <0.0003 (mg/L)

Note: \*\*All water samples are unfiltered when tested in the laboratory.

\* Sample of surface runoff water collected during heavy storm

1. Mercury globules observed in sample.



**Table F-3**  
**Total Mercury Concentrations in Soil/Sediment/Lichen/Water Samples North of Site including**  
**Kodai Lake**

*(Refer Table 7 in Main Report)*

Sample Location	Laboratory Certificate Reference	Type of Sample	Sample Description	Hg in mg/kg	
				MGT (USEPA)	MGT (NEN)
CC-1 (Carlton Compound)	CC-1-A	Soil	5 cm bgl	1.1	-
CM (Charlemont Property)	CM-05A	Soil	5 cm bgl	2.2	-
CM-1 (Charlemont Property)	CM-1-A	Soil	5 cm bgl	1.3, 1.2	-
CM-2 (Charlemont Property)	CM-2-A	Soil	5 cm bgl	0.70	-
CML (Charlemont Property)	CML-A	Lichen	From tree trunk	4.5	-
CML-2 (Charlemont Property)		Lichen	From tree trunk	4.8	-
CM-51(Charlemont Property)	CML-51A	Lichen	From tree trunk	-	7
CM-51(Charlemont Property)	CMB-51A	Bark	From tree trunk	-	5
CM-52 (Charlemont Property)	CML-52A	Lichen	From tree trunk	2.2(a)	-
CM-52 (Charlemont Property)	CMB-52A	Bark	From tree trunk	-	6.5
CM-53 (Charlemont Property)	CML-53A	Lichen	From tree trunk	26	25, 33
CM-53 (Charlemont Property)	CMB-53A	Bark	From tree trunk	-	9
CM-54 (Charlemont Property)	CML-54A	Lichen	From tree trunk	-	6.5
CM-54 (Charlemont Property)	CMB-54A	Bark	From tree trunk	-	1.8
CM-55 (Charlemont Property)	CML-55A	Lichen	From tree trunk	-	8.5
CM-55 (Charlemont Property)	CMB-55A	Bark	From tree trunk	-	3.4, 3.0
KDLK-51(Kodai Lake)	KDLS-51B, KDLS-51-A	Sediment	Lake Bed	0.08, 0.07	<0.2
KDLK-52 (Kodai Lake)	KDLS-52B, KDLS-52-A	Sediment	Lake Bed	0.05, 0.10	<0.2
KDLK-53 (Kodai Lake)	KDLS-53B, KDLS-53-A	Sediment	Lake Bed	0.13	<0.2
KDLK-54 (Kodai Lake)	KDLS-54B, KDLS-54-A	Sediment	Lake Bed	0.20, 0.18	<0.2
KDLL (Kodai Lake Bank)	KDLL/B-A	Lichen	From tree trunk	-	<0.2
LK1 (Kodai Lake Bank)	LK1-A	Soil	5 cm bgl	<0.1	-
LK2 (Kodai Lake Bank)	LK2-A	Soil	5 cm bgl	<0.1	-
LK3 (Kodai Lake Bank)	LK3-A	Soil	5 cm bgl	<0.1	-
LKW (Kodai Lake)	LKW-A	Water	From Lake	<0.0003(mg/L)	-
LSL (Lower Shola Road)	LSL-A, LSL-B	Lichen	From tree trunk	5.0, 2.8(a)	3.1
LSL (Lower Shola Road)	LSB-A	Bark	From tree trunk	-	<0.2
MH-51(Malhotra Property)	MHL-51A	Lichen	From tree trunk	48	55, 68
MH-51 (Malhotra Property)	MHB-51A	Bark	From tree trunk	-	4.7
MH-52 (Malhotra Property)	MHL-52A	Lichen	From tree trunk	-	11
MH-52 (Malhotra Property)	MHB-52A	Bark	From tree trunk	-	1.8
US1 (Upper Shola Road)	US1-A	Soil	5 cm bgl	<0.1, <0.1	-
US2 (Upper Shola Road)	US2-A	Soil	5 cm bgl	<0.1	-
US3 (Upper Shola Road)	US3-A	Soil	5 cm bgl	<0.1	-
US4 (Upper Shola Road)	US4-A	Soil	5 cm bgl	<0.1, <0.1	-
US5 (Upper Shola Road)	US5-A	Soil	5 cm bgl	<0.1	-
US6 (Upper Shola Road)	US6-A	Soil	5 cm bgl	<0.1	-
USW 1 (Upper Shola Road)	USW-A	Water	Stream	<0.0003 (mg/L)	-

Notes: (a) = ALS-USEPA Method; bgl = below ground level  
 All water samples are unfiltered when tested in laboratory

Table F-4  
 Total Mercury Concentrations in Soil/Sediment/Lichen/Water Samples North of Site including Kodai Lake



**Table F-4**  
**Total Mercury Concentrations in Soil/Sediment/Lichen/Bark/Water Samples South of Site**  
**(Levange Path, Shola Forest, Pambar River, Kumbakarrai Falls) (refer Table 8 in Main Report)**  
*(Refer Table 8 in Main Report)*

No.	Laboratory Certificate Reference	Sample Type	Sample Depth	Total Hg, dry basis in mg/kg			MGT (NEN)	MGT (NEN)	Sampling Location Description
				HLRC	MGT (USEPA)	TNO (NEN)			
	DS3LA, DS3LA	Lichen	-	-	57, 5.8	34.4	-	Down-stream of Levange path (closer to site)	
	DS3AL-A, DS3AL-B	Lichen	-	-	80, 35.6(a)	-	45	Down-stream of Levange path (closest to site)	
	SS3AB-A, DS3AB-B	Bark	-	-	1.7, 4.1(a)	-	3.6	Down-stream of Levange path (closer to site)	
	SDSW1L-A	Lichen	-	-	-	-	3.3	On Levange Path immediately south of southeast corner of HLL site	
	DSW1B-A	Bark	-	-	-	-	<0.2	On Levange Path immediately south of southeast corner of HLL site	
	DSW2L-A	Lichen	-	-	-	-	3.1	On Levange Path approximately 130m east of DSW1	
	DSW2B-A	Bark	-	-	-	-	5.5	On Levange Path approximately 130m east of DSW1	
	DW1-A	Water	-	-	<0.0003	<0.002	-	Main Stream Outfall	
	KDUBA, KDUBB	Bark	-	0.1	<0.1	<2	-	Pambar River on the way 5 km to Kumbakarral (Broken Bridge)	
	KDULA, KDULB	Lichen	-	0.5	<0.1	<2	-	Pambar River on the way 5 km to Kumbakarral (Broken Bridge)	
	KDUSA, KDUSB	Sediment	Surface	0.3	<0.1	<1	-	Pambar River on the way 5 km to Kumbakarral (Broken Bridge)	
	KDUWA, KDUSWB	Water	-	<0.0003	<0.0003	<0.004	-	Pambar River on the way 5 km to Kumbakarral (Broken Bridge)	
	KKBA	Bark	-	0.2	<0.1, <0.1	<2	-	Pambar River in Kumbakarral - approx 100 stream	
	KKLA, KKLB	Lichen	-	0.2	<0.1	<5	-	Pambar River in Kumbakarral - approx 100 stream	
	KKSA, KKSB	Sediment	Surface	1.1	<0.1	<1	-	Pambar River in Kumbakarral - approx 100 stream	
	KKWA, KKWB	Water	-	<0.0003	<0.0003	0.005	-	Pambar River in Kumbakarral - approx 100 stream	
	SR-A	Sediment	Surface	-	<0.1	-	-	Just upstream of Kumbakarral Falls opposite Temple	
	SRW-A	Water	-	-	<0.0003	-	-	Just upstream of Kumbakarral Falls opposite Temple	
	KUBBA, KUBBB	Bark	-	1.4	<0.1	<2	-	Upstream of Kumbakarral approx 1 hr walk through Pambar River	
	KJBLA, KJBLB	Lichen	-	0.1	<0.1	<2	-	Upstream of Kumbakarral approx 1 hr walk through Pambar River	
	KUBSA, KUBSB	Sediment	Surface	0.2	<0.1, <0.1	<1	-	Upstream of Kumbakarral approx 1 hr walk through Pambar River	
	KUBWA, KUBWB	Water	-	-	<0.0003	<0.004	-	Upstream of Kumbakarral approx 1 hr walk through Pambar River	
	KUMBA, KUMBB	Bark	-	0.2	<0.1	<2	-	Upstream of Kumbakarral approx 2 hrs walk through Pambar River	
	KUMLA	Lichen	-	0.1	<0.1	<2	-	Upstream of Kumbakarral approx 2 hrs walk through Pambar River	
	KUMSA, KUMSB	Sediment	-	0.6	<0.1	<1	-	Upstream of Kumbakarral approx 2 hrs walk through Pambar River	
	KUMWA	Water	-	<0.0003	<0.0003	-	-	Upstream of Kumbakarral approx 2 hrs walk through Pambar River	
	KUTBA, KUTBB	Bark	-	0.2	<0.1	<2	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River	
	KUTLA, KUTLB	Lichen	-	0.1	<0.1	<2	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River	
	KUTSA, KUTSB	Sediment	-	0.2	<0.1	<1	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River	
	KUTWA	Water	-	<0.0003	<0.0003	-	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River	

(not sampled)

Sample No.	Sample Type	Sample Depth	HLRC	MGT (USEPA)	NO (NEN)	MGT (NEN)	Sampling Location Description
KUTLA, KUTLB	Lichen	-	0.1	<0.1	<2	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River
KUTSA, KUTSB	Sediment	-	0.2	<0.1	<1	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River
KUTWA	Water (not sampled)	-	<0.0003	<0.0003	-	-	Upstream of Kumbakarral approx 3 hrs walk through Pambar River

Table F-4

**Total Mercury Concentrations in Soil/Sediment/Lichen/Bark/Water Samples South of Site  
(Levange Path, Shola Forest, Pambar River, Kumbakarral Falls) (refer Table 8 in Main Report)**  
(Refer Table 8 in Main Report)

Sample No.	Laboratory Certificate Reference	Sample Type	Sample Depth	Total Hg, dry basis in mg/kg			Sampling Location Description
				HLRC	MGT (USEPA)	NO (NEN)	
LP-2-A		Soil	10	-	6.0	-	Levange Path
LP-3-A		Soil	10	-	2.4	-	Levange Path
LP-4-A		Soil	10	-	1.4	-	Levange Path
LP-5-A		Sediment	Surface	126	55	-	Levange Path
LP-6-A		Soil	10	0.8	1.1	-	Levange Path
LP-7-A		Soil	10	-	0.63	-	Levange Path
PDRBA, PDRBB		Bark	-	2.5	<0.1	<2	Pambar River joining Varaganathi in Periakulam
PDRLA, PDRLB		Lichen	-	0.1	<0.1	<2	Pambar River joining Varaganathi in Periakulam
PDRSA, PDRSB		Sediment	Surface	0.6	<0.1	<1	Pambar River joining Varaganathi in Periakulam
PDRWA		Water	-	<0.0003	<0.0003	-	Pambar River joining Varaganathi in Periakulam

All water samples are unfiltered when tested in laboratory  
Mercury concentration in water in mg/L  
(a) = ALS-USEPA Method

**Table F-5**  
**Methyl Mercury Concentrations in Soil/Sediment/Lichen Samples Tested (refer Table 10 in Main Report)**  
*(Refer Table 10 in Main Report)*

Sample Location	Laboratory Certificate Reference	Sample Depth (cm) & Type	Methyl Mercury (mg/kg)	Total Hg (mg/kg)	Ratio Methyl Mercury to Total Mercury
<b>ON SITE LOCATIONS</b>					
CT1	CT1-A	10 (Soil)	0.0029	330	$8.7 \times 10^{-6}$
CT1	CT1-80-A	80 (Soil)	<0.0001	47	$<2.1 \times 10^{-6}$
CT1	CT1-130-A	130 (Soil)	0.0001	14	$7.1 \times 10^{-6}$
CT1		Surface Sediments	0.0026	240	$1.1 \times 10^{-5}$
DD			0.0002	36	$5.6 \times 10^{-6}$
DP1	DP-1-10-A	10 (Soil)	<.00005	155	$0.3 \times 10^{-6}$
DP1	DP-1-40-A	40 (Soil)	0.0094	40	0.0002
DP5	DP5-A	10 (Soil)	0.0049	60	$8.1 \times 10^{-5}$
FN4	FN4-A	10 (Soil)	0.0026	240	$10.8 \times 10^{-6}$
FN5	FN5-A	10 (Soil)	0.0014	20	$7.0 \times 10^{-5}$
MD	MD-05A	5 (Soil)	0.0005	11	$4.5 \times 10^{-5}$
MD	MD-50A	50 (Soil)	0.0005	11	$4.5 \times 10^{-5}$
TBD	TBD-A	Surface Sediments	0.003	110	$2.7 \times 10^{-5}$
L-1	L1-A	Lichen from tree trunk	0.11 (TNO)	60	0.0018
L-2	L2-A	Lichen from tree trunk	<0.10 (TNO)	63	<.0016
L-3	L3-A	Lichen from tree trunk	<0.10 (TNO)	87	<.0015
L-4	L4-A	Lichen from tree trunk	<0.10 (TNO)	18.3	<.0055
L-5	L5-A	Lichen from tree trunk	<0.10 (TNO)	15.4	<.0065
<b>OFF SITE LOCATIONS</b>					
CM (Charlemont Property)	CM-05A	5 (Soil)	0.0011	2.2	0.0005
CML (Charlemont Property)	CML-A	Lichen from tree trunk	0.0019	4.5	0.0004
CML2 (Charlemont Property)		Lichen from tree trunk	0.0019	4.8	0.0004
DFE (Levange Path)	DFE-05A	Surface Sediments	0.126	85	0.0015
DFE1 (Levange Path)	DFE1-A	Surface Sediments	0.06	110	0.0005
DFNE (Levange Path)	DFNE-05A	5 (Soil)	0.0008	6	0.00013
LK1 (Kodai Lake)	LK1-A	10 (Soil)	0.0008	<0.1	<.008
LK3 (Kodai Lake)	LK2-A	10 (Soil)	0.0002	<0.1	<.002
LP5		Surface Sediments	0.0062	55	<.0001
SRA (Kumbakarra Falls)	SR-A	Surface Sediments	0.0001	<0.1	<.001
DS1 (along main stream downstream of Levange Path)	DS1LB	Lichen from tree trunk	<0.03 (TNO)	<5	<.0060
DS1 (along main stream downstream of Levange Path)	DS1SB	Surface Sediments	<0.003 (TNO)	<1	<.0030
DS2 (along main stream downstream of Levange Path)	DS2LB	Lichen from tree trunk	<0.03 (TNO)	10.4	<.0027
DS2 (along main stream downstream of Levange Path)	DS2SB	Surface Sediments	0.004 (TNO)	5.7	0.0007
DS3 (along main stream downstream of Levange Path)	DS3LB	Lichen from tree trunk	0.094 (TNO)	34.4	0.0027
DS3 (along main stream downstream of Levange Path)	DS3SB	Surface Sediments	0.008 (TNO)	51	0.0002

Note: All methyl mercury tests conducted at CSIRO (Melbourne, Australia) except for the labelled (TNO) indicating those performed at TNO (Netherlands).



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MGT ANALYSIS REPORT 154525

CLIENT :- URS  
41 McLaren St  
North Sydney  
New South Wales 2060

SITE :- 49032-002

DATE RECEIVED :- 19/03/02

DATE EXTRACTED OR PREPARED :- 19/03/02 - 20/03/02

DATE REPORTED :- 09/05/02

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 154525  
A total of 3 duplicate analyses or sets of analyses were carried out on this batch of samples.

All QA/QC results for duplicates and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

  
Michael Wright  
Laboratory Manager



Accredited Laboratory  
No. 1261  
NATA is a member of the National Association of Testing Authorities, Australia





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## CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors:

1. Analysis of duplicates. Duplicates run at a minimum of 5%
2. Recovery of known additions. Spikes run at a minimum of 5% with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

### 1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results.

Once enough data has been gathered control data for each method can be developed. The mean range(R) is determined as:

$$R = \frac{(\sum R_i)}{n}$$

Where n = number of observations  
and R<sub>i</sub> = normalised range

and the variance (square of the standard deviation) is determined as:

$$s_r^2 = \frac{(\sum R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become:

Average range	R
Warning Limit	R + 2s <sub>r</sub>
Control Limit	R + 3s <sub>r</sub>

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data). Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

### Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses. If it exceeds the C.L. discontinue analyses and correct the problem.

### Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

\*\*\* Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

### 2. Recovery of known additions.

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

### 3. Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.



  
M. Wright  
Laboratory Manager



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## MGT ANALYSIS REPORT 153252

CLIENT :- URS  
41 McLaren St  
North Sydney  
New South Wales 2060

SITE :- 49032-002

DATE RECEIVED :- 19/03/02

DATE EXTRACTED OR PREPARED :- 19/03/02 - 20/03/02

DATE REPORTED :- 01/05/02

QA/QC DETAILS :-

The QA/QC for these samples is detailed in this report no : 153252  
A total of 8 duplicate, 2 matrix spike & recovery and 1 method blank analyses  
or sets of analyses were carried out on this batch of samples.

The detection limits (PQL - Practical Quantitation Limits) reported are the lowest  
level that can be reliably achieved within the specified limits of precision and  
accuracy for the method

All QA/QC results for duplicates, matrix spike & recoveries, method blank  
and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

  
Michael Wright  
Laboratory Manager

*Michael Wright*  
 Michael Wright  
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Site : 49032-002

URS  
 41 McLaren St  
 North Sydney  
 New South Wales 2060

MERCURY ANALYSIS-USEPA METHOD 7470 & 7471 (CVAA) OR DUTCH METHOD NEN6465 (CVAA)

Sample	CML-51A	CMB-51A	CMB-52A	CML-53A	CMB-53A	CML-54A
Lab. No.	MA2517	MA2518	MA2519	MA2520	MA2521	MA2522
Mercury (Dutch) *	7	5	6.5	25	9	6.5
Mercury (USEPA)	-	-	-	-	-	-
Lichen & Bark results in mg/kg "as received" Sediment results in mg/kg "dry basis".						
Date received 19/03/02						
Date Reported 01/05/02						

\* Non NATA endorsed analysis



NATA Accredited Laboratory  
 Number: 1261  
 This laboratory is accredited by the National Association of Testing Authorities, Australia. This accreditation has been obtained in accordance with AS




















**Environmental Consulting Pty. Ltd.**

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MGT ANALYSIS REPORT 154525

CLIENT :- URS  
 41 McLaren St  
 North Sydney  
 New South Wales 2060

SITE :- 49032-002

DATE RECEIVED :- 19/03/02

DATE EXTRACTED OR PREPARED :- 19/03/02 - 20/03/02

DATE REPORTED :- 09/05/02

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 154525  
 A total of 3 duplicate analyses or sets of analyses were carried out on this batch of samples.  
 All QA/QC results for duplicates and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.



Michael Wright  
 Laboratory Manager







CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS  
VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors:

1. Analysis of duplicates. Duplicates run at a minimum of 5%
2. Recovery of known additions. Spikes run at a minimum of 5% with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results. Once enough data has been gathered control data for each method can be developed. The mean range(R) is determined as:

$$R = \frac{(\sum R_i)}{n}$$

Where n = number of observations  
and  $R_i$  = normalised range

and the variance (square of the standard deviation) is determined as:

$$s_r^2 = \frac{(\sum R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become:

Average range	R
Warning Limit	R + 2s <sub>r</sub>
Control Limit	R + 3s <sub>r</sub>

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data). Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses. If it exceeds the C.L. discontinue analyses and correct the problem.

Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

\*\*\* Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

2. Recovery of known additions.

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

if recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

3. Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.

M. Wright  
Laboratory Manager





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## MGT ANALYSIS REPORT 153151

CLIENT :- URS  
41 McLaren St  
North Sydney  
New South Wales 2060

SITE :- P/N 49032-002

DATE RECEIVED :- 15/03/02

DATE EXTRACTED OR PREPARED :- 15/03/02 - 16/03/02

DATE REPORTED :- 01/05/02

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 153151  
A total of 1 duplicate, 1 matrix spike % recovery and 1 method blank analyses or sets of analyses were carried out on this batch of samples.

The detection limits (PQL - Practical Quantitation Limits) reported are the lowest level that can be reliably achieved within the specified limits of precision and accuracy for the method

All QA/QC results for duplicates, matrix spike % recovery, method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

Michael Wright  
Laboratory Manager





Environmental Consulting Pty. Ltd.

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URS  
41 McLaren St  
North Sydney  
New South Wales 2060

Site : P/N 49032-002

MERCURY ANALYSIS-USEPA METHOD 7470 & 7471 (CVAA) OR DUTCH METHOD NEN6465 (CVAA)

Sample	KDLK54S-A	ABCL	DSLAS-AA	DSIBS-BA	OFNL-0.5	OFNL-3.0
Lab. No.	MA1926	MA1932	MA1933	MA1934	MA1935	MA1936
Mercury (USEPA)	0.20	2.3	10	0.56	23	1.9

DUPLICATE  
of  
OFNL-3.0

Lichen & Bark results in mg/kg "as received" Sediment results in mg/kg "dry basis".

Date received 15/03/02

Date Reported 01/05/02



Environmental Consulting Pty. Ltd.

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Email: mgt@mgtenv.com.au

Site : P/N 49032-002

**MERCURY ANALYSIS-USEPA METHOD 7470 & 7471 (CVAA) OR DUTCH METHOD NEN6465 (CVAA)**

Sample	OFN2-0.5	OFN2-3.0	OFN3-0.5	OFN3-3.0	Spike & Recov	CRM
Lab. No.	MA1937	MA1938	MA1939	MA1940	MA1938S	
Mercury (USEPA)	14	0.30	16	0.44	92%	103%
Lichen & Bark results in mg/kg "as received" sediment results in mg/kg "dry basis".						

Date received 15/03/02

Date Reported 01/05/02



NATA Accredited Laboratory  
Number: 1261  
This laboratory is accredited by the National Association of Testing Authorities, Australia. The test reported herein have been performed in accordance with its scope of accreditation.





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## CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors:

1. Analysis of duplicates. Duplicates run at a minimum of 5%
2. Recovery of known additions. Spikes run at a minimum of 5% with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

### 1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results. Once enough data has been gathered control data for each method can be developed. The mean range (R) is determined as:

$$R = \frac{(\sum R_i)}{n}$$

Where n = number of observations  
and  $R_i$  = normalised range

and the variance (square of the standard deviation) is determined as:

$$s_r^2 = \frac{(\sum R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become:

Average range	R
Warning Limit	R + 2s <sub>r</sub>
Control Limit	R + 3s <sub>r</sub>

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data). Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

### Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses. If it exceeds the C.L. discontinue analyses and correct the problem.

### Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

\*\*\* Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

### 2. Recovery of known additions

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

### 3. Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.



This Laboratory is registered by the National Association of Testing Authorities, Australia. (NATA) reported herein have been performed in accordance with the terms of registration. This certificate is valid for 12 months from the date of issue.

M. Wright  
Laboratory Manager



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MGT ANALYSIS REPORT 149720

CLIENT :- URS  
 41 McLaren St  
 North Sydney  
 New South Wales 2060

SITE :- HINDUSTAN LEVER-KODAIKANAL

DATE RECEIVED :- 03/10/01

DATE EXTRACTED OR PREPARED :- 03/10/01 - 04/10/01

DATE REPORTED :- 10/10/01

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 149720  
 A total of 2 duplicate, 2 matrix spike & recovery and 1 method blank analyses or sets of analyses were carried out on this batch of samples.  
 The detection limits (PQL - Practical Quantitation Limits) reported are the lowest level that can be reliably achieved within the specified limits of precision and accuracy for the method

All QA/QC results for duplicates, matrix spike & recoveries, method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

Michael Wright  
 Laboratory Manager



Environmental Consulting Pty. Ltd.

3 Kingston Town Close, Oakleigh, Victoria 3166, Australia

Michael Wright  
Laboratory Manager



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URS  
41 McLaren St  
North Sydney  
New South Wales 2060

Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	FS23-20	FS24-20	FS25-20	FS25-20 Dup	FS26-10	FS26-30
Lab. No.	OC0320	OC0321	OC0322	OC0322D	OC0323	OC0324
Total Mercury	10	0.64	81	85	650	34

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 03/10/01

Date Reported 10/10/01



NATA Accredited Laboratory  
Number: 1261  
The Laboratory is accredited by the National Association of Testing Authorities, Australia. The principles and methods used have been permitted by accreditation with its.









URS  
41 McLaren St  
North Sydney  
New South Wales 2060



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Email: mgt@mgtenv.com.au

Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	SL2	GS31-30	Spike & Recov	Spike & Recov	Spike & Recov	Meth.Bl. (mg/l)	CRM
Lab. No.	OC0342	OC0343	OC0321S	OC0338S			
Total Mercury	28200	35	91%	89%		<0.01	95%
<i>Sludge Sample from ETP Waste. Stored Separately</i>							
Results in ppm (soils mg/kg dry, waters mg/l).							

Date received 03/10/01

Comments CRM = Certified Reference Material

Date Reported 10/10/01



NATA Accredited Laboratory  
Number: 1261  
This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its



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## CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors:

1. Analysis of duplicates. Duplicates run at a minimum of 5%
2. Recovery of known additions. Spikes run at a minimum of 5% with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

### 1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results. Once enough data has been gathered control data for each method can be developed. The mean range(R) is determined as:

$$R = \frac{(\sum R_i)}{n}$$

Where n = number of observations  
and  $R_i$  = normalised range

and the variance (square of the standard deviation) is determined as:

$$s_r^2 = \frac{(\sum R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become:

Average range	R
Warning Limit	R + 2s <sub>r</sub>
Control Limit	R + 3s <sub>r</sub>

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data). Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

### Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses. If it exceeds the C.L. discontinue analyses and correct the problem.

### Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

\*\*\* Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

### 2. Recovery of known additions.

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

### 3. Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.

M. Wright

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data). Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

*M. Wright*  
M. Wright

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MGT ANALYSIS REPORT 149720

CLIENT :- URS  
41 McLaren St  
North Sydney  
New South Wales 2060

SITE :- HINDUSTAN LEVER-KODAIKANAL

DATE RECEIVED :- 03/10/01

DATE EXTRACTED OR PREPARED :- 03/10/01 - 04/10/01

DATE REPORTED :- 10/10/01

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 149720  
A total of 2 duplicate, 2 matrix spike & recovery and 1 method blank analyses or sets of analyses were carried out on this batch of samples.  
The detection limits (PQL - Practical Quantitation Limits) reported are the lowest level that can be reliably achieved within the specified limits of precision and accuracy for the method  
All QA/QC results for duplicates, matrix spike & recoveries, method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

*M. Wright*  
Michael Wright  
Laboratory Manager









URS  
41 McLaren St  
North Sydney  
New South Wales 2060



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Email: mgt@mgtenv.com.au

Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	GS29-20	GS30-20	GS30-20	FS30-20	FS99	FS31-20	SL1
Lab. No.	OC0336	OC0337	OC0338	OC0339	OC0340	OC0341	OC0341
Total Mercury	100	34	3.1	10	16	47000	
Results in ppm (soils mg/kg dry, waters mg/l).							
Date received 03/10/01				Date Reported 10/10/01			



NATA Accredited Laboratory  
Number: 1261  
This lab is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with AS



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URS  
41 McLaren St  
North Sydney  
New South Wales 2060

Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	SL2	GS31-30	Spike & Recov	Spike & Recov	Spike % Recov	Meth.Bl. (mg/l)	CRM
Lab. No.	OC0342	OC0343	OC0321S	OC0338S	89%	<0.01	95%
Total Mercury	28200	35	91%				

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 03/10/01

Date Reported 10/10/01

Comments CRM = Certified Reference Material



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## MGT ANALYSIS REPORT 149721

CLIENT :- URS  
41 McLaren St  
North Sydney  
New South Wales 2060

SITE :- HINDUSTAN LEVER-KODAIKANAL

DATE RECEIVED :- 03/10/01

DATE EXTRACTED OR PREPARED :- 03/10/01 - 04/10/01

DATE REPORTED :- 10/10/01

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 149721  
A total of 2 duplicate, 3 matrix spike & recovery and 1 method blank analyses or sets of analyses were carried out on this batch of samples.  
The detection limits (PQL - Practical Quantitation Limits) reported are the lowest level that can be reliably achieved within the specified limits of precision and accuracy for the method  
All QA/QC results for duplicates, matrix spike & recoveries, method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

  
Michael Wright  
Laboratory Manager





**Environmental Consulting & Pty. Ltd.**

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URS  
 41 McLaren St  
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Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	IF5A-30	IF5A-60	IF8A-30	IF8A-30 Dup	IF8A-50	IF8B-30
Lab. NO.	OC0344	OC0345	OC0346	OC0346D	OC0347	OC0348
Total Mercury	5.0	0.58	0.68	0.70	0.63	0.73

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 03/10/01

Date Reported 10/10/01





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Site : HINDUSTAN LEVER-KODAIKANAL

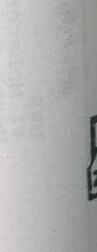
MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	IF4A-30	IF4A-60	IF9A-20	IF10A-30	IF10A-50	IF10B-30
Lab. No.	OC0355	OC0356	OC0357	OC0358	OC0359	OC0360
Total Mercury	3.1	0.78	0.70	0.53	0.55	0.74

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 03/10/01

Date Reported 10/10/01





URS  
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 New South Wales 2060

**mgt** Environmental Consulting & Property. Ltd.

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Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	IF10B-50	IF13A-30	IF13A-50	IF13B-30	IF13B-50	IF14A-30
Lab. No.	OC0361	OC0362	OC0363	OC0364	OC0365	OC0366
Total Mercury	0.43	23	0.91	0.58	0.51	0.53
Results in ppm (soils mg/kg dry, waters mg/l).						

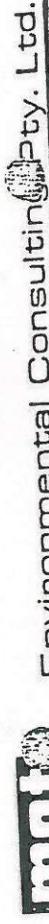
Date received 03/10/01

Date Reported 10/10/01



Accredited Laboratory  
 No. 1261  
 Facility is accredited by the National Accreditation Authority for Laboratories, Australia.  
 This accreditation is based on the performance of the laboratory in accordance with the

Report No. 149721



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URS  
 41 McLaren St  
 North Sydney  
 New South Wales 2060

Site : HINDUSTAN LEVER-KODAIKANAL

MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	IF14A-50	IF14A-60	IF15-30	IF15-50	IF2A-30	IF2A-30 Dup
Lab. No.	OC0367	OC0368	OC0369	OC0370	OC0371	OC0371D
Total Mercury	3.6	2.4	36000	3200	2.0	2.2

DRAIN SAMPLES  
 FROM PROPERTY - SOIL  
 COLLECTED AND  
 STORED

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 03/10/01 Date Reported 10/10/01



# Environmental Consulting Pty. Ltd.

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URS  
41 McLaren St  
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Site: ~~HINDUSTAN LEVER-KODAIKANAL~~ FROM SILT TRAPS  
SEDIMENTS

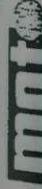
MERCURY: USEPA SW846 METHOD 7470/7471.

Sample	ST4	ST5	Spike % Recov	Spike % Recov	Spike % Recov	Spike % Recov	Meth.Bl. (mg/l)
Lab. No.	OC0378	OC0379	OC0355S	OC0358S	OC0365S	OC0365S	
Total Mercury	40	18	106%	92%	87%		<0.001
<i>SILT TRAP SEDIMENTS</i>							

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 03/10/01

Date Reported 10/10/01







# Environmental Consulting Pty. Ltd.

3 Kingston Town Close, Oakleigh, Victoria, 3166, Australia  
Postal Address: P.O. Box 276, Oakleigh, Victoria, 3166, Australia  
Telephone: (03) 9564 7055  
Fax: (03) 9564 7190

## CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors:

1. Analysis of duplicates. Duplicates run at a minimum of 5%
2. Recovery of known additions. Spikes run at a minimum of 5% with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

### 1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results.  
Once enough data has been gathered control data for each method can be developed. The mean range(R) is determined as:

$$R = \frac{(\sum R_i)}{n}$$

Where n = number of observations  
and  $R_i$  = normalised range

and the variance (square of the standard deviation) is determined as:

$$s_r^2 = \frac{(\sum R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become:

Average range	R
Warning Limit	R + 2s <sub>r</sub>
Control Limit	R + 3s <sub>r</sub>

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data).  
Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

### Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses. If it exceeds the C.L. discontinue analyses and correct the problem.

### Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

\*\*\* Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

### 2. Recovery of known additions

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

### 3. Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.

M. Wright  
Laboratory Manager



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*M. Wright*  
M. Wright  
Laboratory Manager

## MGT ANALYSIS REPORT 147143

CLIENT :- Dames & Moore  
41 McLaren St  
North Sydney  
New South Wales 2060

SITE :- HINDUSTAN LEVER

DATE RECEIVED :- 05/06/01

DATE EXTRACTED OR PREPARED :- 05/06/01 - 06/06/01

DATE REPORTED :- 08/06/01

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 147143  
A total of 1 duplicate analyses or sets of analyses were carried out on this batch of samples.  
All QA/QC results for duplicates and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

*M. Wright*  
Michael Wright  
Laboratory Manager



ATA Accredited Laboratory  
Number: 1261  
This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its









**mgt**

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Dames & Moore  
41 McLaren St  
North Sydney  
New South Wales 2060

Site : HINDUSTAN LEVER

**HEAVY METALS-US EPA SW846 METHODS 7000(AA) & 6010B(ICP), VIC EPA METHODS 13&16.**

Sample	PDRLA *	DS3SA-RETEST	DS3LA-RETEST*	KDUWA	KUMLA *
Lab. No.	JN0584	JN0585	JN0586	JN0857	JN0858
Mercury	<0.1	28	5.8	<0.0003	<0.1

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

Date received 05/06/01

Date Reported 08/06/01

Comments \* Results in mg/kg "as received".



A Accredited Laboratory  
Number: 1761  
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CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS  
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3. Analysis of reagent blanks run with each batch of samples.

1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results. Once enough data has been gathered control data for each method can be developed. The mean range(R) is determined as:

$$R = \frac{(\sum R_i)}{n}$$

Where n = number of observations  
and R<sub>i</sub> = normalised range

and the variance (square of the standard deviation) is determined as:

$$s_r^2 = \frac{(\sum R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become:

Average range	R
Warning Limit	R + 2s <sub>r</sub>
Control Limit	R + 3s <sub>r</sub>

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data). Since the limits are based on 95% and 90% confidence levels respectively, the following actions are taken, based on these statistical parameters.

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M. Wright  
Laboratory Manager

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M. Wright  
Laboratory Manager

MGT ANALYSIS REPORT 146551

CLIENT :- URS Corporation  
41 McLaren Street  
North Sydney  
NSW 2060

SITE :- KODACKANAL

DATE RECEIVED :- 08/05/01

DATE EXTRACTED OR PREPARED :- 08/05/01 - 09/05/01

DATE REPORTED :- 10/05/01

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 146551

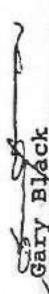
A total of 1 duplicate, 1 matrix spike & recovery and 1 method blank analyses or sets of analyses were carried out on this batch of samples.

All QA/QC results for duplicates, matrix spike & recovery, method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.



NATA Accredited Laboratory  
Number: 1261  
This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its scope of accreditation. This document is valid for the period stated on the

  
Gary Black  
Operations Manager



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URS Corporation  
 41 McLaren Street  
 North Sydney  
 NSW 2060

Site : KODACKANAL

HEAVY METALS-US EPA SW846 METHODS 7000(AA) & 6010B(ICP), VIC EPA METHODS 13&16.

Sample	PPS-2	BE-1	BE-1 Dup	BE-2	BE-3	BS-1
Lab. No. / Sample matrix	MY0684#Soil 0.35	MY0685#Soil 0.51	MY0685D#Soil 0.50	MY0686#Soil 0.13	MY0687#Soil 0.26	MY0688#Soil 0.14
Mercury						

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

Date received 08/05/01

Date Reported 10/05/01



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Site : KODACKANAL

HEAVY METALS-US EPA SW846 METHODS 7000(AA) & 6010B(ICP), VIC EPA METHODS 13&16.

Sample	BS-2	BS-3	BS-4	BS-5	FC-1	FC-2
Lab. No. / Sample matrix	MY0689#Soil	MY0690#Soil	MY0691#Soil	MY0692#Soil	MY0693#Soil	MY0694#Soil
Mercury	<0.1	6.2	2.7	0.99	1.7	1.3

Extraction with H<sub>2</sub>O<sub>2</sub>, HNO<sub>3</sub> & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

Date received 08/05/01

Date Reported 10/05/01



NATA Accredited Laboratory  
 Number: 1261  
 This laboratory is accredited by the National Association of Testing Authorities.  
 Some of the reported results have been performed in accordance with the  
 scope of accreditation. The Department should be encouraged to report in full



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Site : KODACKANAL

HEAVY METALS-US EPA SW846 METHODS 7000(AA) & 6010B(ICP), VIC EPA METHODS 13&16.

Sample	FC-3	FC-4	FC-5	VE-1	Spike % Recov	Meth.B1. (mg/l)
Lab. No. / Sample matrix	MY0695#Soil 1.7	MY0696#Soil 16	MY0697#Soil 3.2	MY0698#Soil 1.1	MY0698S#Soil 92 %	<0.001
Mercury						

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

Date received 08/05/01

Date Reported 10/05/01



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 Laboratory Manager



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## MGT ANALYSIS REPORT 146343

CLIENT :- URS Corporation  
41 McLaren St  
North Sydney  
NSW 2060

SITE :- KODALKANAL

DATE RECEIVED :- 30/04/01

DATE EXTRACTED OR PREPARED :- 30/04/01 - 01/05/01

DATE REPORTED :- 22/05/01

QA/QC DETAILS :- The QA/QC for these samples is detailed in this report no : 146343

A total of 3 duplicate and 1 method blank analyses or sets of analyses were carried out on this batch of samples.

All QA/QC results for duplicates, method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- The results in this report supersede any previously corresponded results.

  
Michael Wright  
Laboratory Manager

