Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

TA57

Date: November 26, 1997
In Reply Refer To: ESH-18/WQ&H:97-0409
Mail Stop: K497
Telephone: (505) 667-7969

Mr. Mark Ashley
Oil Conservation Division
State of New Mexico Energy, Minerals, and
Natural Resources Department
2040 South Pacheco Street
Santa Fe, New Mexico 87505

SUBJECT: MILAGRO PROJECT LAND APPLICATION SITE: POST-APPLICATION SOIL SAMPLING FOR 1997

Dear Mr. Ashley:

In April 1995 your Division conditionally approved Los Alamos National Laboratory's Notice of Intent to Discharge (NOI) for the Milagro Project at Fenton Hill. In accordance with the conditions of this approval, the Laboratory has conducted four rounds of soil sampling at Fenton Hill: (1) pre-application 1995; (2) post-application 1995; (3) post-application 1996; and (4) post-application 1997. The analytical report for post-application sampling in 1997 has been enclosed. In addition, I have enclosed two tables (Tables 1.0 and 2.0) which summarize all four sampling rounds. A map showing the sampling sites has also been enclosed.

In 1997 all of the down-gradient surface and sub-surface sampling locations (SS1, SBS1, SS2, SBS2, SS3, and SBS3) continued to show arsenic concentrations equivalent to pre-application or background conditions (See Tables 1.0 and 2.0). These stable arsenic concentrations strongly indicate that the arsenic is remaining within the application site and is not migrating down-gradient into the watercourse. In 1997 the two surface sampling locations within the application site (SS4, SS5) showed an increase in arsenic concentrations over the 1996 results (See Table 1.0). The sub-surface sampling locations within the application site (SBS4, SBS5) did not show any change from the three previous sampling rounds (See Table 2.0).

With the exception of arsenic, the total metals concentrations at all five sampling locations have shown to be stable throughout the four sampling rounds with no significant increases occurring as a result of the land application activities (See Tables 1.0 and 2.0). In view of these findings, the Laboratory is requesting a waiver from your Division from future sampling for the following metals: Ag, Ba, Be, Cd, Cr, Ni, Pb, Sb, Se, Tl, and Hg.

Due to the variability in the past three year's analytical results for arsenic at sampling locations SS4 and SS5, the Laboratory proposes to continue to monitor arsenic concentrations at the application site and down-gradient sampling locations in 1998.

If you have any questions regarding the enclosed analytical report or the Laboratory's request for a waiver, please contact me at 667-7969.

3711

Sincerely,

Bob Beers
Water Quality and Hydrology Group

BB/mv

Enclosures: a/s

Cy: S. Boyce, Forest Service, Jemez Springs, w/enc.
G. Saums, NMED SWQB, Santa Fe, NM, w/enc.
S. Rae, ESH-18, w/ enc., MS K497
N. Williams, ESH-18, w/enc., MS K497
J. Plum, DOE/LAAO, w/enc., MS A316
G. Sinnis, P-23, w/enc., MS H803
WQ&H File, w/enc., MS K497
CIC-10, w/enc., MS A150

Milagro Project Land Application Site
Pre- and Post-Application Monitoring Data
Summary Table 1.0

Units: ppm

Analyte	Sampling Location: SS1				Sampling Location: SS2				Sampling Location: SS3				Sampling Location: SS4				Sampling Location: SS5			
	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	**3.0**	**3.0**	**<3**	**<3**	**3.0**	**3.0**	**<3**	**<3**	**2.0**	**3.0**	**<3**	**<3**	**3.0**	**24.0**	**3.9**	**8.6**	**2.0**	**18.0**	**<3**	**10.7**
Ba	180	170	191	181	180	150	157	89.8	130	170	111	159	190	160	127	142	120	100	84.8	97.8
Be	0.45	0.78	ND	ND	0.51	0.81	0.54	0.55	0.59	0.93	ND	ND	0.84	1.1	0.65	0.59	0.33	ND	ND	ND
Cd	ND	3.6	ND	ND	ND	4.3	ND	ND	ND	4.0	ND	ND	ND	4.0	ND	ND	ND	3.8	ND	ND
Cr	5.9	8.5	3.9	3.5	7.2	7.2	4.0	2.9	6.4	5.2	3.1	3.7	9.3	10.0	5.6	4.8	6.5	4.9	3.3	3.2
Ni	3.9	12.0	4.5	3.6	6.2	9.6	4.7	2.9	4.8	13.0	3.4	3.5	9.1	14.0	5.9	4.5	6.8	11.0	3.7	2.7
Pb	18.0	8.7	18.3	15.2	18	9.8	11.2	7.3	<20	13.0	11.1	8.7	15.0	ND	12.8	10.4	14.0	9.6	10.6	8.6
Sb	0.25	ND	ND	3.3	ND	ND	ND	3.3	ND	ND	ND	3.6	ND	ND	ND	4.0	ND	ND	ND	4.3
Se	0.5	0.6	ND	ND	0.6	0.4	ND	ND	0.6	0.5	NA	ND	0.6	0.5	ND	ND	0.5	0.3	ND	ND
Tl	0.37	0.37	ND	NA	0.25	ND	ND	NA	0.37	ND	ND	NA	0.37	ND	ND	NA	0.25	ND	ND	NA
Hg	0.02	0.03	ND	NA	ND	0.03	ND	NA	0.01	0.03	ND	NA	ND	0.03	ND	NA	0.04	0.03	ND	NA

NOTE:
ND= Analyte not detected above Sample Detection Limit (SDL)
NA= No analysis conducted for this analyte.

Milagro Project Land Application Site
Pre- and Post-Application Monitoring of Sub-Surface Soils
Summary Table 2.0

Units: ppm

Analyte	Sampling Location: SBS1				Sampling Location: SBS2				Sampling Location: SBS3				Sampling Location: SBS4				Sampling Location: SBS5			
	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997	Pre-Application 1995	Post-Application 1995	Post-Application 1996	Post-Application 1997
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
As	1.0	2.0	<3	<3	2.0	3.0	<3	<3	2.0	4.0	<3	<3	4.0	4.0	<3	<3	2.0	3.0	<3	<3
Ba	38	44	43.2	38.4	110	57	39.1	31.2	82	83	78.5	110	78	56	47	53.9	51	32	24.7	49
Be	0.42	ND	0.65	0.76	0.74	1.3	0.82	0.72	0.79	1.1	0.68	0.82	1.2	0.98	0.54	0.56	0.18	ND	ND	ND
Cd	ND	4.7	ND	ND	ND	4.9	ND	ND	ND	3.6	ND	ND	ND	4.1	ND	ND	ND	3.8	ND	ND
Cr	3.2	4.9	4.2	2.9	8.3	7.7	2.9	2.9	7.6	8.8	4.2	6.5	9.4	6.3	4.2	5.5	3.7	4.9	4.6	2.6
Ni	4.8	8.6	3.5	2.2	8.0	<12	2.9	3.5	4.8	13.0	3.7	5.0	7.0	8.4	3.3	3.7	ND	11.0	3.3	2.0
Pb	9.1	9.9	9.4	7.3	11.0	<7.4	9.8	8.0	<17	<7.4	8.9	6.6	18.0	8.7	9.6	6.4	<13	<7.4	7.4	6.2
Sb	ND	ND	ND	3.2	ND	ND	ND	3.5	ND	ND	ND	5.0	ND	ND	ND	5.0	ND	ND	ND	3.9
Se	0.3	0.3	ND	ND	0.5	ND	ND	ND	0.4	0.4	ND	ND	0.6	0.3	ND	ND	0.3	ND	ND	ND
Tl	0.25	ND	ND	NA	0.37	ND	ND	NA	0.37	ND	ND	NA	0.37	ND	ND	NA	ND	ND	ND	NA
Hg	ND	0.01	ND	NA	ND	0.03	ND	NA	0.03	0.03	ND	NA	0.05	0.03	ND	NA	0.02	0.03	ND	NA

NOTE:
ND= Analyte not detected above Sample Detection Limit (SDL)
NA= No analysis conducted for this analyte.

ASSAIGAI
ANALYTICAL
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Report Generated:
October 23, 1997 09:40

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT TO: LOS ALAMOS NATIONAL LABS
PO BOX 1663-MSK497
LOS ALAMOS, NM 87545

ATTN: BOB BEERS

WORKORDER # : 9710107
WORK ID : FENTON HILL LAND APP SITE
CLIENT CODE : LOS10
DATE RECEIVED : 10/10/97

Lab ID: 9710107-01A
Sample ID: 57-SS1-97
Collected: 10/09/97 10:40:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	181	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	3.5	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.6	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	15.2	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.3	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-02A
Sample ID: 57-SBS1-97
Collected: 10/09/97 11:05:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	38.4	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.76	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735

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Lab ID: 9710107-02A
Sample ID: 57-SBS1-97

Collected: 10/09/97 11:05:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
METALS-ICP SW846 6010						
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.2	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	7.3	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.2	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-03A
Sample ID: 57-SS2-97

Collected: 10/09/97 11:20:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	89.8	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.55	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.9	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	7.3	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.3	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-04A
Sample ID: 57-SBS2-97

Collected: 10/09/97 11:38:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735

Lab ID: 9710107-04A
Sample ID: 57-SBS2-97

Collected: 10/09/97 11:38:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
METALS-ICP/SW846 6010						
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	31.2	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.72	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.5	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	8.0	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.5	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-05A
Sample ID: 57-SS3-97

Collected: 10/09/97 13:25:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	159	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	3.7	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.5	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	8.7	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.6	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-06A
Sample ID: 57-SBS3-97

Collected: 10/09/97 13:40:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	110	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.82	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	6.5	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	5.0	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	6.6	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	5.0	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-07A
Sample ID: 57-SS4-97

Collected: 10/09/97 09:50:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	[illegible]
Aluminum, Al	NT	mg/Kg	25			[illegible]
Arsenic, As	8.6	mg/Kg	3.0	1.0	10/15/97	[illegible]
Barium, Ba	142	mg/Kg	0.50	1.0	10/15/97	[illegible]
Beryllium, Be	0.59	mg/Kg	0.50	1.0	10/15/97	[illegible]
Calcium, Ca	NT	mg/Kg	15			[illegible]
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	[illegible]
Cobalt, Co	NT	mg/Kg	0.50			[illegible]
Chromium, Cr	4.8	mg/Kg	1.0	1.0	10/15/97	[illegible]
Copper, Cu	NT	mg/Kg	0.50			[illegible]
Iron, Fe	NT	mg/Kg	15			[illegible]
Potassium, K	NT	mg/Kg	10			[illegible]
Magnesium, Mg	NT	mg/Kg	10			[illegible]
Manganese, Mn	NT	mg/Kg	0.25			[illegible]
Sodium, Na	NT	mg/Kg	15			[illegible]
Nickel, Ni	4.5	mg/Kg	2.0	1.0	10/15/97	[illegible]
Lead, Pb	10.4	mg/Kg	2.0	1.0	10/15/97	[illegible]
Antimony, Sb	4.0	mg/Kg	1.5	1.0	10/15/97	[illegible]
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	[illegible]
Thallium, Tl	NT	mg/Kg	20			[illegible]
Vanadium, V	NT	mg/Kg	0.15			[illegible]
Zinc, Zn	NT	mg/Kg	5.0			[illegible]

Lab ID: 9710107-08A
Sample ID: 57-SBS4-97

Collected: 10/09/97 10:00:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	53.9	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	0.56	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	5.5	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	3.7	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	6.4	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	5.0	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-09A
Sample ID: 57-SS5-97

Collected: 10/09/97 10:10:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	8.7	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	79.8	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	3.2	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.7	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	7.4	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	4.3	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-10A
Sample ID: 57-SS5-DUP-97

Collected: 10/09/97 10:10:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	10.7	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	97.8	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.9	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.7	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	8.6	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.8	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Lab ID: 9710107-11A
Sample ID: 57-SBS5-97

Collected: 10/09/97 10:20:00
Matrix: SOIL

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
Metal(ICP) DIG /SW846 3050	10/13/97	N/A				
METALS-ICP/SW846 6010						
Silver, Ag	ND	mg/Kg	1.0	1.0	10/15/97	M97735
Aluminum, Al	NT	mg/Kg	25			M97735
Arsenic, As	ND	mg/Kg	3.0	1.0	10/15/97	M97735
Barium, Ba	49.0	mg/Kg	0.50	1.0	10/15/97	M97735
Beryllium, Be	ND	mg/Kg	0.50	1.0	10/15/97	M97735
Calcium, Ca	NT	mg/Kg	15			M97735
Cadmium, Cd	ND	mg/Kg	0.20	1.0	10/15/97	M97735
Cobalt, Co	NT	mg/Kg	0.50			M97735
Chromium, Cr	2.6	mg/Kg	1.0	1.0	10/15/97	M97735
Copper, Cu	NT	mg/Kg	0.50			M97735
Iron, Fe	NT	mg/Kg	15			M97735
Potassium, K	NT	mg/Kg	10			M97735
Magnesium, Mg	NT	mg/Kg	10			M97735
Manganese, Mn	NT	mg/Kg	0.25			M97735
Sodium, Na	NT	mg/Kg	15			M97735
Nickel, Ni	2.0	mg/Kg	2.0	1.0	10/15/97	M97735
Lead, Pb	6.2	mg/Kg	2.0	1.0	10/15/97	M97735
Antimony, Sb	3.9	mg/Kg	1.5	1.0	10/15/97	M97735
Selenium, Se	ND	mg/Kg	2.5	1.0	10/15/97	M97735
Thallium, Tl	NT	mg/Kg	20			M97735
Vanadium, V	NT	mg/Kg	0.15			M97735
Zinc, Zn	NT	mg/Kg	5.0			M97735

Wm. P. Biava

William P. Biava
President

WORKORDER COMMENTS

DATE : 10/23/97
WORKORDER:

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND = Analyte "not detected" in analysis at the sample specific detection limit.
D_F = Sample "dilution factor"
NT = Analyte "not tested" per client request.
B = Analyte was also detected in laboratory method QC blank.
E = Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT = The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS