

Summary Status Report Bioremediation Pad Cleanup Results

at the

Storey Gas Station Facility

for

**Suzanne Storey
Cle Elum, Washington**

prepared by



GALLOWAY ENVIRONMENTAL, INC.
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January 2002



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15 January 2002

Storey Gas Station Facility
Attn. Ms. Suzanne Storey
1310 East First Street
Cle Elum, Washington 98922

**SUBJECT: Summary Status Report — Bioremediation Results at the Storey Station,
1310 East First Street, Cle Elum, Washington**

Dear Ms. Storey:

This letter report presents a summary of Galloway Environmental, Inc.'s (GEI's) findings from Bioremediation Pad Soil Sample Results at the above-referenced site.

This phase of work was targeted to document the cleanup of on-site bioremediation of petroleum-impacted soil. The scope of work for this phase of GEI's Cleanup Action Plan (approved by the WDOE June 19, 2000) includes collecting and analyzing soil samples from Bioremediation Pad.

BACKGROUND

The Washington Department of Ecology (WDOE or Ecology) issued an Agreed Order to the Storey Gas Station (the "Site") on or about October 24, 1997. Ecology's Findings of Fact concluded that water and soil samples confirmed the presence of "hazardous substances" as defined by the Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC (MTCA) on the subject property (*Phase I and Phase II Environmental Site Assessment, Former and Current Service Stations and Bulk Storage Facilities, Cle Elum, Washington, WDOE Central Region Office, December 1996*).

Attached to the Agreed Order was a Statement of Work for the Remedial Design/Feasibility Study (RI/FS) at the Site. The scope of work of the RI/FS was based on MTCA. The objective of the RI/FS was to develop data sufficient to characterize the contamination and identify remedial options for the environmental cleanup of the Site in accordance with WAC 173-340.

GEI completed an RI/FS for the subject property in March 2000. The RI/FS confirmed that petroleum compounds remained belowground at the Site above the WDOE's acceptable Model Toxics Control Act (MTCA) in soil. Based on the WDOE's acceptance of the RI/FS (May 2000), GEI developed a Cleanup Action Plan (CAP) for the site in May 2000. The Plan was approved by the WDOE in June 2000. The remedial action activities outlined in the CAP included the following scope of work:

- 1) On-site bioremediation of approximately 600 cubic yards of petroleum-impacted soil in a secure, lined treatment cell;
- 2) Groundwater quality monitoring of four on-site groundwater wells; and
- 3) A Final Cleanup Action Report will be submitted to the Washington Department of Ecology ("WDOE" or "Ecology") within 30 days following the successful on-site remediation of petroleum-impacted soils currently stockpiled on-site.

RESULTS AND CONCLUSIONS

The following summary is based on field observations and chemical analytical results of samples collected during this phase of remedial action.

Bioremediation Soil Sample Results

The petroleum-impacted soils contained in the on-site bioremediation pad have been sampled and analyzed three times since the pad was constructed in July 2000 (*see Attachment A - Site Plan Map*). Laboratory results of the sampling confirmed that gasoline-range petroleum hydrocarbons were not detected in any of the soil samples.

Recent soil sampling and analysis of the pad have confirmed that heavy oil- and diesel-range hydrocarbons are within the currently acceptable MTCA Method A cleanup levels in the soil. These results are listed in the attached table and the average concentrations are summarized as follows:

September 27, 2000 Soil Sample Results - GEI collected six discreet soil samples from representative grid cells evenly distributed throughout the pad (*see Attachment A - Figure 1 Sample Location Map, attached*). Diesel-range hydrocarbons averaged 453.33 mg/kg and Heavy Oil-range hydrocarbons averaged 208.33 mg/kg.

Based on these results, GEI added petroleum degrading microorganisms and nutrients into the soil to enhance the remediation of the soil. The soil was mixed approximately every week to assist in distributing the microbes and nutrients throughout the soil.

November 29, 2000 Soil Sample Results - GEI collected six discreet soil samples from representative grid cells evenly distributed throughout the pad (*see Attachment A - Figure 2 Sample Location Map, attached*). Diesel-range hydrocarbons averaged 356.67 mg/kg and Heavy Oil-range hydrocarbons averaged 218.33 mg/kg.

Based on these results, GEI has discontinued tilling the soil until the soil thaws early next spring and the microbial degradation of the petroleum becomes active.

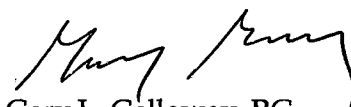
October 17, 2001 Soil Sample Results - GEI collected six discreet soil samples from representative grid cells evenly distributed throughout the pad (*see Attachment A - Figure 3 Sample Location Map, attached*). Diesel-range hydrocarbons averaged 268.33 mg/kg and Heavy Oil-range hydrocarbons averaged 140.00 mg/kg (*see Laboratory Data Sheets, attached*).

Based on these results, GEI has discontinued tilling the soil until the soil thaws early next spring and the microbial degradation of the petroleum becomes active. See table below and Attachment B Laboratory Chemical Results for summary on sample analyses.

TABLE - BIOREMEDIATION PAD SAMPLE RESULTS SUMMARY (mg/kg or ppm)				
Date	Sample Number	Gasoline	Diesel	Heavy Oil
9/27/00	SNW 9/27/00	ND	540	210
"	SNE 9/27/00	ND	320	180
"	SCN 9/27/00	ND	510	220
"	SCS 9/27/00	ND	580	240
"	SSW 9/27/00	ND	370	200
"	SSE 9/27/00	ND	400	200
Average concentrations		---	453	208
11/29/00	SGS1129 1 @ CS	Not Tested	470	200
"	SGS1129 2 @ CS	Not Tested	300	180
"	SGS1129 3 @ CS	Not Tested	220	140
"	SGS1129 4 @ CS	Not Tested	410	300
"	SGS1129 5 @ CS	Not Tested	300	160
"	SGS1129 6 @ CS	Not Tested	440	330
Average concentrations		---	357	218
10/17/01	STOREY BP-1	Not Tested	220	130
"	STOREY BP-2	Not Tested	240	130
"	STOREY BP-3	Not Tested	220	120
"	STOREY BP-4	Not Tested	260	120
"	STOREY BP-5	Not Tested	390	200
"	STOREY BP-6	Not Tested	280	140
Average concentrations		---	268	140
WDOE MTCA Method A Cleanup Levels (August 2001)			2000	2000

Should you have any questions regarding this report or if you would like to discuss our findings, please call me at (425) 688-8852.

Respectfully Submitted,
GALLOWAY ENVIRONMENTAL, INC.



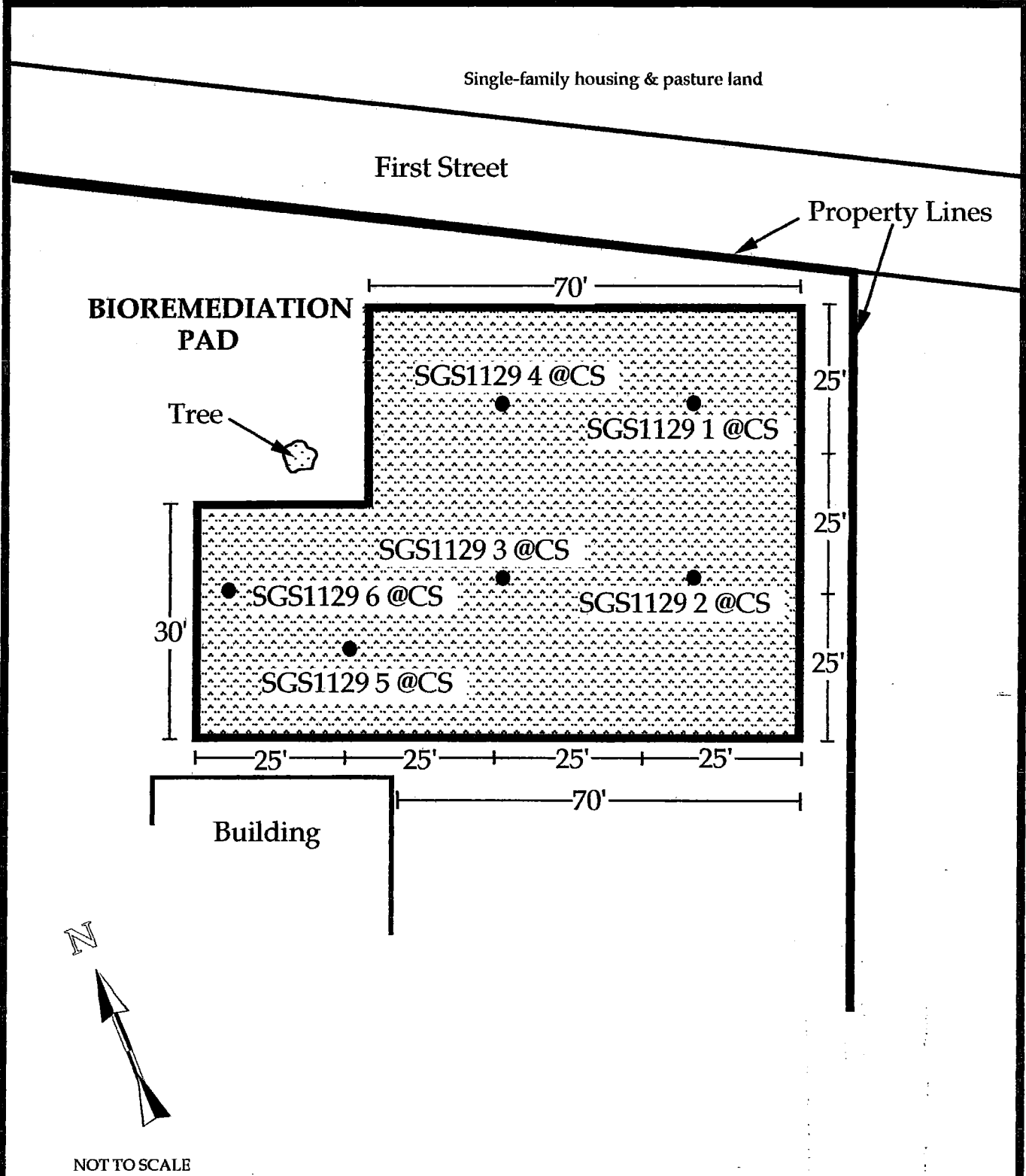
Gary L. Galloway, RG
President

cc: Tom Myler - Marine Vacuum Services
Chung Ki Yee, WDOE Central Division (faxed to 509 575-2809)

ATTACHMENT A

***Bioremediation Pad
Sample Location Maps***

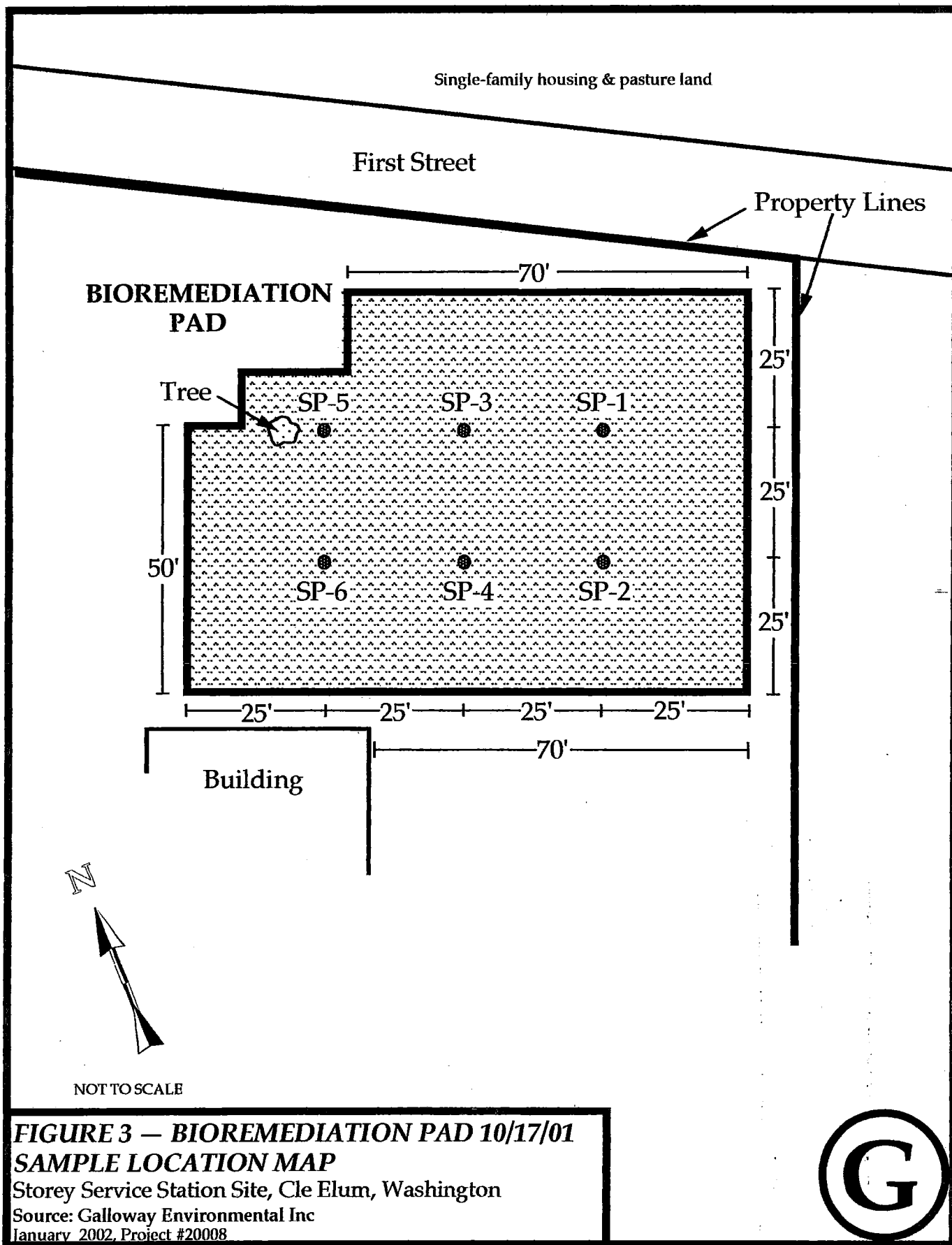




NOT TO SCALE

FIGURE 2 — BIOREMEDIATION PAD 11/29/00
SAMPLE LOCATION MAP
Storey Service Station Site, Cle Elum, Washington
Source: Galloway Environmental Inc
January 2002, Project #20008





**FIGURE 3 — BIOREMEDIATION PAD 10/17/01
SAMPLE LOCATION MAP**

Storey Service Station Site, Cle Elum, Washington

Source: Galloway Environmental Inc

January 2002, Project #20008



ATTACHMENT B

Laboratory Chemical Results



**OnSite
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

October 19, 2001

Gary Galloway
Galloway Environmental, Inc.
3102 220th Place SE
Samamish, WA 98075

Re: Analytical Data for Project Storey
Laboratory Reference No. 0110-147

Dear Gary:

Enclosed are the analytical results and associated quality control data for samples submitted on October 17, 2001.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

Date of Report: October 19, 2001
Samples Submitted: October 17, 2001
Lab Traveler: 10-147
Project: Storey

NWTPH-Dx

Date Extracted: 10-18-01
Date Analyzed: 10-18-01

Matrix: Soil
Units: mg/Kg (ppm)

Client ID:	STOREY BP-1	STOREY BP-2	STOREY BP-3
Lab ID:	10-147-01	10-147-02	10-147-03

Diesel Fuel:	220	240	220
PQL:	28	29	28
Heavy Oil:	130	130	120
PQL:	56	57	57

Surrogate Recovery:			
o-Terphenyl	112%	105%	105%

Flags:

Date of Report: October 19, 2001
Samples Submitted: October 17, 2001
Lab Traveler: 10-147
Project: Storey

NWTPH-Dx

Date Extracted: 10-18-01
Date Analyzed: 10-18-01

Matrix: Soil
Units: mg/Kg (ppm)

Client ID:	STOREY BP-4	STOREY BP-5	STOREY BP-6
Lab ID:	10-147-04	10-147-05	10-147-06
Diesel Fuel:	260	390	280
PQL:	28	27	27
Heavy Oil:	120	200	140
PQL:	57	55	55
Surrogate Recovery:			
o-Terphenyl	88%	74%	134%

Flags:

Date of Report: October 19, 2001
Samples Submitted: October 17, 2001
Lab Traveler: 10-147
Project: Storey

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted: 10-18-01
Date Analyzed: 10-18-01

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: MB1018S1

Diesel Fuel: ND
PQL: 25

Heavy Oil: ND
PQL: 50

Surrogate Recovery:
o-Terphenyl 98%

Flags:

Date of Report: October 19, 2001
Samples Submitted: October 17, 2001
Lab Traveler: 10-147
Project: Storey

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 10-18-01
Date Analyzed: 10-18-01

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: 10-147-06 10-147-06 DUP

Diesel Fuel: 256 227
PQL: 25 25

RPD: 12

Surrogate Recovery:
o-Terphenyl 134% 125%

Flags:

Date of Report: October 19, 2001
Samples Submitted: October 17, 2001
Lab Traveler: 10-147
Project: Storey

% MOISTURE

Date Analyzed: 10-18-01

Client ID	Lab ID	% Moisture
STOREY BP-1	10-147-01	10
STOREY BP-2	10-147-02	13
STOREY BP-3	10-147-03	12
STOREY BP-4	10-147-04	12
STOREY BP-5	10-147-05	9
STOREY BP-6	10-147-06	9