



NORTHERN ENVIROSEARCH LTD.
 620, 703 - 6th Avenue SW.
 Calgary, Alberta T2P 0T9
 Phone: (403) 543-5353 Fax: (403) 233-2513

FILES 503LI-015
 503LI-016
 504LI-011
 504LI-012

Date: March 2/05

Company: Sahtu Land and Water Board

COPY

Attention: Tom Bradbury

Fax Number (Including area code): (867) 598-2325

From: Sandra Lukas-Amulung

Comments: please find attached a response
to the SLWB's WMP, Baseline soil
Sampling and Additional Information
Request dated February 15, 2005,
Re: Apache Canada Ltd. Water Licences
503LI-015, 503LI-016, 504LI-011

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You should receive 15 pages, including cover. If you do not receive all of the pages, please call as soon as possible.

Transmitted By: SA

NORTHERN ENVIROSEARCH Ltd.

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ENVIROSEARCH LTD.**

330, 703 - 6 Avenue S.W., Calgary, AB T2P 0T9 Ph: 403-543-5353 Fax: 403-233-2513

March 1, 2005

Sahtu Land and Water BoardP.O. Box #1
Fort Good Hope, NT
X0E 0H0
By fax: (867) 598-2325**Attention: Tom Bradbury, Water Technician**

Dear Tom:

Re: Request for Waste Management Plans (WMPs), Baseline Soil Sampling and Additional Information for Apache Water Licences: S03L1-015, S03L1-016, S04L1-011 and S04L1-012

Northern EnviroSearch Ltd. (NESL) submits the following Water Licence information behalf of Apache Canada Ltd. (Apache) in response to the Sahtu Land and Water Board (SLWB) letter dated February 15, 2005. The Board's summary of required compliance documents has prompted an investigation of the project files and laboratory database in an effort to supply the Board with any outstanding analytical reports, where available. For analytical results and inspection reports that cannot be submitted at this time, an approximate time period for completion of these requirements is provided below. "Summer 2005" refers to work that will be conducted June-September under snow-free, thawed ground conditions unless otherwise specified.

C-34 Wellsite

The baseline drill pad soil sample will be obtained concurrently with the annual summer inspection, using the method described in the Board's letter of February 15, 2005. The soil will be sampled during the summer of 2005. In the future, annual inspections will include an inspection of remote sumps. The remote sump used for the C-34 program will be inspected in the summer of 2005.

L-80 Wellsite

The drill pad baseline and drilling sump suitability analytical reports were submitted by fax to the SLWB and INAC on February 18, 2005. While L-80 was licenced along with C-34 under S03L1-015 in 2003, the well was not spudded until 2005. The first annual summer inspection of this location will be conducted during summer 2005.

K-14 Wellsite

The baseline drill pad soil sample will be obtained concurrently with the annual summer inspection, using the method described in the Board's letter of February 15, 2005. The soil will be sampled during the summer of 2005.

B-23 Wellsite

Please find attached the baseline drill pad soil analytical report for B-23. The annual summer inspection of the B-23 location will be conducted during the summer of 2005.

Sahtu Land and Water Board
Tom Bradbury
March 1, 2005

Water Licence Compliance Submissions
Apache Canada Ltd. Sahtu Drilling Program
Page 2 of 2

E-44 Wellsite

Although E-44 was not drilled in 2004, drill pad baseline and sump suitability soil samples were obtained and analyzed in February 2004. The results have been attached in anticipation of possible future activities at this location.

E-35 Wellsite

The E-35 well was spudded during the 2004/2005 winter drilling season. Apache plans to conduct the E-35 annual summer inspection during the summer of 2005.

A-67 Wellsite

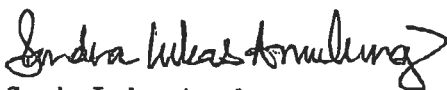
The A-67 well was spudded during the 2004/2005 winter drilling season. Apache plans to conduct the A-67 annual summer inspection during the summer of 2005.

In addition to the above indicated drilling locations, Apache's Turton Lake 2004/2005 Drilling Program consists of 2 locations: G-47 and L-23. The G-47 waste management plan was submitted to the Board and INAC by fax on February 15, 2005 and the sump suitability analytical report was forwarded to the Board during the week of February 21, 2005. Please note that at the time of the site assessment and soil sampling program the Turton Lake drilling locations were known as F-47 and N-23. Once the sites were surveyed the names were revised to G-47 and L-23, respectively. The baseline drill pad analytical reports for both locations are attached.

Should you have any further requests for information, please contact:

David Calvert
Manager Surface Land
Aboriginal and Community Relations
Apache Canada Ltd.
(403) 303-1826 (ph)
(403) 261-1208 (fax)
david.calvert@apachecorp.com

Sincerely,
NORTHERN ENVIROSEARCH LTD.



Sandra Lukas-Amulung
Environmental Technologist

Cc: David Calvert, Apache Canada Ltd.
Steve Deschene, Water Licence Inspector – Turton Lake Program
Armin Johnson, Water Licence Inspector – Maunoir/Nogha Program
Kevin Glowa, Water Licence Inspector – Inuvik

Attachments:

1. B-23 Drill Pad Baseline Analytical Report
2. E-44 Drill Pad Baseline and Sump Suitability Analytical Reports
3. F-47 and N-23 Drill Pad Baseline Analytical Report (determined to be G-47 and L-23 post-survey)



Analytical Report

Norwest Labs
 7217 Reper Road
 Edmonton, AB, T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Northern EnviroSearch
 Report to: Northern EnviroSearch
 330, 703 - 6 Avenue SW
 Calgary, AB, Canada
 T2P 0T9
 Attn: Bob Raina
 Sampled By: NA
 Company: NESL

Project ID: 1778NT04
 Name: Apache
 Location: B-23
 LSD:
 P.O.: 1778NT04
 Acct. Code:

NWL Lot ID: 285476
 Control Number: E 84231
 Date Received: Jan 29, 2004
 Date Reported: Feb 04, 2004
 Report Number: 511497

NWL Number 285476-1
 Sample Date Jan 26, 2004
 Sample Description Nogha B-23 / Well Centre
 Matrix Soil - general

Analyte	Units	Results	Results	Results	Detection Limit
Classification					
Cation Exchange Capacity	meq/100g	24.9			
Salinity					
pH	Saturated Paste pH	7.6			
Electrical Conductivity	Saturated Paste dS/m at 25C	0.50			0.01
SAR	Saturated Paste	0.1			
% Saturation	%	40			
Calcium	Saturated Paste meq/L	3.92			0.01
Calcium	Saturated Paste mg/kg	31.6			
Magnesium	Saturated Paste meq/L	2.39			0.02
Magnesium	Saturated Paste mg/kg	11.7			
Sodium	Saturated Paste meq/L	0.20			0.04
Sodium	Saturated Paste mg/kg	2			
Potassium	Saturated Paste meq/L	0.07			0.03
Potassium	Saturated Paste mg/kg	1			
Chloride	Saturated Paste meq/L	0.19			0.03
Chloride	Saturated Paste mg/kg	3			
Sulphate-S	Saturated Paste meq/L	1.90			0.06
Sulphate-S	Saturated Paste mg/kg	12.2			
TGR	Saturated Paste T/ac	<0.1			
Specific Gravity	Saturated Paste	1.698			
Specific Gravity	As Received	2.163			

NWL Number	285476-1	285476-2
Sample Date	Jan 26, 2004	Jan 26, 2004
Sample Description	Nogha B-23 / Well Centre	Nogha B-23 / Sump
Matrix	Soil - general	Soil - general

Analyte	Units	Results	Results	Results	Detection Limit
Physical and Aggregate Properties					
Hydraulic Conductivity	cm/hr	-	0.347		
Hydraulic Conductivity	cm/s	-	0.0000965		
% solids	Wet Weight %	85.0	-		0.1



**NORWEST
LABS**

Analytical Report

Norwest Labs
7217 Reper Road
Edmonton, AB. T6B 3J4
Phone: (780) 438-5522
Fax: (780) 438-0386

Bill to: Northern EnviroSearch
Report to: Northern EnviroSearch
330, 703 - 6 Avenue SW
Calgary, AB, Canada
T2P 0T9
Attn: Bob Raina
Sampled By: NA
Company: NESL

Project
ID: 1778NT04
Name: Apache
Location: B-23
LSD:
P.O.: 1778NT04
Acct. Code:

NWL Lot ID: 285476
Control Number: E 84231
Date Received: Jan 29, 2004
Date Reported: Feb 04, 2004
Report Number: 511497

Page: 2 of 3

Approved by:

Anthony Neumann, MSc
Laboratory Operations Manager



Methodology and Notes

Norwest Labs
 7217 Roper Road
 Edmonton, AB, T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0398

Bill to: Northern EnviroSearch
 Report to: Northern EnviroSearch
 330, 703 - 6 Avenue SW
 Calgary, AB, Canada
 T2P 0T9
 Attn: Bob Raina
 Sampled By: NA
 Company: NESL

Project ID: 1778NT04
 Name: Apache
 Location: B-23
 LSD:
 P.O.: 1778NT04
 Acct. Code:

NWL Lot ID: 285476
 Control Number: E 84231
 Date Received: Jan 29, 2004
 Date Reported: Feb 04, 2004
 Report Number: 511497

Method of Analysis:

MethodName	Reference	Method	Date Analysis Started	Location
Cation Exchange Capacity (CEC) - Ammonium	McKeague	* CEC and Exchangeable Cations by NH4OAc at pH 7, 3.32	3-Feb-04	Norwest Labs Edmonton
Hydraulic Conductivity	Agronomy No 9, Part 1	* Hydraulic Conductivity of Saturated Soils, 28-4	3-Feb-04	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* Soluble Salts in Saturation Extract, 3.21	2-Feb-04	Norwest Labs Edmonton

* Norwest method(s) is based on reference method

References:

Agronomy No 9, Part 1
 McKeague
 Methods Of Soil Analysis, Part 1
 Manual on Soil Sampling and Methods of Analysis

Comments:

Please direct any inquiries regarding this report to our Client Services group.
 Results relate only to samples as submitted

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Analytical Report

Norwest Labs
 7217 Roper Road
 Edmonton, AB. T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Northern EnviroSearch
 Report to: Northern EnviroSearch
 330, 703 - 6 Avenue SW
 Calgary, AB, Canada
 T2P 0T9
 Attn: Sandra Lukus-Amulung
 Sampled By: S. M.
 Company: NESL

Project
 ID: 1778NT04
 Name: Apache E-44
 Location: Colville, NT
 LSD:
 P.O.: 1778NT04
 Acct. Code:

NWL Lot ID: 291063
 Control Number: E 84179
 Date Received: Feb 25, 2004
 Date Reported: Mar 03, 2004
 Report Number: 520340

Page: 1 of 3

NWL Number	291063-1	291063-2
Sample Date	Feb 18, 2004	Feb 18, 2004
Sample Description	E-44 Sump	E-44 Well Centre / .
Matrix	Soil - general	Soil - general

Analyte	Units	Results	Results	Results	Detection Limit
Physical and Aggregate Properties					
Hydraulic Conductivity	cm/hr	0.179	-		
Hydraulic Conductivity	cm/s		-		
		0.0000497			
Texture		Clay Loam			
Sand	Soil Texture	% by weight	25.6	-	0.1
Silt	Soil Texture	% by weight	38.4	-	0.1
Clay	Soil Texture	% by weight	36.0	-	0.1
solids	Wet Weight	%	-	82.7	0.1



Analytical Report

Norwest Labs
7217 Roper Road
Edmonton, AB. T6B 3J4
Phone: (780) 438-5522
Fax: (780) 438-0398

Bill to: Northern EnviroSearch
Report to: Northern EnviroSearch
330, 703 - 6 Avenue SW
Calgary, AB, Canada
T2P 0T9
Attn: Sandra Lukus-Amulung
Sampled By: S. M.
Company: NESL

Project
ID: 1778NT04
Name: Apache E-44
Location: Colville, NT
LSD:
P.O.: 1778NT04
Acct. Code:

NWL Lot ID: 291063
Control Number: E 84179
Date Received: Feb 25, 2004
Date Reported: Mar 03, 2004
Report Number: 520340

Page: 2 of 3

NWL Number 291063-2
Sample Date Feb 18, 2004
Sample Description E-44 Well Centre / .
Matrix Soil - general

Analyte	Units	Results	Results	Results	Detection Limit
Classification					
Cation Exchange Capacity	meq/100g	18.2			
Salinity					
pH	Saturated Paste pH	7.8			
Electrical Conductivity	Saturated Paste dS/m at 25C	0.82			0.01
SAR	Saturated Paste	0.2			
% Saturation	%	54			
Calcium	Saturated Paste meq/L	5.80			0.01
Calcium	Saturated Paste mg/kg	63.1			
Magnesium	Saturated Paste meq/L	3.12			0.02
Magnesium	Saturated Paste mg/kg	20.5			
Sodium	Saturated Paste meq/L	0.47			0.04
Sodium	Saturated Paste mg/kg	6			
Potassium	Saturated Paste meq/L	0.33			0.03
Potassium	Saturated Paste mg/kg	7			
Chloride	Saturated Paste meq/L	0.32			0.03
Chloride	Saturated Paste mg/kg	6			
Sulphate-S	Saturated Paste meq/L	7.69			0.06
Sulphate-S	Saturated Paste mg/kg	67.0			
TGR	Saturated Paste T/ac	<0.1			
Specific Gravity	Saturated Paste	1.650			
Specific Gravity	As Received	2.010			

Approved by:

Doug Keyes, MSc
Senior Scientist



**NORWEST
LABS**

Methodology and Notes

Norwest Labs
7217 Roper Road
Edmonton, AB. T6B 3J4
Phone: (780) 438-5522
Fax: (780) 438-0306

Bill to: Northern EnviroSearch
Report to: Northern EnviroSearch
330, 703 - 6 Avenue SW
Calgary, AB, Canada
T2P 0T9
Attn: Sandra Lukus-Amulung
Sampled By: S. M.
Company: NESL

Project
ID: 1778NT04
Name: Apache E-44
Location: Colville, NT
LSD:
P.O.: 1778NT04
Acct. Code:

NWL Lot ID: 291063
Control Number: B 84179
Date Received: Feb 25, 2004
Date Reported: Mar 03, 2004
Report Number: 520340

Page: 3 of 3

Method of Analysis:

Method Name	Reference	Method	Date Analysis Started	Location
Cation Exchange Capacity (CEC) - Ammonium	McKeague	* CEC and Exchangeable Cations by NH ₄ OAc at pH 7, 3.32	2-Mar-04	Norwest Labs Edmonton
Hydraulic Conductivity	Agronomy No 9, Part 1	* Hydraulic Conductivity of Saturated Soils. 28-4	1-Mar-04	Norwest Labs Edmonton
Particle Size Analysis - GS	Carter	* Hydrometer Method, 47.3	1-Mar-04	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* Soluble Salts in Saturation Extract, 3.21	27-Feb-04	Norwest Labs Edmonton

* Norwest method(s) is based on reference method

References:

Agronomy No 9, Part 1	Methods Of Soil Analysis, Part 1
Carter	Soil Sampling and Methods of Analysis
McKeague	Manual on Soil Sampling and Methods of Analysis

Comments:

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ALS Environmental



CHEMICAL ANALYSIS REPORT

Date: August 25, 2004
ALS File No. R2113
Report On: 2047NT04
Report To: Northern EnviroSearch Ltd (NESL)
330, 703 - 6th Avenue SW
Calgary, AB
T2P 0T3
Attention: Ms. Jenica von Kuster
Received: August 12, 2004

ALS ENVIRONMENTAL
per:

Bill Chew, B.Sc. - Manager, Client Services
Brent Whitehead, B.Sc. - Operations Supervisor

File No. R2113

REMARKS



Cation Exchange Capacity Results

N-23 (ALS WO#R2113-1) - 225.0

F-47 (ALS WO#R2113-2) - 146.4

Units: meq/100g

Samples were subcontracted to Pacific Soils (Richmond, BC)

File No. R2113

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	N-23	F-47
Sample Date	04-08-01	04-08-01
Sample Time	13:00	15:30
ALS ID	1	2

Physical Tests

Conductivity (dS/m)	0.389	0.368
pH	7.04	7.29
Specific Gravity	1.06	0.860
Saturation Percentage %	600	600
TGR (tonnes/hectare)	<0.10	600
Total Solids	21.6	38.2

Saturated Paste Extractables

Calcium Ca	81.6	221
Chloride Cl	42.2	49.4
Magnesium Mg	135	124
Potassium K	18.6	12.4
Sodium Na	29.6	25.6
Sulphate SO ₄	157	31.0
Sodium Adsorption Ratio (SAR)	0.19	0.14

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 Total Solids are expressed as %.

File No. R2113

Appendix 1 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Conductivity in Soil by Saturation Paste Extraction

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered or decanted and analysed for conductivity with an conductivity electrode using procedures adapted from APHA Method 2510 "Conductivity".

Recommended Holding Time:

Sample Extraction: 6 months

Sample Analysis: 28 days

Reference: Canadian Society of Soil Science and APHA

For more detail see ALS Environmental "Collection & Sampling Guide"

pH in Sediment/Soil

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science).

"Saturated Paste Extract" In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analysed for pH.

"Fixed Ratio Extract (e.g., 1:1, 1:5)" In summary, weigh out the appropriate amount of air-dried soil and add sufficient deionized water to achieve the desired extraction ratio and shake for 1 hour. The resulting extract is then filtered and analysed for pH.

pH analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Extract: asap

Reference: APHA

For more detail see ALS Environmental "Collection & Sampling Guide"

Saturated Paste Extracts

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an

File No. R2113

Appendix 1 - METHODOLOGY - Continued

amount of deionized water required to create a saturated paste. The saturation % can be calculated from the amount of soil and water. The resulting extract is then filtered or decanted and analysed for various parameters.

Recommended Holding Time:

Sample: 6 month

Reference: Canadian Society of Soil Science

For more detail see ALS Environmental "Collection & Sampling

Guide"

Theoretical Gypsum Requirement (TGR) in Sediment/Soil

Theoretical Gypsum Requirement (TGR) is calculated from the Sodium Adsorption Ratio (SAR), and from the Sodium and Saturation % results, using Method A as described in "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth, D. Keyes and J. Crepin (Cdn J. of Soil Science, 1999). Theoretical Gypsum Requirement results are reported as metric tonnes per hectare to a depth of 15 cm.

Please note that 50 tonnes/hectare is considered the maximum practical gypsum amendment.

Recommended Holding Time:

Sample/Extract: not applicable

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

For more detail see ALS Environmental "Collection & Sampling Guide"

Cations and Sodium Adsorption Ratio by Saturation Paste**Extraction**

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analysed for the requested parameters by FAAS using procedures adapted from EPA Method 7000 series. The Sodium Adsorption Ratio (SAR) is calculated from the Na, Ca and Mg results.

Recommended Holding Time:

Sample Extraction: 180 day

Sample Analysis: 180 day

File No. R2113

Appendix 1 - METHODOLOGY - Continued

Reference: Canadian Society of Soil Science and EPA
For more detail see ALS Environmental "Collection & Sampling Guide"

Anions in Soil by Saturation Paste Extraction

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered or decanted and analysed by IC for the requested parameters using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG17 anion exchange column with a sodium carbonate and sodium bicarbonate eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate. Further details are available on request.

Recommended Holding Time:

Sample Extraction: 6 months

Sample Analysis: 28 days (bromide, chloride, fluoride, sulphate)

Sample Analysis: 2 days (nitrate, nitrite)

Reference: Canadian Society of Soil Science, APHA and EPA

For more detail see ALS Environmental "Collection & Sampling Guide"

Sodium Adsorption Ratio (SAR) in Sediment/Soil

Sodium Adsorption Ratio (SAR) is calculated from the Sodium, Calcium, and Magnesium concentrations in the saturated paste extract of a sediment sample. The SAR calculation is described in "Soil Sampling and Methods of Analysis" by M. Carter.

Recommended Holding Time:

Sample/Extract: not applicable

Results contained within this report relate only to the samples as submitted.

This Chemical Analysis Report shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report

