H.S. Jansen July 2015 Fields 103 & 103B

August 2015

3rd Cut Results and 4th Cut Plan

1 3RD CUT RESULTS

H.S. Jansen and Sons cut the 3rd cut alfalfa crop on Fields 103A and 103B on Monday, August 24th and will be chopping the silage on Wednesday August 26h. Soil, feed and manure samples were taken Wednesday, August 19th.

The Feed sample from the second cut Hay produced calculates out to the 96 pounds of nitrogen removed per acre that was projected in the last Plan request. We also took a representative fresh cut fresh cut sample from 4 spots in the field to calculate the nitrogen removal expected from the 3rd cut. This sample came back at 22.22% protein on a dry basis, with the extra 5 days growth hat the plant will have at harvest using a protein content of 20.5% should be realistic. This equates to a nitrogen removal rate of 65.6 pounds per ton of dry matter alfalfa. With the extended harvest interval an expected dry matter yield of 1.5 ton per acre is realistic for a nitrogen removal of 98 pounds per acre.

REPORT NO.
C15232-35004

ACCOUNT NUMBER
05219

A&L CANADA LABORATORIES INC.

2136 Jetstream Rd, London, ON, N5V 3P5 Tel (519) 457-2575 Fax: (519) 457-2664

TO:EMERALD BAY AG SERVICES
10 MARYS EMERALD BAY ROAD
VERNON, BC V1H 2A7

FOR:H.S. JANSEN & SONS

Phone:250-546-3847
Fax:250-546-3847

CERTIFICATE OF ANALYSIS

LAB NUMBER:2326008
SAMPLE ID:FLD 103
SAMPLE MATRIX:Legume (Alfalfa) Hay
SAMPLE CUT:2nd
METHOD ID:FN1WM

DATE SAMPLED:2015-08-18
DATE RECEIVED:
DATE REPORTED:2015-08-24
DATE PRINTED:2015-08-25

	RESULTS			
PARAMETER	AS FED	DRY	UNIT	METHOD
DRY MATTER				
Moisture	6.27	0.00	%	Wet Chemistry
Dry Matter	93.73	100.00	%	Calculation
PROTEIN				
Crude Protein	16.25	17.34	%	NIR
Soluble Crude Protein	35.87	35.87	% of CP	NIR
ADF-CP	1.61	1.72	%	NIR
NDF-CP	3.86	4.12	%	NIR
UIP (Bypass Protein)	27.22	27.22	Est % CP	NIR
FIBRES				
Acid Detergent Fibre	33.95	36.22	%	NIR
Neutral Detergent Fibre	41.60	44.38	%	NIR
Lignin	6.38	6.81	%	NIR
ENERGY				
Total Digestible Nutrients (Weiss)	58.13	62.02	%	Calculation
NE Lactation	1.28	1.37	MCal/Kg	Calculation
Net Energy Lactation (Weiss)	1.31	1.40	MCal/Kg	Calculation
NE Gain	0.70	0.75	MCal/Kg	Calculation
Net Energy Gain (Weiss)	0.70	0.75	MCal/Kg	Calculation
NE Maintenance	1.38	1.47	MCal/Kg	Calculation
Net Energy Maintenance (Weiss)	1.25	1.33	MCal/Kg	Calculation
MINERALS				
Calcium	1.18	1.26	%	Wet Chemistry *
Chloride	0.67	0.72	%	NIR
Copper	7.93	8.46	ug/g	Wet Chemistry
Phosphorus	0.32	0.34	%	Wet Chemistry *
Potassium	3.09	3.30	%	Wet Chemistry
Sulphur	0.32	0.34	%	Wet Chemistry *
Magnesium	0.34	0.36	%	Wet Chemistry
Zinc	27.18	29.00	ug/g	Wet Chemistry *
Iron	259.87	277.25	ug/g	Wet Chemistry *
Manganese	41.78	44.58	ug/g	Wet Chemistry *
Sodium	0.06	0.06	%	Wet Chemistry
CALCULATION				
Relative Feed Value	127.19	127.19		Calculation
OTHER				
NFC	24.58	26.22	%	Calculation
Starch	1.44	1.54	%	NIR
Total Ash	9.28	9.90	%	NIR

BDL - Not Detected

REPORT NO.
C15232-35004

ACCOUNT NUMBER
05219

A&L CANADA LABORATORIES INC.

2136 Jetstream Rd, London, ON, N5V 3P5 Tel (519) 457-2575 Fax: (519) 457-2664

TO:EMERALD BAY AG SERVICES
10 MARYS EMERALD BAY ROAD
VERNON, BC V1H 2A7

FOR:H.S. JANSEN & SONS

Phone:250-546-3847
Fax:250-546-3847

CERTIFICATE OF ANALYSIS

LAB NUMBER:2326009
SAMPLE ID:FLD 103
SAMPLE MATRIX:Legume (Alfalfa) Fresh
SAMPLE CUT:3rd
METHOD ID:FN1WM

DATE SAMPLED:2015-08-19
DATE RECEIVED:
DATE REPORTED:2015-08-24
DATE PRINTED:2015-08-25

	RESULTS			
PARAMETER	AS FED	DRY	UNIT	METHOD
DRY MATTER				
Moisture	78.06	0.00	%	Wet Chemistry
Dry Matter	21.94	100.00	%	Calculation
PROTEIN				
Crude Protein	4.88	22.22	%	NIR
Soluble Crude Protein	35.53	35.53	% of CP	NIR
ADF-CP	0.39	1.80	%	NIR
NDF-CP	0.99	4.50	%	NIR
UIP (Bypass Protein)	26.35	26.35	Est % CP	NIR
FIBRES				
Acid Detergent Fibre	6.72	30.61	%	NIR
Neutral Detergent Fibre	8.60	39.21	%	NIR
Lignin	1.60	7.28	%	NIR
ENERGY				
Total Digestible Nutrients (Weiss)	14.73	67.14	%	Calculation
NE Lactation	0.32	1.48	MCal/Kg	Calculation
Net Energy Lactation (Weiss)	0.33	1.52	MCal/Kg	Calculation
NE Gain	0.19	0.88	MCal/Kg	Calculation
Net Energy Gain (Weiss)	0.19	0.88	MCal/Kg	Calculation
NE Maintenance	0.35	1.60	MCal/Kg	Calculation
Net Energy Maintenance (Weiss)	0.32	1.47	MCal/Kg	Calculation
MINERALS				
Calcium	0.32	1.45	%	Wet Chemistry *
Chloride	0.22	0.99	%	NIR
Copper	1.23	5.62	ug/g	Wet Chemistry
Phosphorus	0.06	0.28	%	Wet Chemistry *
Potassium	0.64	2.93	%	Wet Chemistry
Sulphur	0.08	0.37	%	Wet Chemistry *
Magnesium	0.04	0.19	%	Wet Chemistry
Zinc	4.42	20.15	ug/g	Wet Chemistry *
Iron	22.37	101.96	ug/g	Wet Chemistry *
Manganese	6.27	28.59	ug/g	Wet Chemistry *
Sodium	0.01	0.03	%	Wet Chemistry
CALCULATION				
Relative Feed Value	154.33	154.33		Calculation
OTHER				
NFC	5.65	25.74	%	Calculation
Starch	0.37	1.68	%	NIR
Total Ash	2.26	10.30	%	NIR

BDL - Not Detected

C15232-35004

2 SOIL TEST RESULTS

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

Report Number:C15232-10087
Account Number:05219

To:EMERALD BAY AG SERVICES
10 MARYS EMERALD BAY ROAD
VERNON, BC V1H 2A7

Attn:DOUG MACFARLANE
250-546-3847

For:JANSEN

Grower Code:05219066
Farm:HOME
Field:103 HULLCAR

05219-N816

Report Date:2015-08-21 **Print Date:**2015-08-26

SOIL TEST REPORT

Page:1

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Phosphorus - P ppm Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH	pH Buffer	CEC meq/100g	Percent Base Saturations % K	% Mg	% Ca	% H	% Na
1031A		6	32274														
1031B		12	32275														
1031C		24	32276														

Sample Number	Sulfur ppm S lbs/ac	Nitrate Nitrogen ppm NO3-N	lbs/ac	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts ms/cm	Saturation %P	Aluminum Al ppm	Saturation %Al *	K/Mg Ratio	ENR	Chloride Cl ppm	Sodium Na ppm	Molybdenum Mo ppm
1031A	0	23	H 41														
1031B	0	11	M 20														
1031C	0	6	L 22														

OE VL = VERY LOW L = LOW M = MEDIUM H = HIGH VH = VERY HIGH * G = GOOD, M = MARGINAL, MT = MODERATE PHYTO-TOXIC, T = PHYTO-TOXIC, ST = SEVERE PHYTO-TOXIC

SOIL FERTILITY GUIDELINES (lbs/ac)

Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	Mn	Fe	Cu	B

Crop yield is influenced by a number of factors in addition to soil fertility. No guarantee or warranty concerning crop performance is made by A & L.

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, Ontario, N5V 3P5
Telephone: (519) 457-2575 Fax: (519) 457-2664

Report Number:C15232-10088
Account Number:05219

To:EMERALD BAY AG SERVICES
10 MARYS EMERALD BAY ROAD
VERNON, BC V1H 2A7

Attn:DOUG MACFARLANE
250-546-3847

For:JANSEN

Grower Code:05219066
Farm:HOME
Field:103B DOUGS

05219-N817

Report Date:2015-08-24 **Print Date:**2015-08-26

SOIL TEST REPORT

Sample Number	Legal Land Descpt:	Depth	Lab Number	Organic Matter	Phosphorus - P ppm Bicarb	Phosphorus - P ppm Bray-P1	Potassium K ppm	Magnesium Mg ppm	Calcium Ca ppm	pH pH	pH Buffer	CEC meq/100g	Percent Base Saturations % K	% Mg	% Ca	% H	% Na
03B1A		6	32277														
03B1B		12	32278														
03B1C		24	32279														

Sample Number	Sulfur ppm S lbs/ac	Nitrate Nitrogen ppm NO3-N	Nitrate Nitrogen lbs/ac	Zinc Zn ppm	Manganese Mn ppm	Iron Fe ppm	Copper Cu ppm	Boron B ppm	Soluble Salts ms/cm	Saturation %P	Aluminum Al ppm	Saturation %Al *	K/Mg Ratio	ENR	Chloride Cl ppm	Sodium Na ppm	Molybdenum Mo ppm
03B1A	0	26 H	47														
03B1B	0	11 M	20														
03B1C	0	10 M	36														

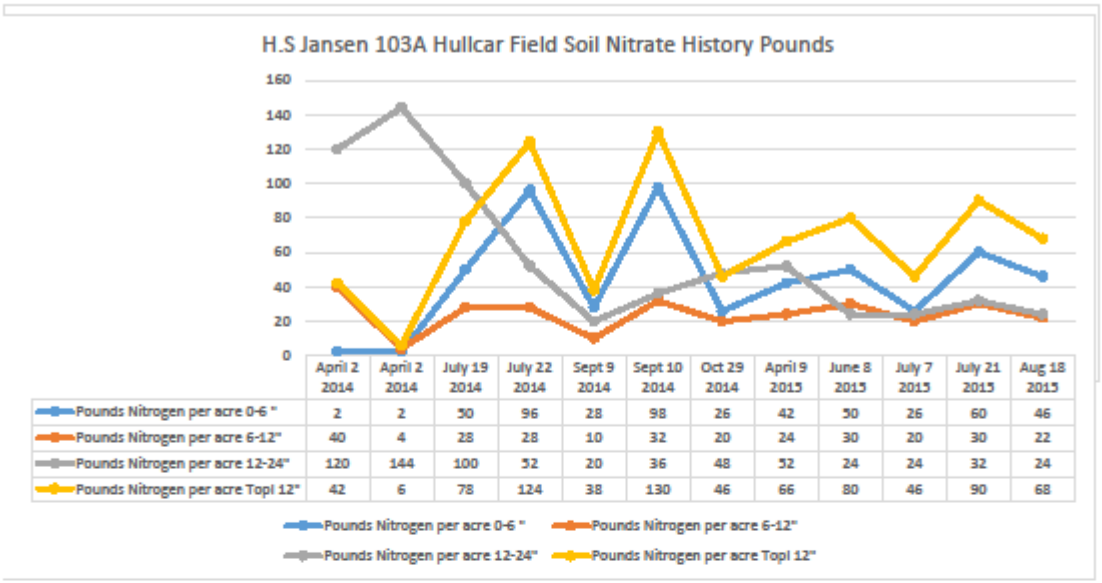
OE VL = VERY LOW L = LOW M = MEDIUM H = HIGH VH = VERY HIGH * G = GOOD, M = MARGINAL, MT = MODERATE PHYTO-TOXIC, T = PHYTO-TOXIC, ST = SEVERE PHYTO-TOXIC

SOIL FERTILITY GUIDELINES (lbs/ac)

Sample Number	Previous Crop	Intended Crop	Yield Goal	Lime Tons/Acre	N	P2O5	K2O	Mg	Ca	S	Zn	Mn	Fe	Cu	B

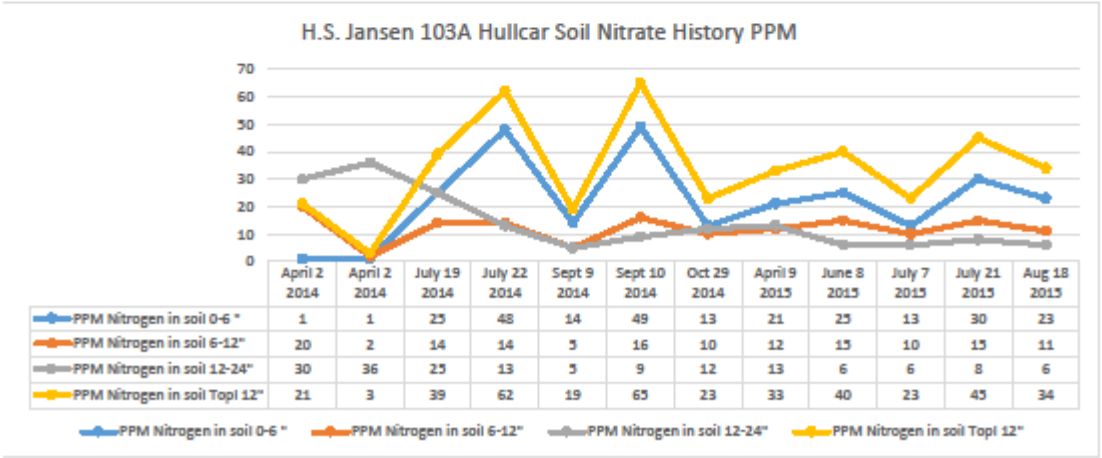
Crop yield is influenced by a number of factors in addition to soil fertility. No guarantee or warranty concerning crop performance is made by A & L.

C15232-10088

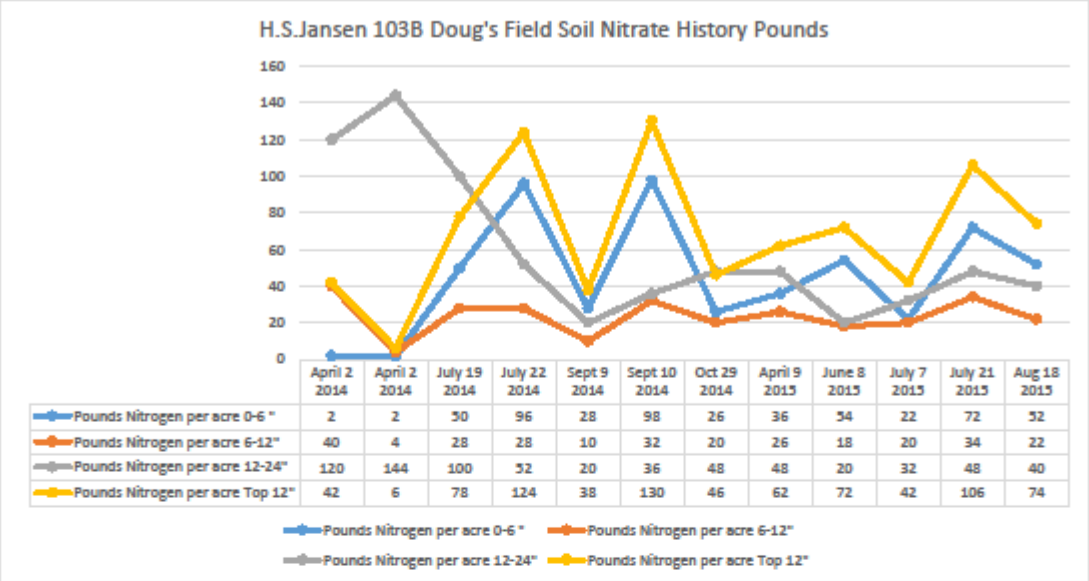


	April 2 2014	April 2 2014	July 19 2014	July 22 2014	Sept 9 2014	Sept 10 2014	Oct 29 2014	April 9 2015	June 8 2015	July 7 2015	July 21 2015	Aug 18 2015
Pounds Nitrogen per acre 0-6 "	2	2	50	96	28	98	26	42	50	26	60	46
Pounds Nitrogen per acre 6-12"	40	4	28	28	10	32	20	24	30	20	30	22
Pounds Nitrogen per acre 12-24"	120	144	100	52	20	36	48	52	24	24	32	24
Pounds Nitrogen per acre Topl 12"	42	6	78	124	38	130	46	66	80	46	90	68

The above chart shows the total available nitrate nitrogen in the 3 soil profiles we are testing along with the total nitrogen available in the top 12 inches (yellow line). The total nitrogen available in the is covered by the grey line. The April 2014 double soil test is the first sample taken in the field to depth and was the starting point of the present NMP. The July 19th waste post cut soil test before any manure application was made. The 3 spikes on July 22, 2014, Sept 10 2014 and July 21 2015 have been the post manure application test done so far. There was no manure application approved after 1st cut in 2015.The dramatic nitrate nitrogen drawdown during the 2nd and 3rd cut crop growth would tell us that the alfalfa was surviving completely on the added nitrogen in the manure and efficiently preforming it's purpose as a nitrogen scavenger. So far in 2015 we have substantially reduced the amount of nitrogen being applied on the field but are trending to have higher Available nitrogen levels post cutting probably due to the plants nitrogen fixing mechanism kicking in.

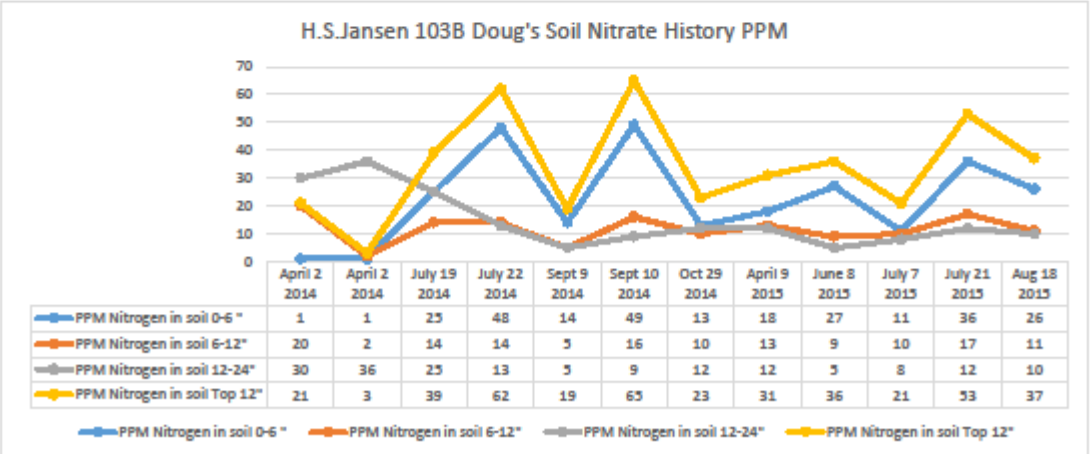


	April 2 2014	April 2 2014	July 19 2014	July 22 2014	Sept 9 2014	Sept 10 2014	Oct 29 2014	April 9 2015	June 8 2015	July 7 2015	July 21 2015	Aug 18 2015
PPM Nitrogen in soil 0-6 "	1	1	25	48	14	49	13	21	25	13	30	23
PPM Nitrogen in soil 6-12"	20	2	14	14	5	16	10	12	15	10	15	11
PPM Nitrogen in soil 12-24"	30	36	25	13	5	9	12	13	6	6	8	6
PPM Nitrogen in soil Topl 12"	21	3	39	62	19	65	23	33	40	23	45	34

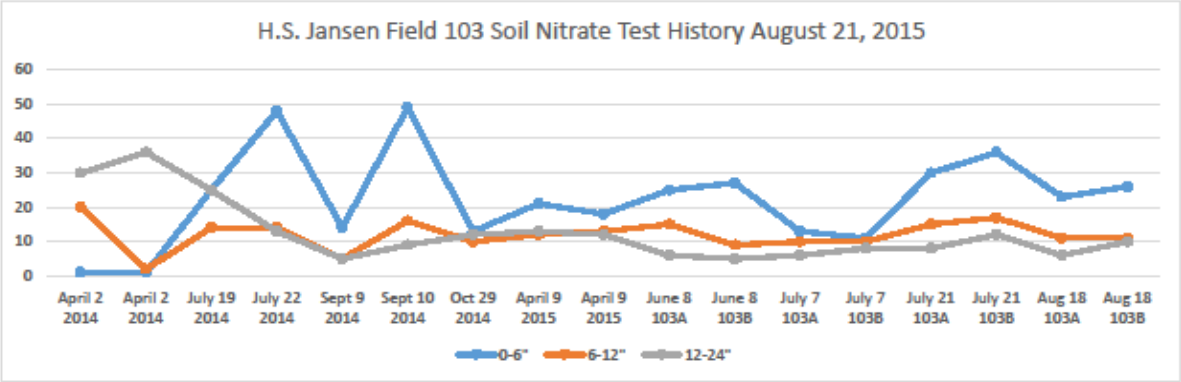


	April 2 2014	April 2 2014	July 19 2014	July 22 2014	Sept 9 2014	Sept 10 2014	Oct 29 2014	April 9 2015	June 8 2015	July 7 2015	July 21 2015	Aug 18 2015
Pounds Nitrogen per acre 0-6 "	2	2	50	96	28	98	26	36	54	22	72	52
Pounds Nitrogen per acre 6-12"	40	4	28	28	10	32	20	26	18	20	34	22
Pounds Nitrogen per acre 12-24"	120	144	100	52	20	36	48	48	20	32	48	40
Pounds Nitrogen per acre Top 12"	42	6	78	124	38	130	46	62	72	42	106	74

Analysis of 103B Dougs field is much the same as the Hulcar field as they have both been treated the same. These graphs are in pounds per acre per test so the Grey line (12-24 inch soil profile) should be compared only to the Yellow line (0-12 inch soil profile) as the Blue and Orange line only cover a 6 inch soil profile. Combined they equal the Yellow line.



	April 2 2014	April 2 2014	July 19 2014	July 22 2014	Sept 9 2014	Sept 10 2014	Oct 29 2014	April 9 2015	June 8 2015	July 7 2015	July 21 2015	Aug 18 2015
PPM Nitrogen in soil 0-6 "	1	1	25	48	14	49	13	18	27	11	36	26
PPM Nitrogen in soil 6-12"	20	2	14	14	5	16	10	13	9	10	17	11
PPM Nitrogen in soil 12-24"	30	36	25	13	5	9	12	12	5	8	12	10
PPM Nitrogen in soil Top 12"	21	3	39	62	19	65	23	31	36	21	53	37

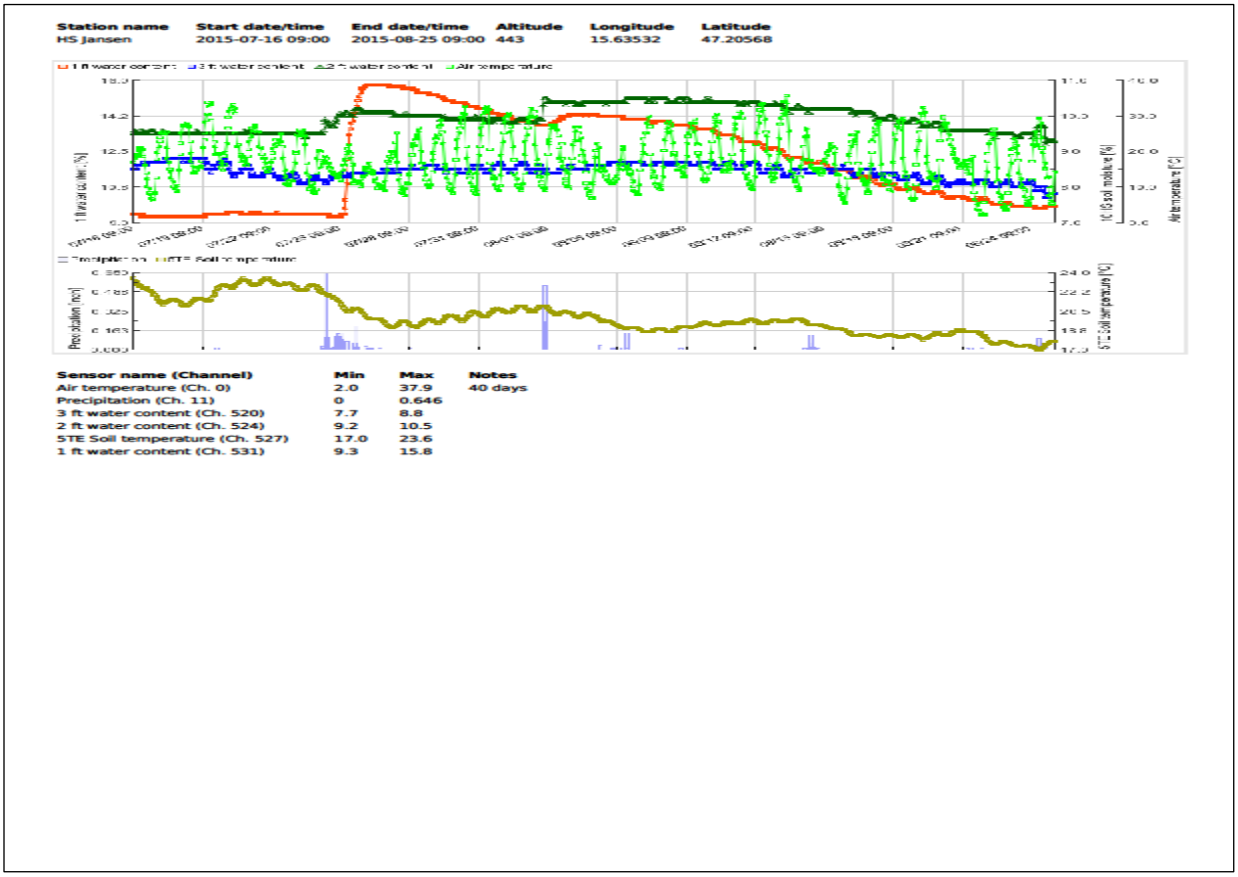


April 2, 2014 - first soil samples	April 2 2014	1	20	30
	April 2 2014	1	2	36
July 19, 2014 - pre manure application after 1st cut alfalfa before manure	July 19 2014	25	14	25
July 22, 2014 - post manure application after 1st cut.	July 22 2014	48	14	13
Sept 9, 2014 - pre manure application after 2nd cut alfalfa	Sept 9 2014	14	5	5
Sept 10, 2014 - post manure application after 2nd cut.	Sept 10 2014	49	16	9
Oct 29, 2014 - post 3rd cut soil test for going into winter.	Oct 29 2014	13	10	12
April 9 2015 - Spring soil test pre crop growth starting	April 9 2015	21	12	13
Note: No manure application after 1st cut	April 9 2015	18	13	12
June 8 2015 - pre manure after 1st cut soil nitrate test	June 8 103A	25	15	6
	June 8 103B	27	9	5
July 7 2015 - pre manure after 2nd cut soil nitrate test	July 7 103A	13	10	6
	July 7 103B	11	10	8
July 21 2015 - post manure after 2nd cut soil nitrate test	July 21 103A	30	15	8
	July 21 103B	36	17	12
August 18 2015 - pre manure after 3rd cut soil nitrate test	Aug 18 103A	23	11	6
	Aug 18 103B	26	11	10

Overall soil nitrate nitrogen has increased from an average of 72 pounds an acre after 2nd cut (with no manure application) to an average of 103 pounds per acre after 3rd cut (96 pounds applied nitrogen from manure) while nitrogen removal by the crop closely matched that applied.

My thinking on this is that by pulling down the available nitrogen in the soil so far during the growth of the 2nd cut crop that the alfalfa plants were forced to start relying on the rhizobia bacteria to start fixing the required nitrogen for growth. By forcing the alfalfa plant to grow at soil nitrate levels below ideal we have been changing the plant from an effective nitrogen scavenger to a nitrogen fixer. In the context of this Nutrient Management Plan that voids much of the reasons for growing Alfalfa.

Personally I would like to see the program being kept on the original plan of not requiring the plant to fix its own nitrogen and feeding it with the manure effluent as required for growth and keeping close control of the irrigation to reduce the chances of nutrient flushing.



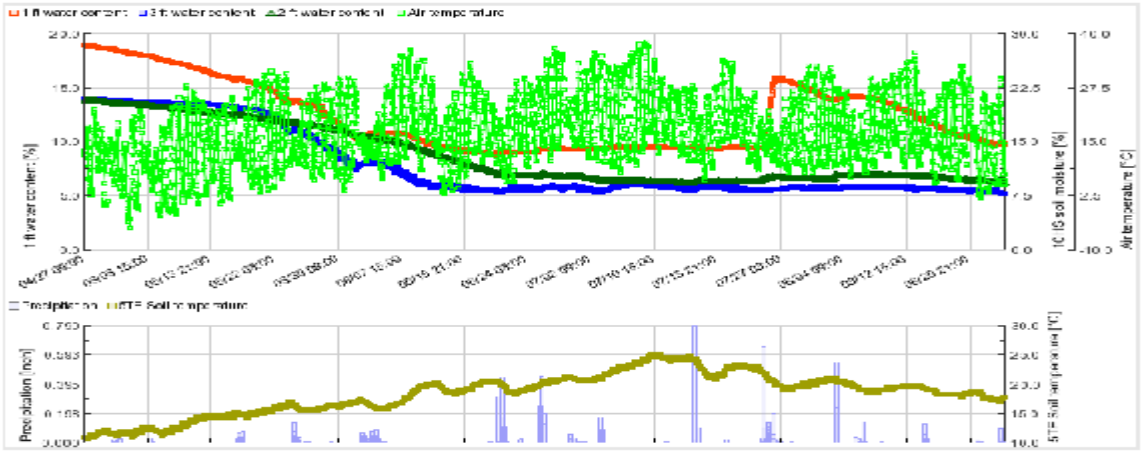
3 SOIL MOISTURE

40 Day Graph

The 40 day graph above show the soil moisture levels at the 1 foot level completely filled and started to raise the 2 foot level. This irrigation and showers totaled **1.51 inches of moisture applied July 24/25th** right after harvest. The **second irrigation of 0.98 inches on August 3rd** gave another bump on the 1 and 2 foot levels. The crop was actively growing by then and the plant water use is much higher. There has been no

substantial evidence through these sensors that any over irrigation has been happening to flush nutrients down in the soil profile.

Station name	Start date/time	End date/time	Altitude	Longitude	Latitude
HS Jansen	2015-04-27 09:00	2015-08-25 09:00	443	15.63532	47.20568



Sensor name (Channel)	Min	Max	Notes
Air temperature (Ch. 0)	-4.8	40.9	120 days
Precipitation (Ch. 11)	0	0.787	
3 ft water content (Ch. 520)	7.7	20.9	
2 ft water content (Ch. 524)	9.2	20.8	
5TE Soil temperature (Ch. 527)	10.7	25.2	
1 ft water content (Ch. 531)	8.8	19.0	

120 Day graph

4 ADJUSTED MANURE NUTRIENT MANAGEMENT PLAN

The original nutrient management plan presented this spring called for a total of 24,000 gallons of dairy manure effluent to be applied to the H.S.Jansen Fields # 103A and B in 3 applications of 8,000 gallons applied after 1st, 2nd and 3rd cuts. No application was done after 1st cut and a reduced application of 6,000 gallons per acre was done after 2nd cut was harvested and a future 6,000 gallon application is being requested for now after 3rd cut.

Enclosed you will find the new manure analysis, and the adjusted NMP worksheets for the Dairy farm. There have been no changes to the manure in the NMP as every test is slightly different and this result came back substantially the same as what we wrote the plan on.

	NMP numbers	Current manure test
Total nitrogen	0.10 %	0.101 %
NH -4 N	712 ppm	677 ppm
Total Phosphorous	0.028 %	0.0213

Also enclosed is the NMP Worksheet 7 changes from reducing the applied manure on these fields by 12,000 gallons per acre or 2,350,000 gallons. The plan was drawn for a planned application amount 4% or 700,000 gallons more than projected manure effluent production. This change to the planned application rates moves us from a 4% under supply to an 8% over supply of manure effluent (1,650,000 gallons). This 8% is worrying but still under the 10% sleeve that is considered workable. A plan is being developed as to where the extra manure will be used this fall so that there will be sufficient storage capacity for this winter's manure production.

Worksheet 7 – Farm Manure Balances

Worksheet 7. Assess Farm Manure Balances

A Manure Source and Application Method (Worksheet 4, Col. A)	B Total Weight to be Applied on All Fields (Worksheet 5, ∑(Col. C x E)) (tons/yr)	C Manure Type e.g. Dairy-liquid	D Total Weight of Manure Produced and Imported [a] (tons/yr)	E Total Weight of Manure to be Applied (sum appropriate values from col. B) (tons/yr)	F Total Weight of Manure to be Exported (tons/yr)	G Excess or Deficiency of Manure [b] (col. D – E – F) (tons/yr)	H Percentage Excess or Deficiency of Manure ((col. G/col. D) x 100) (%)
Flush Lagoon	*88578*	*Dairy Liquid*	*96800*	*88578*		*8222*	*8*
Dairy Solids	*2933*	*Dairy Solids*	*2875*	*2933*		*-58*	*-2*
0	*0*					*0*	*n/a*
						0	*n/a*
						0	*n/a*
						0	*n/a*
						0	*n/a*
						0	*n/a*

[a] If dairy manure, complete Worksheet 7.1 and copy the values from A (A) other manures, use Table 8 or Table 9
[b] positive value indicates surplus, negative value indicates deficit

August 2015 - Manure Nutrient Analysis

REPORT NO. C15232-80002
ACCOUNT NO. 05219

A&L CANADA LABORATORIES INC.

2136 Jetstream Rd, London, ON, N5V 3P5 Tel (519) 457-2575 Fax: (519) 457-2664

TO: EMERALD BAY AG SERVICES
10 MARYS EMERALD BAY ROAD
VERNON, BC V1H 2A7
CANADA
ATTN: DOUG MACFARLANE

PAGE: 1

MANURE ANALYSIS

LAB NUMBER: 2328004
SAMPLE ID: #1 LAGOON

DATE RECEIVED: 2015-08-20
DATE REPORTED:
DATE PRINTED: 2015-08-27

PARAMETER	ANALYSIS RESULT	POUNDS PER 1,000 GAL	ESTIMATED AVAILABILITY PER 1,000 GAL
Dry Matter	1.4 %		
Nitrogen (Total)	0.101 %	10.1	
NH4-N	677 ppm	6.8	
Phosphorus (Total)	0.0213 %		
Phosphate (P as P205) **	0.0490 %	4.9	2.0
Potassium (Total)	0.1204 %		
Potash (K as K2O) **	0.1445 %	14.4	13.0

* All Parameters are reported on an as is basis.
**Available nutrients are reported as total available. Only a portion of these nutrients will be available the year of application.
For information on nitrogen availability, see reverse side of page.
More information available: http://www.alcanada.com/files/Manure_Analysis.pdf

C15232-80002

A&L Canada is a laboratory accredited by Standards Council of Canada / CAEAL and OMAF.

Worksheet 4 – Crop Nutrients in the Manure Sources

Worksheet 4. Calculate Crop Nutrients in the Manure Sources

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Manure Source and Application Method	Manure Nitrogen (N) Availability Calculation									Manure P_2O_5 and K_2O			
	Total nitrogen content (lab report) (%)*	Ammonium content (NH_4-N) (lab report) (ppm)*	Organic nitrogen content (col. B – C / 10^4) x 20 (lb N/ton)	N Mineralization factor (Table 6) (select from drop-down list)	Organic nitrogen mineralized this cropping year (col. D x E) (lb N/ton)	Ammonia (NH_4-N) retention factor (Table 7)	Ammonia (NH_4-N) remaining after volatilization (col. C / 10^4 x 20) x col. G (lb N/ton)	Nitrate (NO_3-N) content of manure (lab report) (ppm)*,b	First-year plant available nitrogen (col. F + H) + (col. I / 10^4) (lb N/ton)	Total P (lab report) (%)*	Total P_2O_5 (col. K x 20 x 2.3) (lb P_2O_5/ton)	Total K (lab report) (%)*	Total K_2O (col. M x 20 x 1.2) (lb K_2O/ton)
Flush Lagoon	*0.10*	*712*	*0.6*	*0.5*	*0.30*	*0.9*	*1.28*		*1.58*	*0.028*	*1.3*	*0.12*	*2.9*
Dairy Solids	*0.24*	*420*	*3.9*	*0.25*	*0.97*	*0.58*	*0.49*		*1.45*	*0.125*	*5.8*	*0.17*	*4.0*
Settling Lagoon	*0.13*	*733*	*1.1*	*0.5*	*0.56*	*0.7*	*1.03*		*1.58*	*0.064*	*2.9*	*0.12*	*2.9*
			0.0		*0.00*		*0.00*		*0.00*		*0.0*		*0.0*
			0.0		*0.00*		*0.00*		*0.00*		*0.0*		*0.0*
			0.0		*0.00*		*0.00*		*0.00*		*0.0*		*0.0*
			0.0		*0.00*		*0.00*		*0.00*		*0.0*		*0.0*
			0.0		*0.00*		*0.00*		*0.00*		*0.0*		*0.0*

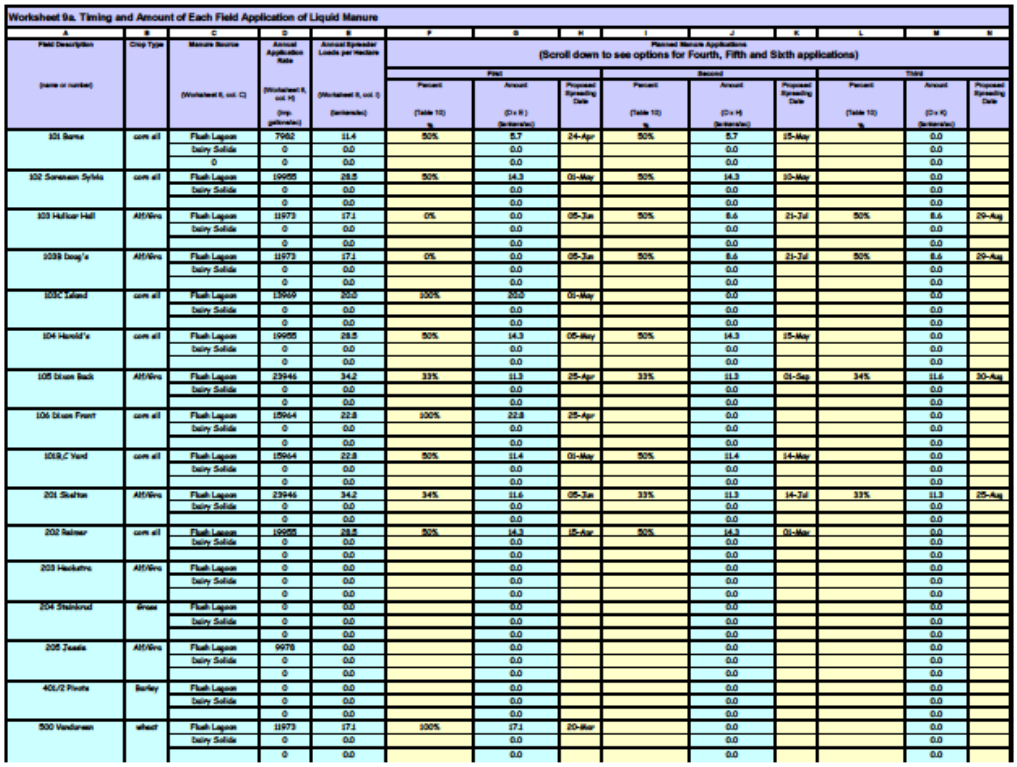
* convert lab manure nutrients (total N, P or K) values to % by:
multiplying ppm, mg/L or mg/kg on a 'Dry Basis' by dry matter percent and divide by 1,000,000
multiplying kg/tonne or mg/g on a 'Dry Basis' by dry matter percent and divide by 1,000
multiplying lb/ton on a 'Dry Basis' by dry matter percent and divide by 2,000
dividing ppm, mg/L or mg/kg 'As Received' by 10,000
dividing kg/tonne or mg/g 'As Received' by 10
dividing lb/ton 'As Received' by 20

b If lab report does not give results for nitrate-N in manure, assume "0" unless manure has been composted.

Table 6. Nitrogen Mineralization Factor for Manures

Type and Moisture Content of Manure	N Mineralization Factor (proportion of organic nitrogen mineralized during year of application)
Poultry	0.5
Dairy (>25% water) or Hog	0.35
Dairy (<25% water) or Beef	0.25
Finished compost or mechanically separated dairy solids	0.1

Worksheet 9A – Adjusted manure application rates and times



Worksheet 9a. Timing and Amount of Each Field Application of Liquid Manure

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Field Description (name or number)	Crop Type	Manure Source (Worksheet 8, col. C)	Annual Application Rate (Worksheet 8, col. H) (Imp. gallons/ac)	Annual Spreader Loads per Hectare (Worksheet 8, col. I) (tankloads)	Planned Manure Applications (Scroll down to see options for Fourth, Fifth and Sixth applications) First: Percent (Table 10) %	First: Amount (D x F) (tankloads)	First: Proposed Spreading Date	Second: Percent (Table 10) %	Second: Amount (D x H) (tankloads)	Second: Proposed Spreading Date	Third: Percent (Table 10) %	Third: Amount (D x K) (tankloads)	Third: Proposed Spreading Date
101 Barns	corn all	Flush Lagoon	7962	11.4	50%	5.7	24-Apr	50%	5.7	15-May		0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
102 Sorensen Sylvia	corn all	Flush Lagoon	19955	28.5	50%	14.3	01-May	50%	14.3	10-May		0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
103 Hullcar Hall	Alf/Grs	Flush Lagoon	11973	17.1	0%	0.0	05-Jun	50%	8.6	21-Jul	50%	8.6	29-Aug
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
103B Dag's	Alf/Grs	Flush Lagoon	11973	17.1	0%	0.0	05-Jun	50%	8.6	21-Jul	50%	8.6	29-Aug
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
103C Leland	corn all	Flush Lagoon	13949	20.0	100%	20.0	01-May		0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
104 Harold's	corn all	Flush Lagoon	19955	28.5	50%	14.3	05-May	50%	14.3	15-May		0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
105 Dixon Back	Alf/Grs	Flush Lagoon	23946	34.2	33%	11.3	25-Apr	33%	11.3	01-Sep	34%	11.6	30-Aug
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
106 Dixon Front	corn all	Flush Lagoon	15964	22.8	100%	22.8	25-Apr		0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
106B,C Yard	corn all	Flush Lagoon	15964	22.8	50%	11.4	01-May	50%	11.4	14-May		0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
201 Skelton	Alf/Grs	Flush Lagoon	23946	34.2	34%	11.6	05-Jun	33%	11.3	14-Jul	33%	11.3	25-Aug
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
202 Reimer	corn all	Flush Lagoon	19955	28.5	50%	14.3	15-Apr	50%	14.3	01-May		0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
203 Hawkethe	Alf/Grs	Flush Lagoon	0	0.0		0.0			0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
204 Steinkrud	grass	Flush Lagoon	0	0.0		0.0			0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
205 Zeade	Alf/Grs	Flush Lagoon	9978	0.0		0.0			0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
40L/2 Pivots	Barley	Flush Lagoon	0	0.0		0.0			0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	
500 Vanderven	wheat	Flush Lagoon	11973	17.1	100%	17.1	20-Mar		0.0			0.0	
		Dairy Solids	0	0.0		0.0			0.0			0.0	
			0	0.0		0.0			0.0			0.0	

5 APPLICATION RATE CALIBRATION AND IMPLEMENTATION

Mountainview Electric in Enderby preformed another flowmeter calibration test on the manure dragline system during the application of the 6,000 gallon manure application in July. This confirmed the application rate of 700 gallons per minute used in the previous applications. Application speed was adjusted to 2.3 miles per hour from 1.1-1.2 used in 2014.

The soil test data showed that the available nitrogen in the soil rose by 52 pounds and 80 pounds per acre for an average of 66 pounds per acre of available. These numbers correspond very nicely with showing approximately 10 pounds of available and 5 pounds of slow release (organic Matter) from the previous manure analysis (6,000 gallons = 60 pounds) and the 65 or so pounds the BCMA calculated. The soil test results are the most accurate way we have with most farms to determine rates. We have talked about installing permanent flow meters and data loggers on the required equipment but the financial costs are substantial and all results so far show good due diligence is being followed on farm.

6 PLAN AND SUMMARY

We will expect an equivalent 1.5 ton dry matter crop for 4th cut resulting in the use of another 96 pounds of nitrogen.

Residual soil nitrogen was increased by 31 pound during the previous cut with an application of 96 pounds. To balance the plant requirements and the desire to keep the plant using added nitrogen from the manure reducing the amount of nitrogen added after 3rd cut to grow 4th cut to 65 pounds would be the minimum level I would recommend. This equates into a desired application rate of 6,000 gallons per acre to be applied in the next 5 days.

Effluent amounts would be adjusted according to the manure effluent test results.

The one thing that makes any of these calculations more difficult is the ENR or Estimated Nitrogen release from the organic matter in previous manure applications on the field and the natural organic matter present in the soil. The ENR is very dependent on warm moist soils for the microbial activities to release the nitrogen. These function much higher during the summer which is the 2nd and 3rd cuts of alfalfa and at a much slower rate in the spring and fall which are the 1st and 4th cuts on these fields. The soil temperature has already dropped from an average 24 degree C during 2nd and 3rd cuts to 18 degrees C lately. This will further reduce nitrogen being released for the plant.

Previous Information

7 FIRST CUT

Due to a major fire on the H.S.Jansen farm that burnt down the hay shed and from 1,100 to 1,200 tons of hay the entire first cut from the farm burnt up 10 days ago. The feed company had yet to take samples for feed analysis so we have no protein content on the first cut. Being as the field is just in its second year of production and it was a very vigorous first crop and the harvest timing was good an expectation of 18% protein on the 1st cut is conservative. Hay yield calculated out to 2.8 tons hay as fed or 2.52 tons dry matter per acre.

Using the conversion factor of 6 ¼ pounds of protein contain 1 pound of nitrate nitrogen the nitrogen use for 1st cut was; 2.8 ton hay X 2000 pounds X 90% dry matter X 18% protein divided by 6.25 conversion factor

2.8 x 2000 x 0.9 x18 / 6.25 ***= 145 pounds of nitrogen per acre removed on 1st cut.***

Soil nitrate levels increased from an average of 12 ppm in April to 14ppm after first cut alfalfa in the beginning of June. The nitrogen used to grow the crop was derived from either the Estimated Nitrogen Releases from the organic matter in the soil from previous manure applications or from the Alfalfa plant itself fixing atmospheric nitrogen in the plant. I consider these levels to be desirable in the fields as they show a reasonable level of available nitrogen to the plant which is required to achieve todays yield goals.

8 SECOND CUT

On Saturday July 4th the fields were cut for the 2nd time in 2015. Soil samples were taken with the results included in this report. The crop was bales Thursday July 9th and the yield will work out to 1 .5 – 1.7

tons per acre with protein content expected in the 21% range because of the short cutting interval followed. This cut works out to the following nitrogen removal;

1.6 ton x 2000 pounds x 90% dry matter x 21% protein divided by 6.25 conversion factor

= 96 pounds of nitrogen removed on 2nd cut

Soil nitrate levels decreased from the 14 ppm average seem after 1st cut to a 9 ppm average on July 4th right after the 2nd cutting. Approximately 38 pounds of the nitrogen removed came from the available pool in the soil while the balance came from either ENR or alfalfa plant nitrogen fixation.

9 SUMMARY

Of the 241 pounds per acre of nitrogen removed from the field so far this year less than 30 pounds of that was removed from the available nitrogen pool in the top 2 feet of the field. The balance has been from either the ENR or nitrogen fixation by the plant. The main reason for planting alfalfa in this field was to use the extra nitrogen available from the manure in growing the alfalfa plant instead of requiring it to fix atmospheric nitrogen which it normally does. Maintaining a program where no manure is to be applied to the alfalfa field will and is only making any efforts to produce a safe and efficient nutrient management plan on this farm more difficult.

If we use even 50% of the 211 pounds of nitrogen from other sources from the manure that would have safely used an additional 1.9 million gallons or almost 10% of the annual available nitrogen from manure on the farm.

10 THIRD CUT PROPOSAL

Assume a 3rd cut equal to the 2nd cut or 1.6 ton hay equivalent @ 21% protein or 96 pounds of nitrogen per acre to grow the cut. Because when we calculate the nitrogen available in the manure we always calculate the total N (available and slow release in the Organic Matter) we should be safe to apply the full amount or ***8,400 gallons per acre for 3rd cut***. The ENR from the soil should balance with the nitrogen tied up in the organic matter in the manure.

8,400 gallons per acre times 196 acres = 1.65 million gallons of manure effluent @ 11.5 pounds total N per 1000 gallons.

Gallons per acre to be adjusted by the manure analysis results when they arrive early next week.

Manure test results returned with a nitrogen content of 15.9 pounds per 1,000 gallons. This changes the application rate to *6,000 gallons per acre*. A second manure test will be done

during application to confirm the numbers as they are a lot higher than any previous test results.

11 THIRD CUT FOLLOW UP

Soil testing after the manure application to be done before and after 3rd cut is done will show how efficient we were at capturing the nitrogen from the manure application. The above calculated amount should be removed by the plants. To maximize crop growth and nutrient uptake the upper soil levels should stay in the medium to high levels while keeping the deeper soil levels in the low to medium levels. As we are starting the cut at quit low soil available levels I would expect most if not all the nitrogen applied would be taken up by the plant. If not there is still the safety factor of 4th cut to cleanup any extra residual nitrogen left in the soil. We would be looking forward to applying an application after 3rd cut to grow the 4th and help free up manure storage for the coming winter months. It is quite important to the farm to go into winter with a low manure inventory to ensure ample storage until the following spring can begin.