

Overview

- Our facility

- Decisions

- Why would we want a LIMS?

- What do we need it to do for us?

- Implementation

- Features



NAPS Unit

DNA Sequencing Facility

- ~40,000 sequencing samples processed per year
- Core-prepared

- User-prepared
- Difficult template troubleshooting
- >500 users

Instrumentation

- 377
- 3730

- Other services (Fragment Analysis, RT-PCR)



Why LIMS?

- Customer-driven
- The never ending quest for cheaper sequencing...
- Acquisition of 3730
- Address dual-platform data generation (Mac, PC)
- Increased throughput capability requires more efficient sample tracking system



Our Criteria

- On-line request submission & data retrieval, with automatic email notification
- Chromatogram viewer – eliminate printing!
- Ability to re-process samples (charge/no charge)
- Reports
 - Invoicing
 - Statistics
- Secure log-in
- Flexibility to customize & expand



Shopping Around

- Budget

- Logistics – where do we start?

- Access to an in-house programmer to develop this?
- Contract out externally?
- Commercial source?

- Timeline



dnaTools

- Budget

- US\$10K for system + server

- Yearly maintenance contract

- Server

- Our responsibility to maintain

- “Out of the Box” LIMS



Customizing

Be flexible – CHANGE IS GOOD

GTATGCTACAGGCAATTGCGCGACCCGATCTCTAGGTCCAGGATCAAGCTTGGTAAATATGGTATACTGTTTCCTGTGAAATGTTATCCGCTCACAATTCACACAATACGAGCCGGAAAGC
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

TAAAGTGAAAGCCCTGGGGTCCATAATGAGTGAAGTAACTCACATTAATTGGGTGCGCTCACTGCCCGCTTTCAGTCCGGAAACCTGTCTGGCAAGCTGCATTAATGAATCCGTCACACCGCGGGGAGAGCCGGTTTGGTATTGGCCGCTCTCCG
190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340

TTCCCTCGCTCACTGACTCCCTGCGCTCGGTCTGCGCTGGGGGAGGGGAAATAGGTTATCAACAAGATCAGGGATACCGAGGAAAGAAATGTGAGAAAAGTCAAGAAAAGCCAGGACCGTAAAAGCCCGCTGT
350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510

TGCGTTTTCAAGGTCGCCCCGACGAGATCAAAAATCAAGTCAAGTCAAGGGCAAAACCGAGGCTATAAATACAGCGTTTCCCGAAGTCCCTCGTCTCCGCTCAACCCCGCTTCCGATACGTCCTCCCTTCTCCCTGGGA
520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700

GGGGCTTCTATACTACCTGAGGATCTAGTTGGGTAGTCTTCCCTCAAGTCTGGTGAAGCAACCCCGTAAAGCCCGCTCCCTATCCGCAACTATGCTTGAATCAACCGTAAAGACCACTATCCGACTCAACCACTGTAAGATTAG
710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890

TAGCGGGATGATGGGCTAAGATCTGAGTGGCCCAATAGCTAAGTCAAGGATTTGATCTCCCTCCGAGCGTACCTCCGAAAGGTTGATCTTATCCCGAACCAACCGCTGATCCGCTTTTGTGTAAGCAAGTACCCGAGAAAGATC
900 910 920 930 940 950 960 970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080 1090 1100

GGGGCTTCTATACTACCTGAGGATCTAGTTGGGTAGTCTTCCCTCAAGTCTGGTGAAGCAACCCCGTAAAGCCCGCTCCCTATCCGCAACTATGCTTGAATCAACCGTAAAGACCACTATCCGACTCAACCACTGTAAGATTAG
930 940 950 960 970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080 1090 1100














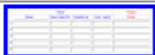

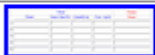




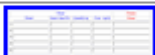
Configure DNA Sequencing Request Form

WARNING: Always contact dnaTools when using this form!
 You can easily loose your database configuration by using this form.

Check Items to be included on the DNA Sequencing Request Form

[Bottom of Page](#)

1. Select a Table Header for the Table type Sequencing Request Form
 (Select an icon to view Image)

						
<input type="radio"/> Table Header 0	<input type="radio"/> Table Header 1	<input type="radio"/> Table Header 2	<input type="radio"/> Table Header 3	<input type="radio"/> Table Header 4	<input type="radio"/> Table Header 5	<input type="radio"/> Table Header 6
						
<input type="radio"/> Table Header 7	<input type="radio"/> Table Header 8	<input type="radio"/> Table Header 9	<input type="radio"/> Table Header 10	<input type="radio"/> Table Header 11	<input type="radio"/> Table Header 12	<input type="radio"/> Table Header 13
						
<input type="radio"/> Table Header 14	<input type="radio"/> Table Header 15	<input type="radio"/> Table Header 16	<input type="radio"/> Table Header 17	<input type="radio"/> Table Header 18		

2. Select Data Fields

[Select List Values](#)

All Data Fields are text boxes except as noted.

investigator)	<input type="checkbox"/> Principal Investigator (Text Box)	<input type="checkbox"/> Principal Investigator (Display Only, Read from Accounting DB)	
Difficulties (Select List) ▼	<input type="checkbox"/> Sample Location	<input type="checkbox"/> Sample Status (Select List) Select if Sample Status was Configured. Ligation_mix ▼	<input type="checkbox"/> Department



GTATCGCTACAGGCAATTCCGCTGCACCCGCGTCTCTAGGTCCAGCGATCAAGCTTGGGTAATCATGGTATACTGTGTTCCGCTGCAAAATGTTATCCGCTCACAAATCCACACACATACGAGCCGGAGCG

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

Going Live - FINALLY



[Login to dnaLIMS](#)

[Create Login Account for dnaLIMS](#)

[Forgot Your Login Information?](#)

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TACAGCGGATGTAFFGCGCTAAGAGTCTTGAAGCGCCCAATAGCGAAGCTAGAGAGATTGATCTCCGCTCCGAGCAGTACCTCCGAAAGAGTTCACCTTATCCCGACCAACCCCGTACCGCGTTTTGTTGACCAAGATACCCGAGAAATGATC

900 910 920 930 940 950 960 970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080 1090 110

NAPS Unit - Michael Smith Laboratories
University of British Columbia



NAPS Unit Pipeline

Request
Submission

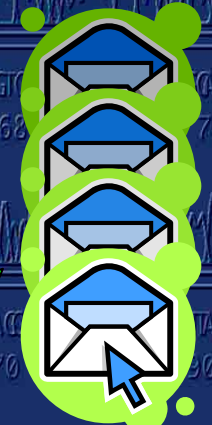
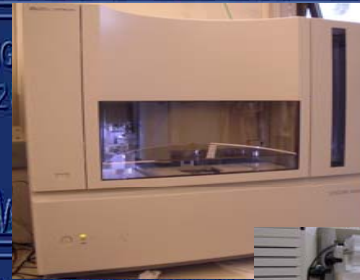
Core-
prepared User-
prepared

Sample Check-in

Reaction Log

Sample Sheet

Process Run Folder



Sequencing Request Submission

Enter the Number of Reactions to Create Sequencing Requests For:

Select the Sequencing Type.


Service Requested:

- Select
- NAPS-Prepared
- User-Prepared

Core-Prepared

User-Prepared

Sequencing Request | View or Delete Request | Retrieve Results | Change Password | **Menus** | Login Page


 NAPS-Prepared DNA Sequencing Request Form

Speed Chart / PO Number:

Additives:

Comments:

Sequencing Request | View or Delete Request | Retrieve Results | Change Password | **Menus** | Login Page

 User-Prepared DNA Sequencing Request Form

Speed Chart / PO Number:

Gel Ready:

Comments:

- Dry (gel ready)
- Wet (requires drying)
- Wet (NAPS cleaning)

[Learn More](#)

Template			DNA Type	Primer	
Name	Conc. ng/ul	Size bp	Name	Name	Conc. pmol/ul
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="Select"/>	<input type="text" value="Select"/>	<input type="text" value="3.2"/>
1			<input type="text" value="Select"/>		3.2
2			BAC Cosmid Genomic Other PCR Plasmid	<input type="text" value="Select"/>	3.2
3				<input type="text" value="Select"/>	3.2

[Learn More](#)

Sample I.D.	Purification Method	Chemistry
<input type="text"/>	<input type="text" value="Select"/>	<input type="text" value="Select"/>
1		
2	<input type="text" value="Select"/>	<input type="text" value="Select"/>
3	<input type="text" value="Select"/>	<input type="text" value="Select"/>
	<input type="text" value="Select"/>	<input type="text" value="Select"/>



Reaction Log (core set-up)

Reaction Log

Display Log
 Update Log
 Export Log
 Import Log
 Delete Log
 Download Log

With values entered or calculated below.
 To file in TO-UNIX

Select Reaction Log:
 Reaction Logs
 r-Feb1-17288.xls
 r-Feb3-111050.xls
 r-Feb3-18294.xls
 r-Feb3-183933.xls
 r-Feb6-172049.xls

dH2O =	Total Volume	- (DNA Vol for Plasmid =	200	ng/ul / dna conc)	- (Primer Vol = Primer Amt	5	pmol / P-Conc)	-	Chem Mix	3	ul	-	Buffer	ul
dH2O =	Total Volume	- (DNA Vol for BAC =	800	ng/ul / dna conc)	- (Primer Vol = Primer Amt	10	pmol / P-Conc)	-	Chem Mix	4	ul	-	Buffer	ul
dH2O =	Total Volume	- (DNA Vol for PCR = bp x	15	ng/100 bp / dna conc)	- (Primer Vol = Primer Amt	5	pmol / P-Conc)	-	Chem Mix	3	ul	-	Buffer	ul

Ready to Run	No DNA	No Primer	Reaction Status	Service	Repeat	Order	Req	PI	User	Date	Well	Sample	Primer	DNA Type	bp	Dna Conc	DNA Vol	Primer Conc	Primer Vol	dH2O Vol	Buffer	Chemistry
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	imported	NAPS-Prepared	No	5241	34107	Chanway, Chris	kariminia,amin	Feb 1 2006		41	R1406	Invalid	700	3	0	5	0	0	0	na
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	imported	NAPS-Prepared	No	5241	34108	Chanway, Chris	kariminia,amin	Feb 1 2006		42	R1406	Invalid	700	3	0	5	0	0	0	na
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	imported	NAPS-Prepared	No	5241	34109	Chanway, Chris	kariminia,amin	Feb 1 2006		45UP	R1406	Invalid	700	3	0	5	0	0	0	na
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	imported	NAPS-Prepared	No	5241	34110	Chanway, Chris	kariminia,amin	Feb 1 2006		45DOWN	R1406	Invalid	700	3	0	5	0	0	0	na
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	imported	NAPS-Prepared	No	5241	34111	Chanway, Chris	kariminia,amin	Feb 1 2006		49	R1406	Invalid	700	3	0	5	0	0	0	na
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	imported	NAPS-Prepared	No	5241	34112	Chanway, Chris	kariminia,amin	Feb 1 2006		52	R1406	Invalid	700	3	0	5	0	0	0	na



Create Sample Sheet

Select Sequencer and Plate

Clear

Submit

Select the Comb/Well Plate size.	96	
Select the Sequencer & Id	3730	Sequencer Machine ID: 2
Sort samples by	Reaction Log	

to Create Sample Sheets using the New Version-2 Data Collector.

- Req #
- Time
- None
- Reaction Log
- Order
- User
- Primer
- User, Primer
- Primer, User
- User, Primer, Req#
- User, Req#, Primer
- User, Sample, Primer
- Chemistry
- Sample Checkin Date
- Sample Checkin Date & Service Requested
- Service Requested & Sample Checkin Date
- Purification Method
- Service, Purification Method



Sample Sheet Creator

Sequencer & ID: 3730-2 Sample Sheet: 875 Plate Date: Feb 8 2006 (M D Y xxxx xx xxxxx) Plate Name: Feb-8-2006 A Data Collector 2 Sample Sheet Creator

Index, Rec#, Sample_name, Primer, User, Date, Service, Chem, Order#
* 1 34594 CBA1 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 2 34596 KY3 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 3 34598 KY4 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 4 34600 KY7 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 5 34602 gfp1 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 6 34604 gfp3 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 7 34606 C3H1 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 8 34608 C3H2 T7 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 9 34595 CBA1 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 10 34597 KY3 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 11 34599 KY4 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 12 34601 KY7 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 13 34603 gfp1 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 14 34605 gfp3 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 15 34607 C3H1 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 16 34609 C3H2 SP6 wilson,erica Feb-6-2006 NAPS-Prepared na 5314
* 17 34623 R13K-A14S-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 18 34624 R13K-A14S-2 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 19 34625 R13K-A14S-3 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 20 34626 D114P-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 21 34627 D114P-2 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 22 34628 D114P-3 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 23 34629 D116E-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 24 34630 D116E-2 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 25 34631 D116E-3 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 26 34632 Y117F-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 27 34633 Y117F-2 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 28 34634 Y117F-3 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 29 34635 I117E-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 30 34636 I117E-2 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 31 34637 I117E-3 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 32 34638 D116A-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 33 34639 D116A-2 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 34 34640 D116A-3 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320
* 35 34641 D116N-1 T7 fonseca,bruno Feb-6-2006 NAPS-Prepared na 5320

Start Number 1 Stop Number 6 [Button Help File](#)
 System Message Insert Mode [Loading Protocol Help File](#)

Well Plate												
Well	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

Step 1. Exclude any unwanted samples

Step 2. Pre-position any samples

Step 3. Position Control Samples

Step 4. Load by Order Number

Step 5. Swap or Remove Samples from Plate

Step 6. Select the Loading Protocol

Step 7. Load the samples into the plate

Step 8. Submit or Clear

To Exit, And not make the sample sheet.



Process Run Folder

Clear

Submit

Plate 669

Select Rerun to put requisition back in Queue.

Req #	Order #	User	Well-ID	Sample	Primer	Size	Conc.	Comments
34336	5287	zhao, tiehan	669-1 A1	pTOPO-CnAIP2	M13F	1500	100	Great Sequence
34337	5287	zhao, tiehan	669-2 B1	pTOPO-CnAIP2	M13R	1500	100	Great Sequence
34338	5287	zhao, tiehan	669-3 C1	AIP2-PvuII-A	P2R2	1400	10	Great Sequence - signal trails
34339	5287	zhao, tiehan	669-4 D1	AIP2-PvuII-A	AP2	1400	10	Short Sequence - signal trails
34340	5287	zhao, tiehan	669-5 E1	AIP2-EcoRV-C	P2CR2	1200	10	Great Sequence
34341	5287	zhao, tiehan	669-6 F1	AIP2-EcoRV-C	AP2	1200	10	Great Sequence
34342	5287	zhao, tiehan	669-7 G1	ABI3-HpaI-B	B3BR2	1000	10	Great Sequence
34343	5287	zhao, tiehan	669-8 H1	ABI3-HpaI-B	AP2	1000	10	Great Sequence
34368	5291	zhang, mary	669-9 A2	pTREHADF-2F	pTREFor	4800	100	OK Sequence - signal trails
34369	5291	zhang, mary	669-10 B2	pTREHADF-2R	pTRERe	4800	100	Great Sequence
34370	5291	zhang, mary	669-11 C2	pTREHADF-3F	pTREFro	4800	100	Great Sequence
34371	5291	zhang, mary	669-12 D2	pTREHADF-3R	pTRERe	4800	100	Great Sequence
34372	5291	zhang, mary	669-13 E2	pTREHADF-5F	pTREFor	4800	100	Great Sequence
34373	5291	zhang, mary	669-14 F2	pTREHADF-5F	pTRERe	4800	100	Great Sequence



Sample Re-Runs

Plate 664

Select Rerun to put requisition back in Queue.

Req #	User	Well-ID	Sample	Primer	Size	Conc.	Rerun Sample
34194	martin,morgan	664-1 A1	14-1	FP1	5000	200	<input type="checkbox"/>
34195	martin,morgan	664-2 B1	15-1	FP1	5000	200	<input type="checkbox"/>
33963	bechberger,john	664-3 C1	Cx43	P5	1149	280	<input type="checkbox"/>
33964	bechberger,john	664-4 D1	Cx43	P3	1149	280	<input type="checkbox"/>
34167	park,ji	664-5 E1	HSPP2	hRCF1	0	78	<input type="checkbox"/>
34168	park,ji	664-6 F1	SPS8	M13F	0	66	<input type="checkbox"/>
34169	park,ji	664-7 G1	SPS8	M13R	0	66	<input type="checkbox"/>
34263	o'hara,liisa	664-8 H1	pGem	CP1	1	200	<input checked="" type="checkbox"/>

Rerun Samples

Clear

Submit

Select Buttons

Req #	Order #	Plate	Customer Name	UID	Sample	Primer	Free Rerun	Charged Rerun	Comment
34263	cs	664	o'hara,liisa	1371	pGem	CP1	<input checked="" type="radio"/>	<input type="radio"/>	



Data Retrieval

Select a Button to download ALL corresponding files listed in the results table.

Sequencer Output		Phred Output			
Text	Trace	Fasta	Qual	Phred	SCF
<input type="button" value="Text"/>	<input type="button" value="Chromat"/>	<input type="button" value="fasta"/>	<input type="button" value="qual"/>	<input type="button" value="phred"/>	<input type="button" value="scf"/>

To download individual files:

Mac: Hold down Control Key, Click Mouse. Select Save Linked File As...

PC: Right Mouse Click, Save Link As...

Gel Number 669

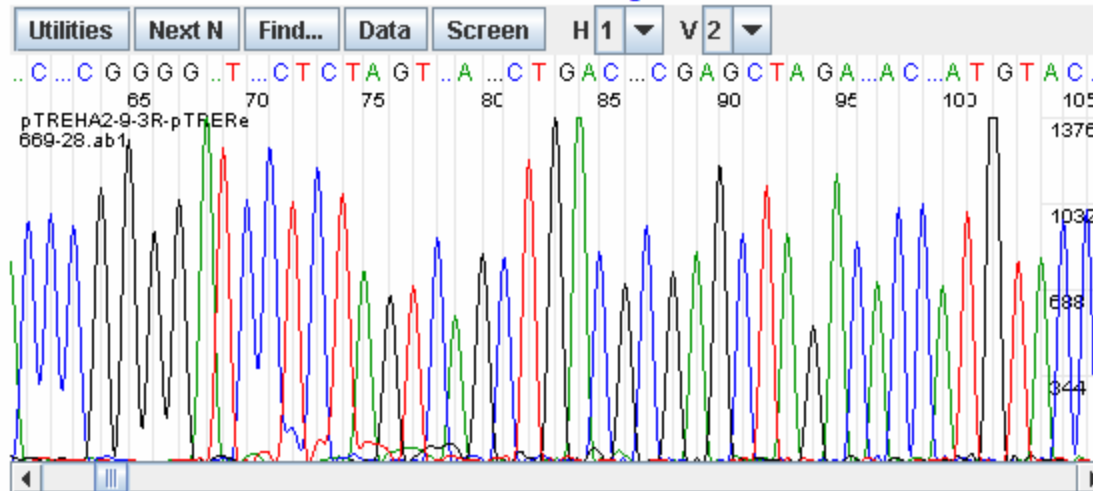
Order#	Req#	Download	View	SeqId	WID	Sample	Primer	Investigator	UID	Date	Phred Q20	Comments
5287	34336	Text Chromat	View	669-1	A1	pTOPO-CnAIP2	M13F	zhao,tiehan	1840	Feb 3 2006	phd qual 989 fasta scf	Great Sequence
5287	34337	Text Chromat	View	669-2	B1	pTOPO-CnAIP2	M13R	zhao,tiehan	1840	Feb 3 2006	phd qual 963 fasta scf	Great Sequence



dnaTools Viewer

Display Results for 669-28 pTREHA2-9-3R-pTRERe

3730 Chromatogram



Sequence Text Phred Sequence Clear Text Area

Use the text box to Copy contents to the clipboard.

NNNNNNNNNNGANANCCGGGACCGATCCNGCCTCCGCGGCCCGAATTCGAGCTCGGTACCCGGGGATCCTCTAGTCAGCTG



Reports

Invoicing & Statistics

Summary for Jan 2006

<u>PO</u>	<u>Date In</u>	<u>Samples</u>	<u>Failed</u>	<u>Resubmit</u>	<u>NAPS-Prepared</u>	<u>User-Prepared</u>	<u>No Charge</u>	<u>Cost</u>	<u>Service</u>
12060	Jan 4, 2006	4	0	0	4	0	0	80	NAPS-Prepared
0253551	Jan 5, 2006	8	0	0	8	0	0	160	NAPS-Prepared
IPA	Jan 31, 2006	6	0	0	6	0	0	120	NAPS-Prepared
IPA	Jan 24, 2006	5	0	0	5	0	0	100	NAPS-Prepared
RR	Jan 13, 2006	6	0	0	0	6	0	48	User-Prepared



Before



After



NAPS Unit - Michael Smith Laboratories
University of British Columbia



Acknowledgements

NAPS Unit DNA Sequencing Team

Liisa O'Hara

Marian van der Geest

Michael Smith Laboratories IT Group

Steve Macdonald

Vince Tingey

NAPS Unit - Michael Smith Laboratories
University of British Columbia

