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Emergency Program



**DGIR INLAND** 

**DGIR Incident Report** 

Category : Code 1 Incident Date Time : 03/10/2005 MCTS #OVERNIGHT

10 89.11

DGIR 501860

			:
Spiller :	MORNING STAR NURSERIES		
Location :	1380 176ST SURREY		
Area :	SURREY	PEP Region : SWE	MOE Region : Lower Mainland Region
Material(s): Amount(s):	DIESEL 5000 - St APPROX 200 LITRES	DOO LITED	
Received Fro	m:		
Caller.	A: CARL RAVENSBERGEN	Caller B	:
Or	g: MORNING STAR NURSERIES	Org	:
Phon	e; 604-541-1124	Phone	:
Alternat	e :	Alternate	
Tim	8:	Time	s F
Received at P	EP by Duty Officer : PATRICK	When Received : 03	/10/2005 07:21
Affected Envi	ronment : Ground	Other :Little Campbe	N
Type of Spillin Equipment Fai	ng: ilure	Other Spill Type :	_
Accidents:			
Sector:	Commercial		
Cause :			
A pump was le property. Migra dammed culve	eft running overnight from a boiler, re ated through perimeter drains to dito art with wood at back and shut down	esulting in approximately 200 lit that rear of property. Believe d sump pumps.	res of diesel spill to ground at front of itch runs to the Little Campbell. Have
Response :			
Caller advised	to also contact Surrey Fire Dept.		
Jurisdiction :	Provincial, Municipal 💦 🍼 🖉	00	
Task # :06292	20 Amount : \$50	Issued To : REG MARC	QUARDT
Notification :			
07:30 - Briefeo 07:50 - Faxed	Prov MOE RO Reg Marquardt, Co MOE Fort St. John/MOE Surrey	de 1	

Emergency Coordination Center Phone 1-800-663-3456 Fax (250) 952-4872



DGIR Incident Update Report DGIR 501860



Update #: 1

Type: INLAND UPDATE Subject : DIESEL Task #: 062920 Assigned To ; REG MARQUARDT Incident Area : SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : **PEP Region :SWE** MOE Region :Lower Mainland Region MCTS#:

Location: 1380 176ST SURREY Caller: ARLENE Organization : FIRE DEPT Primary No: Business 604-543-6700 Alt No:

This Update Logged :03/10/2005 09:11 PEP Duty Officer :BETH

#### Details :

Advised fire crews are on scene at the location. They would like Environment Canada and BC Environment on scene. The product is going into a ditch which flows in the Campbell River. It is 1000 litres of diesel versus 200 litres originally reported. The Battalion Chief on scene is Dave Rivett. at 604-250-1204

#### Notification :

peter 540 -1124 09:12 paged MOE Surrey 09:18 paged EC 09:20 paged RM 09:21 briefed Bob Stubbings RM 09:22 briefed Elizabeth Graca. Advised to call 604-666-6011 to report 09:29 briefed EC Main Office 09:30 briefed Avtar Sundher MOE RO. Will call the Fire Department on scene. 09:34 faxed MOE Surrey and MCTS 09:36 briefed Cam D/Dir. Wants to know if MOE RO is contacting health authority and requests PDF copy of spill. 09:38 MOE Avtar Sundher advises he is responding to the scene and will not be notifying the Health Authority until he assesses the situation. 09:41paged RM 09:42 briefed BoB Stubbings. Advised he would contact EPC if needed. EPC is a member of the Fire Department. 09:55 faxed to MOE Surrey, MCTS and SWE Region

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PEP EC

PEP ECC VICTORIA #1

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DGIR Incident Update Report DGIR 501860



Update #: 2

Type : INLAND UPDATE Subject : DIESEL Task # : 062920 Assigned To : REG MARQUARDT Incident Area : SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : PEP Region :SWE MOE Region :Lower Mainland Region MCTS# :

Location: 1380 176ST SURREY Cailer: OPERATIONS OFFICER INITIATED Organization: PEP Primary No: Alt No:

This Update Logged :03/10/2005 12:47 PEP Duty Officer :BETH

## Details :

Requested update from Jennifer McGuire MOE. MOE advised CTV Media is on scene. The MOE region has dispatched Brent Moore Environmental Quality Section Head to assist with sampling and respond to Media requests. The diesel amount is now 6000 litres of diesel. The spill is now being upgraded to a Code 2. Conservation Office has been contacted. Quantum Environmental Services is on scene doing some recovery. MOE RO Avtar Sundher is the contact on scene at 604-328-5095. Diesel had gone into a ditch which leads to a creek which is tributary Little Campbell River. Unknown if the river has been impacted.

#### Notification :

12:50 briefed Cam D/Dir 12:52 paged RM 12:54 briefed Bob Stubbings RM 13:01 phoned Washington EMO and briefed Allan 13:04 phoned Cindy Rose PEP Media 13:04 Faxed to Surrey MOE, MCTS, SWE region, Washington EMO, MOE HQ 10/3/05 1:22:56 PM Email to EC (emergencies.pyr@ec.gc.ca) sent from SGPEP.ECC1@gov.bc.ca

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DGIR Incident Update Report DGIR 501860



Update #: 3

Type: INLAND UPDATE Subject: DIESEL - CODE 2 Task #: 062920 Assigned To: REG MARQUARDT Incident Area: SURREY

Orlginal Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : PEP Region :SWE MOE Region :Lower Mainland Region MCTS# :

Location : 1380 176ST SURREY Caller : BOB STUBBINGS BY EMAIL Organization : PEP RM Primary No : Alt No :

This Update Logged :03/10/2005 13:50 PEP Duty Officer :BETH

#### Details :

Further to my briefing from the ECC (E. Anthony) at 1253 hours advising that the spill is now a Code 2, I had a telephone conversation with the Surrey EPC Tom Lewis at 1309 hours who was on site. I spoke with Tom and also with the Battalion Chief, Dave Rivett who has been on-site all morning. I was advised of the following:

-The spill has travelled about one half mile down a creek.

-The spilled diesel will NOTenter the Campbell River.

-There are 15-20 booms in place.

-Drinking water is not affected though there were concerns of water for cattle. Neighbouring farms have deep wells and the owners have been contacted.

-Remediation is going to be a big job.

Tom Lewis EPC will provide PEP SWE with any updates.

#### Notification :

PDF'd Cam D/Dir PEP.MOE RO Avtar Sundher is on scene
14:00 briefed Rhonda Brett EC
14:08 phoned Washington EMO, briefed Ted Hankle. Advised no further verbal updates required unless USA impact changes. Fax copy only.
14: 11phoned Cindy Rose PEP Media on cell, briefed
14:13 phoned Bruce Holmss MOE HQ on cell, briefed
14:18 phoned INAC, briefed Emanuel Guison INAC
14:22 paged PSEPC
Faxed to Surrey MOE, MCTS, SWE region, Washington EMO, MOE HQ, OFC.

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DGIR Incident Update Report DGIR 501860



Update #: 4

Type: INLAND UPDATE Subject: DIESEL - CODE 2 Task #: 062920 Assigned To: REG MARQUARDT Incident Area: SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : PEP Region :SWE MOE Region :Lower Mainland Region MCTS# :

Location: 1380 176ST SURREY Caller: BOB STUBBINGS Organization: SWE RM Primary No: Alt No:

This Update Logged :03/10/2005 16:09 PEP Duty Officer :PERRY

## **Details** :

At 1540 hours 03/10/2005, I spoke with the Surrey Fire Department's Battalion Chief Dave Rivett who had just left the site. He provided the following update to the information I forwarded previously:

-There are three vacuum trucks working on site.

-The diesel fuel is concentrated in the immediate area of the nursery but the amount in the ground is unknown. -There is concern about the amount of the actual spill versus what the spiller has stated.

-A Ministry of Health representative was on site and Dave Rivett expressed his fear of shallow wells potentially being contaminated.

-There is concern that a heavy rain could cause the diesel to work its way down stream.

-Dave Rivett stated that he shares the opinion of Avtar Sundher, MOE that this situation will have to be watched closely.

PEP SWE will continue to monitor this situation.

## Notification :

16:18 paged EC, Elizabeth Graca briefed.

16:20 called Cindy Rose PEP Media, and briefed.

16:24 called Bruce Holmes, MOE HQ on cell and briefed. He requested that it be determined if the Regional Health authority had been contacted as they would be the agency to conduct well checks and issue drinking water advisories.

16:37 Called INAC and briefed Emanuel Guison.

16:52 paged PSEPC, through answering service. Wayne Hirlehey PSEPC called in and was briefed. He requests updates be emailed to him in future.

17:07 called D/Dir Cam Filmer, aware of update and will continue to deal with this incident. If anything new comes in other than this incident send to DM, Brad Judson.

17:12 briefed Reg Marquardt, Prov MOE RO and he advised to continue to go to Avtar Sundher as he is the lead MOE RO for this incident.

17:21 Called Surrey FD, 604-543-6700 and spoke with Dave Rivett, Battalion Chief and he advised that there

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was a representative from he assumed was the Fraser health authority there although he did not get a name at the time. There has been no firm quantity established of the spill size or of the amount recovered at this point. 17:23 PDF'd Cam D/Dir PEP, PSEPC Wayne Hirlehey.

17:25 faxed MOE Surrey, MCTS, SWE region, Washington State EMO, MOE HQ, OFC, PSEPC.

10/3/05 5:45:56 PM Email to EC (emergencies.pyr@ec.gc.ca) sent from SGPEP.ECC1@gov.bc.ca

This report printed on: 06/10/2005 at 11:30:01

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PEP ECC VICTORIA #1

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DGIR Incident Update Report DGIR 501860



Update #: 5

Type: INLAND UPDATE Subject : DIESEL - CODE 2 Task #: 062920 Assigned To : REG MARQUARDT Incident Area : SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : **PEP Region :SWE** MOE Region :Lower Mainland Region MCTS#;

Location: 1380 176ST SURREY Caller: AVTAR SUNDHER Organization : MOE RO Primary No : Alt No :

This Update Logged :03/10/2005 20:26 PEP Duty Officer : RICK

#### Detalls :

Advised Fire Dept has left site. Contractors Quantum and Mcraes along with MOE RO remain on site. Off site diesel impacted ditch and Sam Hill Creek have been cleaned of bulk diesel. Minor residues remain which will be collected behind weirs and soaked up with absorbents. Contaminated soil and water remain on site, contractors are developing and implementing plan to remediate. MOE legal Bio Assay samples are en route to PESC. Reduced to code 1

#### Notification :

20:51 paged EC 20:58 briefed Elizabeth Graca 20:52 left message for Cindy Rose PEP Media 20:55 briefed MOE HQ Bruce Holmes 21:17 PDF'd Cam D/Dir PEP, PSEPC Wayne Hirlehey. 21:12 Faxed MOE Surrey, MCTS, SWE region, Washington State EMO, MOE HQ, OFC, PSEPC



DGIR Incident Update Report DGIR 501860



Update #: 6

Type : INLAND UPDATE Subject : DIESEL - CODE 2 Task # : 062920 Assigned To : REG MARQUARDT Incident Area : SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : PEP Region :SWE MOE Region :Lower Mainland Region MCTS# :

Location : 1380 176ST SURREY Caller : BOB STUBBINGS Organization : SWE RM Primary No : Alt No :

This Update Logged :03/10/2005 16:09 PEP Duty Officer :PERRY

## Details :

At 1540 hours 03/10/2005, I spoke with the Surrey Fire Department's Battalion Chief Dave Rivett who had just left the site. He provided the following update to the information I forwarded previously:

-There are three vacuum trucks working on site.

-The diesel fuel is concentrated in the immediate area of the nursery but the amount in the ground is unknown. -There is concern about the amount of the actual spill versus what the spiller has stated.

-A Ministry of Health representative was on site and Dave Rivett expressed his fear of shallow wells potentially being contaminated.

-There is concern that a heavy rain could cause the diesel to work its way down stream.

-Dave Rivett stated that he shares the opinion of Avtar Sundher, MOE that this situation will have to be watched closely.

PEP SWE will continue to monitor this situation.

## Notification :

16:18 paged EC, Elizabeth Graca briefed.

16:20 called Cindy Rose PEP Media, and briefed.

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was a representative from he assumed was the Fraser health authority there although he did not get a name at the time. There has been no firm quantity established of the spill size or of the amount recovered at this point. 17:23 PDF'd Cam D/Dir PEP, PSEPC Wayne Hirlehey.

17:25 faxed MOE Surrey, MCTS, SWE region, Washington State EMO, MOE HQ, OFC.

This report printed on: 03/10/2005 at 17:24:42

PEP ECC VICTORIA #1

→ MOE SURREY

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DGIR Incident Update Report DGIR 501860



Update #: 6

Type: INLAND UPDATE Subject: DIESEL - CODE 2 Task #: 062920 Assigned To: REG MARQUARDT Incident Area: SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : PEP Region :SWE MOE Region :Lower Mainland Region MCTS# :

Location: 1380 176ST SURREY Caller: BOB STUBBINGS Organization: SWE RM Primary No: Alt No:

This Update Logged :04/10/2005 14:36 PEP Duty Officer :YVONNE

#### Details :

At 1300 hours today Bob spoke to Tom Lewis, Surrey E/C, and the diesel fuel has saturated the soil and is leaching below ground. Soil removal may be required. Remediation will be a big task. The spill is in an area of farms and well testing for contamination is being considered. Unless the situation deteriorates there will be no further updates.

## Notification :

1508 Paged MOE RO. 1510 Briefed MOE RO Bill Michael. 1517 Faxed MOE Surrey & MCTS.

This report printed on: 04/10/2005 at 15:18:03



DGIR Incident Update Report DGIR 501860



Update #: 7

Type: INLAND UPDATE Subject: DIESEL - CODE 2 Task #: 062920 Assigned To: REG MARQUARDT Incident Area: SURREY

Original Entry Logged :03/10/2005 07:21 Amount :\$50 ASE Number : PEP Region :SWE MOE Region :Lower Mainland Region MCTS# :

Location: 1380 176ST SURREY Caller: BY EMAIL - RO AVTAR SUNDHER Organization: MOE Primary No: Alt No:

This Update Logged :05/10/2005 16:59 PEP Duty Officer :SHANNON

#### Details :

EEROs Avtar and Bill Michael inspected the site earlier today. Quantum Environmental crews were on-site and changing the absorbent pads soiled by residual diesel leaching from the ditch bank and vegetation. A maximum of 1-2 litres of diesel was collected over-night in the ditch (minor). Quantum will continue to change absorbents as required.

The spilled fuel contaminated soil in the vicinity of the over-filled tank and surrounding tile field located inside of the greenhouse. Because of this remaining contamination, the storm pipe which services the spill area and discharges to ditch has been

1) excavated,

2) 50 foot section of pipe removed,

3) the excavation lined with 2 layers of poly and

4) three oil/water separation chambers constructed inside the excavation (see attached picture).

This will ensure that any diesel, which may leach from the spill area during rainfall, remains on-site, preventing further impacts to off-site ditch and creek.

Morning Star owner has retained Hemmera Environmental Consultants to assess the diesel contamination remaining on-site and to develop and implement a remediation plan. Hemmera will conduct regular water monitoring on the impacted ditch and Sam Hill Creek.

Actual volume of diesel spilled will be calculated following transport of all waste to Newalta Corporation and further accounting of volumes by Morning Star. Currently estimated to be Max. 7500 litres.

#### Notification :

17:05 faxed MOE Surrey, MCTS and Region HQ SWE pdf'd D/Dir Cam Filmer, DRM's Bob Stubbings and Mike Andrews

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TASK REPORT FORM



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Province of			·	Provincial
British Columbia		124	Emergency	Program
TASK NUMBER 62920	RCC INCIDEN	T NUMBER	50 860	Mar. 1
A. TO BE COMPLETED BY TASK LEAD	DER			
Region SWE Area	02	Task Typ	· DANGEROUS	GOODS
Date Task Commenced Oct. 3/01	Time T	ask Commenced	16:30	
Date Task Completed	Time T	ask Completed	21:30	
Number of Registered Volunteers Involved	_ () N	lumber of Person H	lours O	
Number of Other Response Personnel Involv	red O N	Jumber of Person H	Iours ()	
Number of Victims O_ Injured O	Fatalities	O Still Los	t	
B. TO BE COMPLETED BY TASK LEAT	DER		and the second second	
Details of Task (attach additional pages if ne	eded) Sf	E ATTACH	ET)	
PLEASE CLOSE FILE.	1	· ·		
Equipment Used/Lost				
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Signature Task Leader		Date	() ct. 2	4/05
Forward to Emergency Program Coordinato;	r along with Ta	ask Registration Fo	rm, Invoices and oth	ler Support
Material. Complete Section D if applicable.	•		м.	
Signature Emergency Program Coordinator Forward approved task package to regional	othe		Date	
C. TO BE COMPLETED BY REGIONAL	L MANA GER			
Comments/Recommendations				
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Regional Manager Signature		Date		,
D. EQUIPMENT REPLACE/REPAIR RE	EOUEST	D	ASKNUMBER	
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Recommended YES / NO Regional Mana	iger Signature	· · · · · · · · · · · · · · · · · · ·	Date	

## Sundher, Avtar S ENV:EX

From:Sundher, Avtar S ENV:EXSent:Mon, March 20, 2006 4:41 PMTo:Trudgian, Jack ENV:EXCc:Warriner, Steffanie M ENV:EXSubject:FW: POST INVESTIGATION REVIEW: Morning Star Nurseries

Hi Jack,

Please issue the warning letter.

Avtar

----Original Message----From: McGuire, Jennifer ENV:EX Sent: Mon, March 20, 2006 4:36 PM To: Sundher, Avtar S ENV:EX Cc: Warriner, Steffanie M ENV:EX Subject: Re: POST INVESTIGATION REVIEW: Morning Star Nurseries

Looks good. Proceed as you have proposed. Thx JLM

Sent from my BlackBerry Wireless Handheld

----Original Message----From: Sundher, Avtar S ENV:EX To: McGuire, Jennifer ENV:EX Sent: Mon Mar 20 16:08:40 2006 Subject: POST INVESTIGATION REVIEW: Morning Star Nurseries

Jennifer,

Morning Star responded to our 27 Feb. 2006 letter requesting procedures implemented and works installed to prevent future fuel spills from migrating off the property. Specifically, how their fuel handling procedures have changed to prevent over-filling. Ministry letter was in response to the recommendation by the Regional Management Compliance Team noted in the Post Investigation Review section.

Morning Star advised in a 16 March 2006, four page fax of the following:

\* The hose used to fill the generator tank from the large underground storage tank has been removed. A commercial fuel supplier has been contracted to fill the tank as needed;

\* The drainage for the area is now connected to a permanent oil/ water separator and sumps contain underflow weirs;

\* Other environmental risks were identified by reviewing the "BC Environmental Farm Plan" booklet obtained from the Ministry of Agriculture. They have developed an . environmental action plan to address these risks which includes the construction of a chemical storage room for perficides, fungicides, growth retardants etc.; and

\* Morning Star has worked with a consultant to excavate contaminated soil and conduct confirmatory samples. The report will be available for our review/files.

I have no other conderns. Shall I Entward cost recovery notice to Morning Star and advise (05 to issue wathing letter?

104.03

MORNINGSTAR



1350 - 176th Street, Surrey, B.C. V3S 9S7 Tel: (604) 541-1124 Fex: (604) 538-0001 Visit our Website: morningstarnurserles.com

To: Ministry of Enviroment Attn: Avtar S. Sundher

Re: Report on Diesel Spill

Good morning Avtar:

I tried emailing the reports Karl and I prepared last night to both you and Jack but the came back undelivered.

So attached you'll find the reports as promised.

I'll fax copies to Jack also and I'll phone you to make sure you received them.

Please call if you have any questions or concerns. My cell is

Have a great day

Pete





TO SHINE

February 27, 2006

File: DGIR 501860

Morning Star Nurseries Ltd. 1350 - 176<sup>th</sup> Street Surrey, B.C., V3S 9S7

## **ATTENTION:** Peter Den Haan - President

Dear Mr. Peter Den Haan:

# Re: Diesel Fuel Spill at Morning Star Nurseries Ltd, 1350 – 176th Street, Surrey

This letter is in follow-up to the diesel fuel spill on the above noted Morning Star Nurseries Ltd (MSNL) property, reported to the Provincial Emergency Program on 3 October 2005. We note that the spill was the result of employee error. A valve was left open on a fuel circulation loop that extends from a large underground storage tank to burners that heat the greenhouses.

Specifically, the valve on the circulation loop was opened to fill a secondary fuel tank that supplies a generator. The valve was not closed when the tank was filled. The secondary tank over-flowed into the greenhouse drainage system and subsequently into an eastern property boundary ditch. The ditch flows south and discharges into Sam Hill Creek. The ditch and creek were significantly impacted by diesel fuel.

Please advise the ministry, in writing by March 15, 2006, what procedures have been implemented and works installed to prevent future fuel spills from migrating off the MSNL property. We note that a permanent concrete oil/water separator has been installed in the storm drain prior to ditch discharge.

If you have any questions, please do not hesitate to contact the undersigned at (604) 582-5376. This letter is not prejudice to further legal action that may be necessary under the *Environmental Management Act*.

Sincerely,

Avtar S. Sundher, B.Sc. Environmental Emergency Response Officer

Date: March 15, 2006

From: Morningstar Nurseries Ltd.

To: Ministry of Environment Attn: Avtar S. Sundher

To: Conservation Officer Service Attn: Jack Trudgian

File: DGIR 501860

Re: Diesel Fuel Spill

Good day gentlemen:

As requested what follows is a brief report outlining the plans, procedures and works that have – and will – been implemented or installed to prevent not only future fuel spills from migrating off our properties, but hopefully any other environmentally related issues.

I will send -by email and fax - a separate document that Karl prepared that summarizes - in log format - the work we've been doing regarding the remediation of contaminated soil etc. in and around the greenhouse zone where the spill actually happened. It also highlights some of the measures we've implemented to remove the possibility of the same thing - fuel spill over from filling auxiliary tank - happening again and/or any other contaminates flowing out of our drainage system and into the ditch.

Avtar, though your letter only requested what we're doing in the case of fuel spill prevention and management, we have been taking a more comprehensive approach in our efforts to prevent future damage to the environment. With your permission I'd like to highlight some of what we're doing.

As you're probably aware the BC Ministry of Agriculture, Food and Fisheries Resource Management Branch together with the BC Agriculture Council has produced a "British Columbia Environmental Farm Plan" that is designed as a tool for farmers as ourselves to use to be able to assess their farming operation for environmental risk and then to help a farmer to develop an Environmental Action Plan. It consists of a highly comprehensive questionnaire covering all potential environmental issues related to farming that helps a farmer identify where he's off-side and then includes a workbook that helps him develop an Environmental Action Plan.

Prior to the oil spill Karl and I had attended a one day seminar that explained what this program is and roughly how it worked. Just from attending the one day information seminar

MOE-2014-00237 Page 16

## 03/16/2006 08:05 6045380001

MORNINGSTAR

we already new we needed to take action in certain areas. So though we hadn't gone through the questionnaire process yet, we decided to immediately drain both of our colored fuel tanks that we had on the property and removed them. We consequently do not use colored fuel anymore and do not have the means to fuel our trucks and vehicles on the property. We also immediately began construction of a chemical storage room that met all the requirements highlighted in the Environmental Action Plan mentioned above.

As the oil spill diverted a tremendous amount of our available capital – in cash and people – he hadn't to date been able to actually have the consultants who work with this program come for a site visit so that we can spend the day required to go through the workbook questionnaire and make the Environmental Action Plan. As it stands Karl and I have an appointment with them for this coming Friday morning and we hope to be able to complete this then.

Meanwhile we have nearly completed our chemical storage room. We had an opportunity recently to remove – for remediation – a bunch of chemicals from our property that were no longer "listed" and or which we felt we'd never use. We should have all of our chemicals that we store – pesticides, fungicides, growth retardants, etc. – safely stored away in this new self-contained room very soon.

Meanwhile we'll complete the Environmental Action Plan and begin to implement the corrective or preventive measures it highlights in order of priority.

Gentlemen, I don't know what else I might say to convince you that Diana and I as owners - as well as all of our staff - take prevention of environmental harm very seriously.<sup>s.22</sup>

So I think I will end here and trust that you'll feel free to call me if you have any other comments, questions, or concerns.

Let me end by saying again how appreciative we are for the help and encouragement we have received from both of you throughout this very trying experience. I don't know if we would have "made it" thru this without your help. I'll look forward to hearing from you soon.

God bless

Pete Den Haan

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Contaminated soil log

Late November we began excavating the contaminated greenhouse drainage system.

By Dec 23 we had removed four ten-yard containers. We dug out all the drain rock and scraped down the sides and bottoms of the drain trenches.

On Jan 3<sup>rd</sup> we sent in four soil samples to Norwest Labs to ensure we were cleaning the ditches adequately. Although there were detectable trace amounts in all four samples, they were all less than a 1000 ug/g with the exception of the sample I collected from the silt that had built up at the discharge end of the drain system. That sample tested at 1150 ug/g in the EPHs 10-19.

Although, to the best of our knowledge, anything less than 1000 ug/g is acceptable, we decided to scrape down the walls and bottoms of the trenches one more time to ensure we were clean. We also made sure all silt got scraped away.

Or jan 13 we also sent in 2 water samples from the drainage discharge. Sample one from the first containment hole at the original spill site, and sample two from the last collection sump prior to exiting the building.

Both came back with higher than acceptable readings, although sample two was only higher in the EPHs 19-32 test. (as per the adult cow drink water guide limits)

As we cleaned the trenches for the second time, we also noticed that the diesel in some place had penetrated the soil any where from a few inches to a couple of feet all along the trenches in very local and random places, concentrated mostly in the south quarter of the greenhouse where the diesel had pooled in the drain system. In order to find all these contaminated 'pockets' we went over the trenches once more foot by foot taking small samples and sniffing them. As we completed each trench we noticed the overall smell of diesel in the greenhouse begin to lessen. We are almost done with the checking and sniffing of all the trenches, and then we will retest the discharge water. Visually it has significantly improved however

When a few of the trenches were completely clean, we sent in two more soil samples on march 3, which came back with no detectable amounts of diesel in them.

# Prevention:

As noted all drainage water is now routed through a permanent oil separator. Some drainage water from outlying areas eventually will be diverted separate discharge lines to reduce the load on the separator (and increase it's effectiveness)

The hose on the offending valve has been removed, making the fuel system a completely closed loop. The generator tank will now need to be filled by a commercial fuel supplier. The fuel system has also been reviewed to ensure that operator error resulting in a similar spill is no longer possible.

Wherever the drainage system has been upgraded, exit lines have been converted to underflow only, to prevent any contamination from flowing over the surface of the drain water.

04/05

PAGE

All contaminated soil has been removed from the drainage system, so regular drain water is not capable of carrying off any contaminates.

The original spill area has been cleaned as best as possible at this time, and is separated from the drain system with an oil separator, to prevent any leakage into the drain system. The oil separator is installed in such a way that any water making its way into the original spill area will be collected by the oil separator and then discharged into the drainage.

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Ministry of Environment

Regional Operations Lower Mainland Region

# MEMORANDUM

To: Jack Trudgian Conservation Officer Ministry of Environment Lower Mainland Region Date: February 7, 2006

File:

## Re: Morning Star Nurseries Diesel Spill on October 3, 2005

## Introduction

On November 18, 2005, Conservation Officer (CO) Jack Trudgian requested that the Environmental Quality section provide an environmental impact assessment for a diesel fuel spill at Morning Star Nurseries Ltd. (Morning Star) located at  $1380 - 176^{\text{th}}$  St., Surrey. At that time I was provided with a Legal Analysis report from Pacific Environmental Science Centre (PESC), addressed to Mr. Avtar Sundher, dated November 9, 2005. I have subsequently been provided with the following information related to the subject spill for my review:

- Continuation Report (current to November 19, 2005) written by CO Trudgian,
- Report written by Hemmera Envirochem Inc. (Hemmera) consultants, addressed to Mr. Denhaam, dated November 21, 2005, and
- Memorandum written by Environmental Emergency Response Officer (EERO) Sundher, dated January 5, 2006.

On the morning of Friday, September 30, 2005, an employee at Morning Star accidentally left a valve open during the transfer of fuel oil from an underground storage tank to an aboveground storage tank in the generator room<sup>1</sup>. When the employee returned to work on Monday, October 3, 2005, he saw that the diesel fuel had overflowed from this tank, onto the concrete pad, and into an irrigation drain. This drain flows into the storm sewer trunk line which discharges into a ditch<sup>2</sup>. At the site, it was observed that the spilled product entered the ditch from a single discharge pipe and was then transported downstream towards Sam Hill Creek<sup>3</sup>. The subject ditch flows into Sam Hill Creek, which then flows into the Little Campbell River<sup>4</sup>.

On Monday, October 3, 2005, EERO Sundher responded to the reported diesel fuel spill at Morning Star. Members of the Surrey Fire Department were also present at the spill site setting out booms and absorbent pads to contain the spill. Battalion Chief Dave Rivet stated that there could have been between 4,000 - 6,000 L of diesel fuel spilled into the subject ditch<sup>5</sup>. The fire department reported that diesel was visible in the ditch and in Sam Hill Creek to approximately 50m past the confluence of the impacted ditch and the creek<sup>6</sup>. This is where the most downstream boom was placed. EERO Sundher collected water samples just upstream of this boom, approximately 40m downstream from the confluence of the ditch and Sam Hill Creek. EERO Sundher also collected water samples in the subject ditch, approximately 70m upstream of the where the diesel entered the ditch.

# Results

The following table presents the results from the toxicological tests and the chemical analyses performed by PESC on the samples collected by EERO Sundher.

MoE	PESC	Sample Location	96 hour	48 hour	Petroleum	Oils and	Hydrocarbons
Sample ID	Sample		Rainbow Trout	Daphnia	Hydrocarbons	Greases	
and	ID		LC50	magna LT50			
	120110	Downstream of	20.160/				
14, 10, 10,	129119	Downsuleant of	20.10% There was				
Morning	-1	Spill, ill Saill					
woming		downstream of	10070				
		its confluence	mortanty in 40				
		ns connuence	nours to the				
		ditab	raindow trout				
		unch.					
			100%				
#2	120120	Dourse stresses at	concentration.	> 4 = 24			
#2 Morning	129120	Downstream of		> 4 < 24	Contains		
Morning	-1	Spin, in Sam		1000/	retroieum		
		doumstream of		100%	Hydrocarbons characteristic of		
		its confluence			Discol fuel (with		
		ns connuence			Diesei luei (with		t
		ditab			a inyurucar bui		
		ditch.			1 ange 11 011 $1C-$ 9 to $nC-24$ )		
3 Morning	129121	Downstream of		> 4 < 24	<u> </u>	085 000	085.000
J WOINIng	-1	spill in Sam		hours at		703,000 ma/L	903,000 mg/I
		Hill Creek 40m		10013 40		mg/L	ing, L
		downstream of		10070			
		its confluence	-				
		with the subject			-		
-		ditch.					
4a, 4h, 4c,	129122	Upstream of	Not acutely				
#4d	-1	spill: In subject	lethal. There		· ·		
Morning	- ·	ditch. 70m	was 0%	•			
		upstream of	mortality in 96				
· -		subject	hours to	-	· · .		
		discharge.	rainbow trout	-			
			exposed at				
			100%			-	
		-	concentration.	-	-		
#5	129123	Upstream of		Not acutely	Does not contain		
Morning	-1	spill; In subject		lethal at	Petrolcum		
-		ditch, 70ın		100%	Hydrocarbons		
		upstream of					
-		subject			-		
		discharge.					
#6	129124	Upstream of				< 0.5	< 0.5 mg/L
Morning	-1	spill; In subject				mg/L	
_		ditch, 70m		-			
		upstream of					
		subject					
		discharge.					

Laboratory analyses conducted on the water samples collected in Sam Hill Creek showed that they were acutely toxic to aquatic life (both fish and invertebrates), and that they had high concentrations of oils and greases and hydrocarbons<sup>7,8</sup>. Sample 1 (labeled as 1a, 1b, 1c, 1d and collected in Sam Hill Creek) was acutely toxic to rainbow trout in a 96 hour LC50 test. Testing of this sample resulted in half of the test fish dying in 96 hours at 20.16% concentration (of the original sample). The 100% concentration in the test resulted in all of the fish dying within 48 hours of exposure. Toxicity testing conducted on samples 2 and 3 (both collected at the same location in Sam Hill Creek as sample 1), resulted in the mortality of the freshwater test invertebrate, *Daphnia magna*. All of the invertebrates died between 4 and 24 hours after exposure to the 100% concentration.

Chemical analysis of sample 2 confirmed that the sample contained petroleum hydrocarbons characteristic of diesel fuel, while sample 3 was found to have very high concentrations of oils and greases (985,000 mg/L) and hydrocarbons (985,000 mg/L)<sup>9</sup>. These results are consistent with the information that there was a diesel fuel spill into a freshwater environment.

#### Assessment

The ditch which the subject spill entered is classified as AO in the City of Surrey's Fisheries, Watercourse Classification<sup>10</sup>. This classification means that the ditch is inhabited, or potentially inhabited, by salmonids during the overwintering period. This ditch flows into Sam Hill Creek and the Little Campell River, both of which are classified as A by the City of Surrey. This means that these watercourses are inhabited, or potentially inhabited, by salmonids year round. Fish species which have been reported in both Sam Hill Creek and the Little Campell River, coho, and sockeye salmon, cuthroat and rainbow trout, kokanee, dolly varden, steelhead and sturgeon<sup>11</sup>. Consequently, any impacts to this ditch may affect the aquatic life within it, as well as the fish-bearing waters connected downstream.

Diesel fuel spills into freshwater environments may have direct and indirect inpacts on aquatic life. Diesel is acutely toxic to many organisms including fish, amphibians, invertebrates, crayfish and algae<sup>12</sup>. The laboratory toxicity tests (both fish and invertebrate) verified that the subject samples were acutely toxic to freshwater organisms and were very high in petroleum hydrocarbons characteristic of diesel fuel.

Besides being acutely toxic to aquatic life, diesel fuel in freshwaters may have indirect and longer lasting impacts in the environment. Although chronic impacts are often less relevant in short-term spill events, they can be long-lasting. Sublethal impacts of diesel spills to fish in freshwaters have included the uptake of hydrocarbons into fat and flesh<sup>13</sup>, tainting of the flavour<sup>14</sup> and extensive DNA damage<sup>15</sup>. Indirectly, organisms may be adversely affected as a consequence of a shift in the food web. Spills may alter the density and composition of the invertebrate community which constitutes food resources to higher level organisms (such as fish, birds and mammals)<sup>16</sup>. Consequently, food availability for these organisms may be affected.

Diesel spills may also affect habitat. The BC freshwater aquatic life working criteria states that water surfaces should be virtually free of oils and grease<sup>17</sup>. The measured high oil and grease concentrations, as well as the visual observations of thin films and sheens of oil in the creek as well as on the banks of the ditch, indicate that this criteria was exceeded at this site<sup>18</sup>. The water surface microlayer (the top 50µm) is frequently a concentration point for certain contaminants including petroleum products such as diesel<sup>19</sup>. This coincides with its frequent use by the reproductive life stages (i.e. eggs, larvae and tadpoles) of fish, amphibians and invertebrates<sup>20</sup>. Diesel fuel covering the water surface can be acutely toxic, can physically coat organisms, can interfere with air exchange at the water's surface and/or can be ingested as oil droplets. The oiling of riparian areas may also harm semi-aquatic and terrestrial organisms.

#### Summary

In the subject ditch, as well as downstream in Sam Hill Creek, there were visible oil and grease sheens. Samples collected from Sam Hill Creek had very high concentrations of oils and greases, and petroleum hydrocarbons characteristic of diesel fuel. Diesel fuel is toxic in aquatic environments. Laboratory toxicity testing of the subject samples collected in Sam Hill Creek were acutely toxic to aquatic life (both rainbow trout and *D.magna*). Sam Hill Creek is a fishbearing watercourse with salmon, trout and other fish species present in it.

## Conclusiou

From the information provided to me, it is my opinion that this entry of diesel into the subject ditch and creek constitutes *pollution* as defined under the *Environmental Management Act*. Since downstream of the diesel spill is the fish-bearing Sam Hill Creek, since the diesel spill entered Sam Hill Creek at acutely toxic concentrations, and since there are detrimental acute and chronic impacts of diesel spills to aquatic life, the diesel fuel discharge is a *deleterious substance* as defined under the *Fisheries Act*.

Diane Sutherland Environmental Quality Biologist Ministry of Environment

## References

- 1. Memorandum from Environmental Emergency Response Officer, Avtar Sundher, B.C. Ministry of Environment, dated January 5, 2006.
- 2. Ibid.
- 3. Hemmera report addressed to Mr. Denhaam, dated November 21, 2005.
- 4. Memorandum from Environmental Emergency Response Officer, Avtar Sundher, B.C. Ministry of Environment, dated January 5, 2006.
- 5. Continuation Report for Morning Star Nurseries. File #PIR 039-05. Prepared by CO Trudgian.
- 6. Memorandum from Environmental Emergency Response Officer, Avtar Sundher, B.C. Ministry of Environment, dated January 5, 2006.
- 7. Letter from Grant Schroeder, Analyst, Environmental Toxicology Section, PESC, to EERO Sundher, dated November 8, 2005.
- 8. Letter from Oxana Blajkevitch, Analyst, Chemistry Section, PESC, to Mr. Grant Schroeder, PESC, dated November 2, 2005.
- 9. Letter from Oxana Blajkevitch, Analyst, Chemistry Section, PESC, to Mr. Grant Schroeder, PESC, dated November 2, 2005.
- 10. City of Surrey Engineering Department, Fisheries Watercourse Classification Map.
- 11. Fishwizard, <u>http://FishWizard.com</u>
- 12. Bury, R.B., <u>The Effects of Diesel Fuel on a Stream Fauna</u>, Calif. Fish Game, Vol. 58, No. 4, pp. 291-295. 1972.
- 13. Ibid.
- 14. Mackie, P.R., A.S. McGill, and R. Hardy, <u>Diesel Oil Contamination of Brown Trout (Salmo</u> <u>trutta L.</u>), Environmental Pollution, Vol. 3, pp. 9-16, 1972.
- 15. Kurelec, B., A. Garg, S. Krca, S. Britvic, and D. Lucic, <u>DNA Adducts in Carp Exposed to</u> <u>Artificial Diesel-2 Oil Slicks</u>, Eur. J. Pharmacol – Environmental Toxicology and Pharmacology Section, Vol. 228, No. 1, pp. 51-56, May 1992.
- 16. Lytle D.A. and B.L. Peckarsky. Spatial and temporal impacts of a diesel fuel spill on stream invertebrates. Freshwater Biology Vol. 46, Issue 5, pp. 693-704. May 2001.
- 17. Nagpal, N.K., L.W. Pommen and L.G. Swain. <u>A Compendium of Working Water Quality</u> <u>Guidelines for British Columbia</u>. Water Management Branch, Environmental and Resource Management Department, Ministry of Environment, Lands and Parks. August 2001.
- 18. Memorandum from Environmental Emergency Response Officer, Avtar Sundher, B.C. Ministry of Environment, dated January 5, 2006.
- Hardy, J.T., E.A. Crecelius, L.D. Antrim, S.L. Kiesser, V.L. Broadhurst, <u>Aquatic Surface</u> <u>Microlayer Contamination in Chesapeake Bay</u>. Marine Chemistry, Vol. 28. No. 4, pp. 333-352. 1990.

20. Ibid

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Please call	Tel, No. 	   Ext. 
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Date	Time	Message received by
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# MINISTRY OF ENVIRONMENT

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File Number: 31010-50/IRP-ES

INVESTIGATION REVIEW FORM COMPLIANCE AND ENFORCEMENT POLICY AND PROCEDURE
SECTION A: RECORD OF NON-COMPLIANCE
This section to be completed for the purpose of recording non-compliance.
Date initiated: 2005.10.03 Initiator: C.O. J. Trudgian
Company/Individual: Morning Star Nurseries
Address: 1350-176 <sup>th</sup> Street Surrey B.C., V3S-9S7 Phone #604-763-1123 (Home) 604-541-1124 (Business)
Licence/Approval/Permit #: <u>N/A</u> Date of non-compliance: <u>2005-10-01 to 2005-10-03</u>
Non-compliance (Act, Section): EMA 6(2) FFA 36(3) Location of non-compliance: Surrey, B.C.
Summary of non-compliance: On October 1, 2005, an employee of Morning Star Nurseries Ltd. Opened up a boiler
fuel pump, which he forgot to turn off before the end of his shift. This caused the generator tank to overflow and
release approximately 2000 to <b>6</b> 000 litres of diesel fuel. He did not notice it until he returned to work on the morning
of October 3, 2005, where the flow of fuel was then turned off and the appropriate agencies were called.
Non-Compliance Decision Matrix – Level of Impact:
$\Box \text{ Level } 1 \qquad \Box \text{ Level } 2 \qquad \Box \text{ Level } 3 \qquad \boxtimes \text{ Level } 4 \qquad \Box \text{ Level } 5$
Summary of Impact (environmental, human health and/or safety): <u>Approximately 2000 to 6000 litres or more of</u>
diesel fuel was released onto Morning Star properties and into the water filled ditch behind the property and then
flowed into the upper portion of Sam Hill Creek.
Non-Compliance Decision Matrix – Likelihood of Compliance:
X Category A ☐ Category B ☐ Category C ☐ Category D ☐ Category E
Summary of Likelihood of Compliance (Compliance History/Willingness and Capacity to Comply). The owner
Peter-Dehaan has no history of non-compliance and has been very cooperative with the investigation and has been
remorseful. He has taken on all the costs associated with the clean-up, which appears will be very costly to him. On
his own accord he has called an environmental consultant to assess the damage and assist with the clean-up.
Please enclose, if applicable:
Photos     Correspondence with any/all agencies
☐ Inspection form ☐ File notes/sketch/site map
Permit/Approval/Licence     Record of past non-compliance
Company/Property Searches (BC Online)
Recommended Response (for optional internal program area use):
Advisory Warning Directive Administrative Sanction
Signature (SH): Date:
SECTION B: REQUEST FOR INVESTIGATION
for referring an investigation to COS/Park Rangers under Column 2, Table 1 of the policy.
Has cross-divisional consultation occurred? 🔀 Yes 🔲 No
Comments: Have consulted with the Environmental Protection staff and consultants on sight.
Please provide an estimate of the resource requirements (e.g., staff and sampling costs): One Evironmental
Emergency Response Officer, one Environmental Impact Officer, water samples taken to the Pacific Environmental
Science Centre and myself.
Signature: (initiator)
Signature: (SH) Date:
Routing:
2. If pre-investigation review is required forward to Regional Manager who will convene the RMCT

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initiation of investigation	nal Management Compliance Team (RMCT) prior to the
	as under Column 1, Table 1 of the policy.
Date Received:	Investigation supported? 🔲 Yes 🗌 No
Rationale for decision:	
Action required:	
Staff and resources assigned:	
Decision date:	Signature: (COS Manager)
· · · · · · · · · · · · · · · · · · ·	Signature: (ES Manager)
	Signature: (EP Manager)
SECTION D: INVESTIGATION FIND	UNGS AND RECOMMENDATION(S)
I his section to provide information on t	The investigative team's findings and recommendation(s).
Investigative Leam Findings	COORS# <u>スレン ゆうやく /</u>
Non-Compliance Decision Matrix	
Level of Impact:	
Level 1 Level 2 Level 2	13 Level 4 Level 5
Likelihood of Compliance	
🔀 Category A 🔚 Category B 🛄 Categ	ory C Category D Category E
Comments:	A de la construcción de la constru A de la construcción de la construc A de la construcción de la construc
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Investigative Team Recommendation(s)	
Ticket 🔲 Directive 🖾 Administ	trative Sanction 🗌 Formal Charges 🛛 🕅 Other
Is there sufficient evidence to support the recomme	
is more sufficient evidence to support the recomme	endation of charges?
Yes No	endation of charges?
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SECTION C: PRE INVESTIGATION REVIEW Alto do This section to be completed by the Regional Management Compliance Team (RMCT) prior to the initiation of investigations under Column 1, Table 1 of the policy. 40. Date Received: 11 Investigation supported? T Yes Rationale for decision: Action required: Ø Staff and resources assigned: Signature: (COS Manager) Decision date: Signature: (ES Manager) Signature: (EP Manager) Ł SECTION D: INVESTIGATION FINDINGS AND RECOMMENDATION(S) This section to provide information on the investigative team's findings and recommendation(s). Investigative Team Findings Non-Compliance Decision Matrix Level of Impact: Level 3 Zevel 4 Level 5 Level I Level 2 Likelihood of Compliance Category B Category C Category D X Categor A Category E. Comments: Investigative Team Recommendation(s) Ticket Directive Formal Charges X Other Is there sufficient evidence to support the recommendation of charges? Yes No SEE ATACHE Comments: UARNING DETTER 2005.02.02 Signature: (COS) Date: Signature: (EP/E Routing: Forward to COS Manager for conveyance to RMCT> SECTION E: POST INVESTIGATION REVIEW This section to be completed by the RMCT prior to the initiation of the above recommended action. Date Received: Recommendation supported? Yes No Rationale: Action required: Staff assigned: Signature: (COS Manager) Decision date: Signature: (EP Manager) Signature: (ES Manager)\_ Routing: Forward a copy of completed forms to the investigative team and to Compliance Division (Fax: 387-8894)



Picture #1 – Generator room and tank in background, the source of the spill when overfilled. A hose, located at the base of the tank and to the right is used to fill the tank from the top.



Picture #2 – Looking towards the boiler room (east from 176<sup>th</sup> St). Large underground diesel storage tank located in front of the overhead door below the concrete pads. Picture #3 – Hose used to fill AGST from the top. Note valve through hole near base of wall is connected to loop which circulates diesel between boiler and large underground storage tank.





Picture #4 – AGST overflowed into greenhouse floor and irrigation drains. Diesel pooled in shovelled areas. Generator room with AGST is to left of picture.



Picture #5 – Black pipe from left of picture discharged diesel into ditch running along the eastern property boundary. Attempts made to cover culvert in foreground.



Picture # 6 – Vacuum Truck recovering fuel from storm sumps located between two rows of greenhouses.



Picture # 7 – Free product found in both the sumps in Picture #6. White adsorbent pad in sump was immediately saturated with fuel.



Picture # 8 – Confluence of ditch and Sam Hill Creek looking east. Ditch discharges into creek at left. Note diesel fuel collected on surface of creek behind booms placed around the bend.



Picture # 9 - Saturated adsorbents in ditch



Picture # 10 – Saturated adsorbents in ditch, south of 12<sup>th</sup> Avenue.



Picture # 11 - Collected saturated adsorbents.



Picture # 12 - Recovered fuel from ditch at Morning Star storm outfall .



Picture # 13 – Fuel collected behind last boom in Sam Hill Creek and Sample Location #1.



Picture # 14 – Four bio-assay containers, labelled 1a, 1b, 1c, 1d, collected from Sample Location # 1.

Containers were subsequently locked in EERO truck.

Picture #15 – A small hole was dug to daylight broken storm pipe in front of the loads of lumber (top centre of picture). Fuel was found in hole. There was minimal fuel in sump located in the foreground.





Picture # 16 – Upstream bio-assay samples 4a, 4b, 4c and 4d and 1 litre amber glass bottles #5 and 6 obtained from Sample Location #2. The samples were permanently scribed and sealed.


Picture # 17 – OCTOBER 4, 2005 Sumps between greenhouses.



Picture # 18 – OCTOBER 4, 2005 Closer look at sump in Picture # 17 above. Fuel had collected overnight. Note adsorbent pad quickly saturated with diesel.



Picture # 19 – OCTOBER 4, 2005 Storm discharge pipe excavated, cut and blocked to prevent discharge off-site. Ditch on eastern property boundary is behind mini-excavator.



Picture # 20 – OCTOBER 4, 2005 Excavated and cut storm pipe as in Picture 19. Note some fuel is present in the storm discharge from the greenhouse, where diesel entered irrigation drainage.



Picture # 21 – OCTOBER 4, 2005 Adsorbents in ditch. Note pads recently changed. Only minor residues noted.



Picture # 22 – OCTOBER 4, 2005 Ditch just north of 12<sup>th</sup> Ave. Ditch relatively clean

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Picture # 23 – OCTOBER 4, 2005 Ditch south of 12<sup>th</sup> Ave. Replaced absorbents. Only a slight sheen visible.



Picture # 24 – OCTOBER 4, 2005 Ditch just before discharge into Sam Hill Creek. Some emulsified diesel had collected behind weir.



Picture # 25 – OCTOBER 4, 2005 Last boom in Sam Hill Creek. Only a minor hydrocarbon sheen visible in a small area.



Picture # 26 - OCTOBER 4, 2005 Ditch at back of Morning Star, upstream of storm and spill discharge pipe. Sample Location # 2 is in ditch beside 1 x 6 wooden board (foreground).



Picture # 27 – OCTOBER 5, 2005 Temporary oil/water separator system to prevent off-site discharge. A replacement concrete separator is being unloaded in background.



Picture # 28 - OCTOBER 5, 2005 Ditch north 12<sup>th</sup> Ave. No diesel residues noted.



Picture # 29 - OCTOBER 5, 2005 Ditch just before confluence of Sam Hill Creek. Very minor residues noted.



Picture # 30 - OCTOBER 5, 2005 Dead muskrat (?) found on the bank of Sam Hill Creek at the confluence of the ditch.



Ministry of Environment

Regional Operations Lower Mainland Region

# MEMORANDUM

To: File

Date: January 5, 2006

File: DGIR: 501860

# Re: Morning Star Nurseries Limited – 3 October 2005 Diesel Fuel Spill at 1380 – 176<sup>th</sup> Street, Surrey

3 October 2005, 721 hours - Carl Ravensbergen advised the Provincial Emergency Program (PEP) concerning a spill of 200 litres of diesel to ground at the above referenced site.

0730 hours - PEP advised the Provincial Standby Officer and Environmental Emergency Response officer (EERO), Reg Marquardt . Lower Mainland EEROs were not immediately contacted as the initial report was of relatively small volume.

0911 hours – Surrey Fire Department contacted PEP and advised that over 1000 litres of diesel had spilled into a ditch and subsequently into Campbell River. Dave Rivett, Battalion Chief on-site contacted at (604) 250-1204 by Avtar S. Sundher, Lower Mainland EERO. DR advised that public works and fire department have deployed absorbents in the ditch and creek system. AS to attend.

1000 hour approx. – EERO arrived on-site. Fire Department – Hazmat team, Surrey Public Works, Quantum Environmental, McCrae's, Newalta Corportation, Peter Den Haan, owner Morning Star Nurseries, Carl Ravensbergen an employee and relative of owner and other greenhouse labour were on-site.

Chief DR along with the owner advised that a spill of diesel occurred over the weekend when an approximate 700 - 1000 litre aboveground tank (AGST), located in the generator room, was overfilled (see picture #1). The AGST was filled from a large, approximately 8000 litre, underground tank (UGST) located near the front of the boiler room (see Diagram #1, and Picture #2). The UGST is used mainly to store back-up fuel for the boilers who normally burn natural gas. A fuel pipe loop is installed between boiler room, generator room and underground fuel tank. The fuel intermittently circulates within the loop when the boiler is on. On September 30, 2005, Carl Ravensbergen, opened the valve on the loop and commenced filling the AGST (Picture #3) and forgot to turn off the valve over the weekend. The spill was discovered by CR on Monday October 3, 2005. The fuel overflowed onto to the concrete pad, greenhouse and irrigation drains. The diesel flowed south in the irrigation drain to the storm sewer trunk line which runs east between two rows of greenhouses (see diagram #1 and Picture #4). The storm sewer discharges into a ditch at the back of the property (see Picture #5). The ditch flows south into Sam Hill Creek.

# Morning Star Nurseries Ltd 3 October 2005

McCrae's vacuum truck service was recovering fuel from storm sumps located between the greenhouses (see item # 6 on Diagram #1 and Picture # 6 & 7). Free product was flowing into both sumps.

Fire Chief DR advised that his crew had walked up Sam Hill Creek from Campbell River and placed adsorbent boom across Sam Hill Creek at the first sign of diesel. The spilled diesel had migrated approximately 50 feet downstream of the confluence of the impacted ditch and Sam Hill Creek (see Diagram #1, item 13 and Picture # 8). Further downstream of this last adsorbent boom, natural vegetation, shrubbery and dead leaves across the creek provided secondary protection. Numerous absorbent pads and booms were placed in the ditch between Morning Star property and Sam Hill Creek (see Picture # 9 & 10). Diesel product was recovered with absorbents at numerous location in the ditch and creek (see Picture #11 & 12).

Approx. 1230 hours AS contacted Jennifer L. McGuire and advised there was significant media attention and assistance required with sampling and a Conservation Officer for legal statements. Volume of spill significantly more than 200 litres as originally reported. Potential spill of up to 6000 to 8000 litres. Requested that JLM update PEP and incident upgraded to code 2 because of 1) media attention, 2) potential for impact to drinking water, 3) significant impact to fish habitat and 4) International interest – Washington State has requested updates as Campbell River flows across border.

AS requested Quantum Environmental to send a vacuum truck to Sam Hill Creek to remove fuel collected behind the last boom.

1350 hours - AS collected creek water sample from Sam Hill Creek at Sample Location #1, just upstream of the last boom, approx. 40 feet downstream of the confluence of ditch and creek (see Diagram #1 and Picture #13 & 14). The containers were marked 1a, 1b, 1c, and 1d. The 4 containers, with the assistance of other Quantum Environmental and Ministry staff, were carried back to EERO truck and locked inside.

1425 hours – AS collected Sample # 2 in 1 litre amber glass bottle, from Sample Location #1.

1430 hours - AS collected Sample # 3 in 1 litre amber glass bottle, from Sample Location #1.

Sample # 2 and # 3 were locked in the back of EERO truck.

Chief DR called and advised that more fuel was being discharged from Morning Star property. Did not know why. AS returned to site and found that small amount of fuel was being discharged. A small hole was excavated at 14 (see diagram #1 and Picture #15) to uncover storm discharge pipe. Pipe was broken and fuel pooled in excavation. AS requested that the pipe be cut and plugged to prevent further discharge into ditch. A vacuum truck to collect the fuel accumulated in the excavation. Diagram #2 was provided by Morning Star clarifying how the storm drainage and sumps were connected. Excavation commenced in the area.

1805 hours – AS collected upstream bio-assay water samples 4a, 4b, 4c and 4d from the ditch running behind Morning Star Nurseries (east of greenhouses) and approximately 70 meters

# Morning Star Nurseries Ltd 3 October 2005

upstream of the storm outfall which discharged spilled diesel into the ditch (see Sample Location #2 on diagram #1 and Picture #26).

1810 hours – AS collected upstream water samples # 5 and #6 from Sample Location #2 in 1litre amber glass bottles.

Samples 4a, 4b, 4c, 4d, 5 and 6 were carried, with the assistance of CO Jack Trudgian, to CO truck and scribed and sealed (see picture # 16). Continuity report completed (attached).

1905 hours – AS transferred samples 4a, 4b, 4c, 4d, 5 and 6 to Jack Trudgian for transport to the Pacific Environmental Science Centre (PESC) in North Vancouver.

Downstream samples 1a, 1b, 1c, 1d, 2 and 3 were removed from locked EERO truck and scribed and sealed. Continuity report completed (attached).

1955 hours – AS transferred samples 1a, 1b, 1c, 1d, 2 and 3 to Jack Trudgian for transport to PESC. Client Service Request # 11208 completed (copy attached) for all samples collected and accompanied the shipment to the lab.

JT left site to deliver the samples to the Lab. Arrangements had been made with Richard Strub of PESC to accept the samples after hours.

Owner Peter Den Haan provided copy #1 of manifest # 2241118-5, 2301701-5, and 2301616-5 for 3 shipments of diesel contaminated water to Newalta Corporation in Surrey. In total 18,230 litres of waste was shipped to Newalta. (see attached copies of manifests). The ditch and creek had been cleaned of the majority of bulk diesel. Residues remain which will be captured by fresh absorbents placed in creek and ditch. On-site contaminated site issues remain and a plan was being drafted.

2026 hours – AS updated PEP and advised to reduce to code 1.

Approx. 2100 hours – AS left site.

# 4 October 2005

AS inspected site in morning. Some free product collected in sump located between warehouses (see Picture # 17 & 18). Requested that PD remove product. Trench excavated east of the greenhouses to daylight storm pipe which leads to ditch (see Picture # 19 & 20).

Inspected ditch and creek. Minor residues along spill path. Adsorbents had been changed (see Picture #21, 22 & 23) Some build-up of product behind weir in ditch at confluence of Sam Hill Creek (see Picture # 24). Fresh adsorbents were applied to collect the residues. Very minor residues behind last boom in Sam Hill Creek (see Picture # 25).

Picture # 26 shows the October 3, 2005 Sample Location # 2. The upstream samples were taken from the ditch near the 1 x 6 board.

# Morning Star Nurseries Ltd 3 October 2005

# 5 October 2005

AS inspected site with Bill Michael. Quantum Environmental on-site changing adsorbents. PD advised that Hemmera Environmental has been retained to conduct an assessment of the soil and groundwater. Risk of further leaching of fuel from the immediate spill area in the greenhouse. Further, due to a forecast for more rain, temporary 3 chamber oil/water separator was constructed east of the greenhouses (see Diagram #1 and Picture # 27). The sumps on the property located between the greenhouses were now clean. A permanent concrete separator was on-site and will be installed shortly.

Ditch and creek were inspected with only minor rainbow sheen observed (see Picture # 28 and 29).

A dead muskrat (?) was found on the bank of Sam Hill Creek at the confluence of the ditch (see Picture # 30). Unknown cause of death.

PESC lab results attached.

Avtar S. Sundher, B.Sc. Environmental Emergency Response Officer Lower Mainland Region

Attachments: Pictures # 1 to 30 Diagram # 1 and 2 Client Service Request # 11208 Two x Continuity Report Copy of Legal Notes taken on-site Three Manifests Company Search Printout for Morning Star PESC lab results

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Manifest Reference No. Nº de référence du manifeste

# **MANIFEST - MANIFESTE**

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Special handling/Emergency instructions       Attached       Delow         Circulation no Cuebec only       If handling code 'Other' (specify)         Sicode de manutention 'divers' specifie'.       If handling code 'Other' (specify)         Sicode de manutention 'divers' specifie'.       If handling code 'Other' (specify)         Sicode de manutention 'divers' specifie'.       If handling code 'Other' (specify)         Sicode de manutention 'divers' specifie'.       If waste to be transferred 'specify intended'.         Oracignor Certification:       Time / Heure       Scheduled arrival date / Date d'arrovée prévue         Year / Année       Mont, / Mois       Day / Jaur       A.M.       Provincial d'arrovée prévue         Year / Année       Mont, / Mois       Day / Jaur       A.M.       Provincial in Part A is correct and complete.         Declaration de l'expédition:       I declare that the information contained in Part A is correct and complete.       Declaration d'active préving into / Medice are used in the information contained in Part A is correct and complete.         Declaration de l'expédition:       Je declare que tous les renseignements à la partie? Nont veridiques et complets.         Name of authorise (aractères dimpinmarie)       Signature       Tel no / N° de tél         MOR - LYN       BAKER       Other Wear / Année       Mather Wear / Année							
Special handling/Emergency instructions       Attached       Below       Circulation no Quebec only         Manutention speciale/Instructions d'urgence       Ci-jointes       Circulation no Quebec only         A H ARS       EME (GENCY       664 - 4334 - 8313         Date shipped/Date d'expédition       Time / Heure       Scheduled arrival date / Date d'arrivée prévue         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Var / Année       Month / Mois       Day / Jour         Date shipped / Date d'expédition       A.M.       P.M.       Scheduled arrival date / Date d'arrivée prévue         Var / Année       Month / Mois       Day / Jour       City / Ville       Prov.         Déclaration de l'expéditeur : Je déclare that the information contained in Part C is correct and complete.       Déclaration de l'expéditeur : Je déclare que tous les renseignements à la partie C sont véridiques et comp							
24 HRS       EMEGENCY       604-434-8313         Date shipped / Date d'expédition       Time / Heure       Scheduled arrivel date / Date d'arrivée prévue         Year / Année       Month / Mois       Dey / Jaur         O_5       1       0       3         Consignor Certification: I declare that the information contained in Part A is correct and complete.         Déclaration de l'expéditeur : Je déclare que tous les renseignements à la partie C sont veridiques et complets.         Name of authorized partson (print)         Nom de l'agent autorisé (caractères d'imprimerie)         LORI-LYN       BAKER	Special handling/Emergency instructions Attached Manutention spéciale/instructions d'urgence Ci-jointes	CI-dessous	Circulation no. – Nº de circulation	Guebec only - Réservée au	Québec	If handling code "Other" (specify Si code de manutention "divers"	by spécifier (unténded Provincial ID No. / NR d'id. provincial
Year / Année       Wonth / Mois       Dey / Jour         0       5       1       0       3         Consignor Certification:       1       0       5       1       0       3         Consignor Certification:       1       0       5       1       0       3         Consignor Certification:       1       0       5       1       0       0       3         Declaration de l'expéditeur:       1       0       5       0       0       3       0       3         Déclaration de l'expéditeur:       1       0       0       3       0       3       0       0       3         Name of authorized person (print)       Nom de l'agent autorisé (caractères d'imprimerie)       Signature       Tel. no. / Nº de tél.       Signature       Tel no / Nº de tél         ADRI-LYN       BAKER       Di-Marcolaration       604, 541-1124       Signature       None of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie)	24 HRS EMEGENCY 604-434 Date shipped / Date d'expédition Time / Heure Sched		prévue			company name / Si les déchets transférés, préciser le nom du de	aritester activestere activestarie
Consignor Certification: I declare that the information contained in Part A is correct and complete. Déclaration de l'expéditeur : Je déclare que tous les renseignements à la partier sont veridiques et complets. Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimerie) LORI-LYN BAKER Tel ng /N° de tél. Tel ng /N° de tél. Signature Tel ng /N° de tél. Tel ng /N° de tél.	Year/Année Month / Mois Day / Jaur   Year/ 0,5   1,0   0,3     A.M.   P.M.	Année Month/Mais Day/.	3			Address / Adress	City / Ville Prov.
Nom de l'agent autorisé (caractères d'imprimerie) LORI-LYN BAKER Tel no. / Nº de tél IORI-UN BAKER Tel no. / Nº de tél	Consignor Certification: I declare that the information contained Déclaration de l'expéditeur : Je déclare que tous les renseignem	in Part A is correct and com ents à la partie A sont veridie	plete. ques et complets.			Declaration castination, neclare in Declaration du caspéditeur de décl complets. Name of authorized person (print) / No	ex une nueumisium containee in Part C is correct and complete. lare que tous les renseignements à la partie C sont véridiques et om de l'agent autorisé (caractères d'imprimerie)
	Nom de l'agent autorisé (caracières d'imprimerie)	Di-thmen	alle 1604	° œ têl. 541-1	124	Signature	

MDE 04-1917 (12/01)

Instructions for completion and distribution on reverse / Instructions pour compléter et distribuer au verso

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MANIFEST - MANIFESTE										
I nis mannest pointorms to all regeral and rhovincial transport and environmental legislation requiring manifesting. Ce manifeste est conforme aux législations fédérale es provinciale sur l'environnements al je transport, requérant un manifestre.						Manifest Reference N Nº de référence du m	lo. anifeste	2241	118-5	
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Company name / Nom de l'entreprise	Company name / Nom de l'entrepris MCRAE	S TAN	<u>ik St</u>	21010	ce	C Consignee (F Destinataire (Réceptionna	Receiver) lire)	Provincial ID No. / N	º d'id, provincial	
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Destinataire prévu M. P. Mark Hon PS -	Trailer/Rail Car No. 2 2ª remorque – wagón Point of entry Point d'entrée	Point	of exit de sortie			City / Ville		Province	Postal code / Cod	de postal
Address / Adresse City / Ville Province Postal code / Code postal	Carrier Certification: I declare that I have to the intended consignee and that the info du transporteur: Janeste avoir regules d livraison au destinateire choisi et que les n	received waste as offermation contained in F information contained in F iéchets offerts par l'exp enseignements inscrits	ered by the consig Part B is complete : péditeur dans la p a à la partie B cont	nor in Part A for and correct. / Dé artie A en vue de l'exacts et compl	delivery iclaration leur lets.	Receiving site addr	ess / Destin	allon de l'expédition		
Receiving site address / Destination de l'expédition	Year / Année Month / Moja Day /.	Jour Name of authority Jour Nom de l'ager	prized person (prin nt autorisé (caracti	nt) ères d'imprimèrie	a) 1 in a	City / Ville		Province	Postal code / Cod	ie postal
City/Ville Province Postal code / Code postal Surrey BC V3W-4H	signation and the second	<u> </u>	<u>CA 4/0</u> Tel. No. / Nº de 1 (6. 04 -	<u> </u>	<u>1175</u> 890	Date received / Date ( Year / Année   Month /	de reception Mois Day	Time / Heure	A.M. [	 P.M.
Physical state Shipping name of waste Provin Etat Appellation réglementaire du dèchet (Oueber Queber Queber	Waste identification Identification du déchet Identification du déchet Identification du déchet Dataio any Identification du déchet Identification Identific	Quentity shipped Quantité expédiée	Unitas Lor ou kg Unitas Unitas	acking group Groupe d'emballage ZZ Z Seg C Se	kaging ntenants Codes int e ext.	Quantity received Quantité reçu	Units Lor ou kg t unites	dentify any shipment discrepancy problems. Attach addendum if recessary. / Indiquer ioute différence relative à 'expédition. Annexer receive.	Deconta Handling Déconta code Cackaging Code de Contenants matutent Jes No.	amination Imination Avenicle s.c. Véhicule Yes No Dui Non
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Special handling/Emergency instructions	Below	Circulation no	Quebec only	<u> </u>		If handling code "Othe	r" (specify)	<u> </u>		
= 1 - 460 - 662 - 201 K			- Reservee au	Quebec		Si code de manutenti If waste to be transfer company name / Si le transtérés, préciser le	red, specify s déchèts d	spécifier intended Provir olivent étre	ncial ID No. / Nº d'id.	provincial
Date shipped / Date d'expédition Year / Année Month / Mois Qay / Jour Sched Year /	uled arrival date / Date d'arrivée prévue (Année Month / Mois Day / Jour	-			1	Address / Adress		City / Ville	Prov.	
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Déclaration de l'expéditeur : Je déclare que tous les renseigners Name of authorized person (print) Nom de l'agent autorisé (caractères d'Imprimerie) Sig	efits à la partie A sont veridiques e	et cio <i>mplets.</i> Tel. no. / N <sup>a</sup>	o de tél.	(		Name of authorized perso	(print) / Nor	n de l'agent autorisé (carac	tères d'imprimerie)	
MOE 04-1917 (12/01)	<u> </u>	604	5411	124					./ № de tel. 002 <sup>3</sup> 37	
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Pacific Environmental Science Centre 2645 Dollarton Highway North Vancouver, BC, V7H 1B1

Region: LOU	IER MAINLAND REGION District:	
File / Location N	Lame: MORNING STAR NURSERIES, 1380-176 M	ST , SURREY
KAt 138	0-176th STREET SURREY BC.	
At the Pacifi	ic Environmental Science Centre (PESC),	hu ML 2/05-
at (time)	<u>1430</u> hrs., received from VIA GRAR SAMPLING	$(ale) = 0 \alpha (3 + 0)$
via (mode of	f delivery / technique)	
ITEM NUMBER	ITEM DESCRIPTION (incl. # of containers)	LAB. ASSIGNED SAMPLE # (FOLDER+ALIQUOT #)
1	5-gallon bIO-ASSAY CONTAINER WITH WITHTE/GREY LID	
la	CONTAINING A LIQUID. CONTAINER HAS SILVER DUCT THAT	
	ON-SIDE WITH PIN-HOLE LEAK SRIBED " 19, MORNING	
	OLT. 3105, 1350 HES, UFIUP, A5 11 >0	
	5-gallon Dio-ASSA CONMINER WITH WHITE/GREG LID	
l lh	CONTAINING A LIQUID AND SCRIBED " IL MORNIAIG	
	Oct. 3/05, 13 SO HRS UF/UP AS "	
	5-gallon Bio-Assay contrainen with withine/ GREY	1
10	LID CONTRINING A LIQUID and SCRIBED " I CARDING	
	000 3/05 1350 Hzs 110 ASI	r
	20	
	5- gallon BIU - ASSAY CONTAINER WITH WHITE/ GREY	
	LID CONTAINING A LIQUID AND SCRIBED II IN	
IC	MORNING OUT. 3/05, 1350 HRS 112/11P ASI	
	1- 11 TOR AMBER GLASS BOTTLE WITH WHITE LID	
1	CONTAINING A LIQUID AND SCRIBED" 2, MORNING	
~	Oct. 3/05, 1425 HRS, UF/UP, AS	· · · ·
	1- title AMBER GLASS BOTTLE WITH WHITTE LID	
$\overline{}$	CONTAINING A LIQUID AND SCRIBED "3 MORNING	
	OUT. 3/05, 1430 HRS, VEILP. AS 7/	
The original Item	n(s) was / were sealed.  GrAil  G Some (#)  G None	NOTES:
The original Iten	n(s) was / were permanently scribed. 🛛 🎝 🛛 🗠 Some (#) 🗖 None	
The original Item	n(s) was / were permanently Initialled. DrAll D Some (#) D None	
The original item	its) was / were permanently dated. UrAll Li Some (#) Li None	A strategy of the strategy of
Person: Avt	rective above are here-by certified correct. A Date: Oct. 3/05	and a start of the start
Phone: (604)	572-5376 Cell: (604) 328-5095 Facsimile: 604) 582-533.4	
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#### CONTINUITY REPORT CONTINUED

# MOVEMENT OF ITEMS OR SAMPLES,

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MOE-2014-00237

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Pacific Environmental Science Centre 2645 Dollarton Highway North Vancouver, BC, V7H 1B1

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Region: <u>LOW</u>	ER MAINLAND REGION District:	,t.
File / Location N	ame: MORNING STAR NUDSERIES / 1380-176. ", ST S	SURPEY.
☑ At <u>1,3 80</u> □ At the Pacific 1, <u>Aurran</u> at (time) <u>18</u> via (mode of	-176 h St. SURREY c Environmental Science Centre (PESC), S. Sunn Hend came into possession of the following item (s) on (c 10 Hm hrs., received from Ma GRAB Sampting delivery / technique)	late) <u>Cef. 3/05</u>
ITEM NUMBER	ITEM DESCRIPTION (incl. # of containers)	LAB. ASSIGNED SAMPLE # (FOLDER+ALIQUOT #)
4a	5 gallons plastic bio-assal container with white/ GREY Lid CONTRINING A LIQUID AND SCIEIBED "4a, MORNING, Oct. 3/05, 1805 Hizs, UF/UP, AS."	
1	5-gallon plastic, bio-assay container with write GREY	
46	ad. 3/05, 1805 H25, UF/UP, 45"	G,
	5-gallon plustic bio-assay contained with white/oney	1
4c · ·	LID CONTRINING A LIQUID AND SCRIBED " 4(, MORNING Oct. 3/05, 1805 HPS, UF/UP, AF."	
42	S-gallon Plastic bio-assay contained with white/GREY LID CONTAINING A LIQUID AND SCRIBED" Ad, HORNING, Cot. 3/05, 1805 HRS, UF/UP, AS	
5	1-Litre AMBER GLASS BOTTLE, WITH WHITE LID CONTRAINING A LIQUID AND SCRIBED, "" S, MORNING Oct. 3/05, 1810 HRS, UF/UP, AS."	
·	1-Litue AMBER GLASS BOTTLE WITH WHATE LID,	
	CONTRINING A LIQUID AND SCRIBED " #6, MORNING,	
0	Oct. 3/05, 1810 HRS, UF/UP, AS "	
The original Item	(s) was / were sealed.	NOTES:
The original Item	(s) was / were permanently scribed.	
The original item	(s) was / were permanently initialied. Ur Ali Li Some (#) Li None (s) was / were permanently dated. Ur Ali Li Some (#) Li None	
The original Item	(s) was / were placed in secure storage.	
The notations dir Person: <u>4177147</u> Phone: ( <u>/ror</u>	ectly above are here-by certified correct. 25.5  (ND) Signature: 572-5376 Cell: $(602) 328-595$ Facsimile: $(604) 585-53324$	

#### CONTINUITY REPORT CONTINUED

# MOVEMENT OF ITEMS OR SAMPLES

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MOE-2014-00237 Page 59

Page \_\_\_\_ of \_\_



# MINISTRY OF ENVIRONMENT CLIENT SERVICE REQUEST

CONTACT: <u>Autoratic -</u>	S. SUNDHE /			DATE REQUESTED:	1. 1. A. C. 1	0 105
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INSTRUCTIONS: 1. When work is initiated by laboratory: RED - Retained by Lab BROWN - Send to Fin/Admin Vict. GREEN - Returned to sampler BLUE Local Admin. Clerk. 2. When work is complete send photocopy to client. OPC 4251 (1293) Page 60



**Ministry of Finance** Corporate and Personal **Property Registries** www.corporateonline.gov.bc.ca Mailing Address: PO BOX 9431 Stn Prov Govt. Victoria BC V8W 9V3

Location: 2nd Floor - 940 Blanshard St. Victoria BC 250 356-8626

No

# **BC Company Summary** For

MORNINGSTAR NURSERIES LTD.

Date and Time of Search: **Currency Date:** 

December 29, 2005 11:30 AM Pacific Time November 04, 2005

# ACTIVE

Incorporation Number: Name of Company: **Recognition Date:** Last Annual Report Filed: BC0633400 MORNINGSTAR NURSERIES LTD. August 31, 2001 as a result of an Amalgamation In Liquidation: No August 31, 2005 Receiver:

# AMALGAMATING CORPORATION(S) INFORMATION

Name of Amalgamating Corporation

MORNINGSTAR NURSERIES LTD.

NORTH WEST WHOLESALE GROWERS LTD.

# **REGISTERED OFFICE INFORMATION**

Mailing Address: 102, 15399 - 102A AVENUE SURREY BC V3R 7K1 CANADA

**Delivery Address:** 102, 15399 - 102A AVENUE SURREY BC V3R 7K1 CANADA

Carto Correctore and

# **RECORDS OFFICE INFORMATION**

Mailing Address:

102, 15399 - 102A AVENUE SURREY BC V3R 7K1 CANADA

Delivery Address: 102, 15399 - 102A AVENUE SURREY BC V3R 7K1 CANADA

Incorporation Number in BC BC0240961 BC0316862

A CONTRACTOR OF THE OWNER OF THE OWNER

# DIRECTOR INFORMATION

#### Last Name, First Name, Middle Name: DEN HAAN, PETER

#### Mailing Address:

1350 - 176TH STREET SURREY BC V4P 1M7 CANADA

# Last Name, First Name, Middle Name:

Den Haan, Diana

# Mailing Address:

1350 - 176 STREET SURREY BC V4P 1M7 CANADA Delivery Address: 1350 - 176TH STREET SURREY BC V4P 1M7 CANADA

Delivery Address: 1350 - 176 STREET SURREY BC V4P 1M7 CANADA

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# **OFFICER INFORMATION AS AT August 31, 2005**

# Last Name, First Name, Middle Name: DEN HAAN, PETER Office(s) Held: (President)

Mailing Address:

1350 176 STREET SURREY BC V4P 1M7 CANADA Delivery Address: 1350 176 STREET SURREY BC V4P 1M7 CANADA

### Last Name, First Name, Middle Name: Den Haan, Diana Office(s) Held: (Secretary)

#### Mailing Address: 1350 - 176 STREET SURREY BC V4P 1M7 CANADA

# Delivery Address:

1350 - 176 STREET SURREY BC V4P 1M7 CANADA

# DIAGRAM #1 DIESEL SPILL- Morning Star Nurseries LTD



From:	Akins, Tiffany PAB:EX
Sent:	October 6, 2005 6:30 PM
To:	Sundher, Avtar WLAP:EX
Subject:	Re: Morning Star Nurseries - Dairy Farmer concern

Thanks for keeping me in the loop Avtar. Tiffany Akins Public Affairs Officer Ministry of Environment 250 953-4577

----Original Message----From: Sundher, Avtar WLAP:EX <Avtar.Sundher@gov.bc.ca> To: McGuire, Jennifer WLAP:EX <Jennifer.Mcguire@gov.bc.ca> CC: Akins, Tiffany PAB:EX <Tiffany.Akins@gov.bc.ca>; Trudgian, Jack WLAP:EX <Jack.Trudgian@gov.bc.ca> Sent: Thu Oct 06 16:59:23 2005 Subject: Morning Star Nurseries - Dairy Farmer concern

Jennifer,

FYI <sup>5.22</sup> called and advised that<sup>5.22</sup> is concerned about <sup>5.22</sup> cows drinking the water in Sam Hill Creek downstream of the Morning Star Nurseries diesel spill. During the incident, we advised that<sup>5.22</sup> should block access to Sam Hill Creek with fence (I believe Morning Star assisted with the fence installation). <sup>5.22</sup> cows have access to drinking water via Little Campbell River.

s.22 wants to know... will dissolved diesel components in the water taint the milk? I contacted Merv Wetzstein, (604) 536-3013 Ministry of Agriculture, who will respond to s.22 concern. MW indicated that if you can smell diesel in the water it may taint the milk (however unlikely). Low dissolved diesel components are not hazardous to the cow.

Avtar

1

# Sundher, Avtar ENV:EX

From: Schroeder, Grant [PYR] [Grant.Schroeder@ec.gc.ca]

Sent: October 12, 2005 9:48 AM

To: Sundher, Avtar WLAP:EX

Subject: Morning Star Nurseries Final Results-Rainbow trout toxicity test

#### Avtar:

The Rainbow trout toxicity tests on the Morning Star Nurseries # 1 and # 4 samples have been completed. The Rainbow trout 96 hour LC50 for sample # 1 was 20.16%. There was 30% mortality in the 18% concentration and 100% mortality in the 32%, 56% and 100% test concentrations. The test with sample # 4 had no mortalities in any of the test concentrations. The control fish had no mortalities or abnormal behaviour.

The final reports and legal letter are now being prepared.

If you have any comments or questions in regard to these results please let know.

Grant Schroeder Environmental Toxicology Technician Pacific Environmental Science Centre Enviroment Canada 2645 Dollarton Hwy. North Vancouver, BC V7H 1B1 ph: 604-924-2515 fax: 604-924-2554 grant.schroeder@ec.gc.ca

Grant Schroeder Environmental Toxicology Technician Pacific Environmental Science Centre Enviroment Canada 2645 Dollarton Hwy. North Vancouver, BC V7H 1B1 ph: 604-924-2515 fax: 604-924-2554 grant.schroeder@ec.gc.ca

## Sundher, Avtar ENV:EX

From:	Trudgian, Jack WLAP:EX
Sent:	October 17, 2005 9:05 AM
То:	Sundher, Avtar WLAP:EX
Subject:	FW: Morning Star Nurseries investigation

Avtar, do we have anything back from the lab results yet and do we have an environmental assessment report from this incident?

Jack

-----Original Message-----

From:	Sundquist, Lance WLAP:EX
Sent:	October 14, 2005 11:33 AM
To:	Tancock, Randy WLAP:EX; Trudgian, Jack WLAP:EX
Cc:	Clark, Brian WLAP:EX; McGuire, Jennifer WLAP:EX; Mitchell, Jackie WLAP:EX
Subject:	Morning Star Nurseries investigation

Further investigation into this incident has been approved. The completed Investigation Review Form will be forthcoming once the signatures are collected.

Recommended action include: s.13

Jackie - once the IRF has been returned to COS, please enter this into the Tracking Sheet.

Lance Sundquist Manager, Conservation Officer Service South Coast Region Telephone: 250 751-3119 Cell phone: <sup>s.17</sup> Fax: 250 751-7383 NEW EMAIL: Lance.Sundquist@gov.bc.ca

"Be Bear Aware - don't attract bears with food"

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Er Ca

Environment Canada Environnement Canada

# Grant Schroeder, B.Sc. Biology, PBD, Env.Sc.

Environmental Toxicology PacIfic Environmental Science Centre 2645 Dollarton Highway North Vancouver, B.C. Canada V7H 1B1 Telephone: (604) 924-2515 Facsimile: (604) 924-2515 E-mail: grant.schroeder@ec.gc.ca

Canada

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#### November 17, 2005

Mr. Avtar Sundher Toxic Management/Emergency Response Officer BC Ministry of Environment 10470 152<sup>nd</sup> St. Surrey, BC, V3R 0Y3

#### Subject: Review of Documents for Legal Analysis, Morning Star Nurseries

Please carefully review the attached Legal Analysis documentation. It is possible that the laboratory results provided in these documents may be used in future criminal or other prosecutions of the subject location.

When you have completed your review, please reply to me by telephone, facsimile, letter or e-mail, preferably within two to four weeks of your receipt of these documents, so that your concerns may be dealt with quickly.

If you had sample containers returned to your custody, please note that the original <u>Continuity Report</u> which accompanied those containers and on which you should have filled in the appropriate sample receipt information, is for your file and should also be reviewed at this time.

Please feel free to contact me by telephone at (604) 924-2515 if you have any questions or require clarification of any issues covered in the documents.

Thank you very much for your assistance in this matter.

Thank Murda

Grant Schroeder, Analyst Environmental Toxicology Section Phone: (604) 924-2515 Fax: (604) 924-2554 e-mail: grant.schroeder@ec.gc.ca

Attachments: (3)

November 4, 2005

Folder: 200501229

Grant Schroeder, Analyst Environmental Toxicology Section Pacific Environmental Science Centre Environment Canada 2645 Dollarton Highway North Vancouver, BC, V7H 1B1

Subject: Legal Analysis, Morning Star Nurseries

General: The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Grant Schroeder on October 4, 2005:

#### 200501229 129120-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 2 MORNING OCT. 3/05 1425 HRS UF/UP AS" plus other markings.

200501229 129121-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "3 MORNING OCT. 3/05 1430 HRS UF/UP AS" plus other markings.

200501229 129123-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 5 MORNING OCT. 3/05 1810 HRS UF/UP AS" plus other markings.

200501229 129124-1

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 6 MORNING OCT 3/05 1810 HRS UF/UP AS" plus other markings.

#### Purpose:

To analyse Sample 200501229 129120-1, Sample 200501229 129121-1, Sample 200501229 129123-1 and Sample 200501229 129124-1 for Acute Lethality to *Daphnia magna*.

Document \_\_\_\_\_ of 2

Page 1 of 2 <u>C.B.</u>

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## Procedure: The samples were analysed for:

Acute Lethality to *Daphnia magna* using a 48-hour acute lethal static (no replacement) median Lethal Time (LT50) daphnia toxicity test, performed following as appropriate, Environment Canada, Biological Test Methods, Report EPS 1/RM/11 (July 1990), amended May 1996 and Report EPS 1/RM/14 Second Edition (December 2000) and PESC LC50DA15.SOP.

#### Results: Daphnia Acute Lethality Test Results

- At 100% concentration, the 48-hour LT50 for Sample 200501229 129120-1 was determined to be greater than 4 hours but less than 24 hours of exposure to Daphnia magna (48-hour LT50 = > 4 < 24- hours @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 100% mortality after 24 hours to Daphnia magna exposed at 100% concentration.</li>
- At 100% concentration, the 48-hour LT50 for Sample 200501229 129121-1 was determined to be greater than 4 hours but less than 24 hours of exposure to Daphnia magna (48-hour LT50 = > 4 < 24- hours @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 100% mortality after 24 hours to Daphnia magna exposed at 100% concentration.</li>
- At 100% concentration, Sample 200501229 129123-1 was not acutely lethal to Daphnia magna over 48-hours of exposure (48-hour LT50 = not acutely lethal @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 0% mortality after 48 hours to Daphnia magna exposed at 100% concentration.
- At 100% concentration, Sample 200501229 129124-1 was not acutely lethal to Daphnia magna over 48-hours of exposure (48-hour LT50 = not acutely lethal @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 0% mortality after 48 hours to Daphnia magna exposed at 100% concentration.
- There were no Daphnia magna control mortalities during the toxicity tests.

#### **Remarks:**

- Sample 200501229 129120-1 and Sample 200501229 129121-1 were conveyed to Mr. Grant Schroeder.
- Sample 200501229 129123-1 and Sample 200501229 129124-1 were conveyed to Ms. Oxana Blajkevitch.

C. Buday

Craig Buday, Analyst Environmental Toxicology Section Phone: (604) 924-2514 Fax: (604) 924-2554

Folder: 200501229

Page 2 of 2 \_\_\_\_\_

Pacific Environmental Science Centre 2645 Dollarton Highway North Vancouver, BC, V7H 1B1

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Region: LOW	VER MAINLAND REGION District:					
File / Location N	File / Location Name: MORNING STAR NURSERIES, 1380-176 M ST., SURREY					
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At the Pacifi	c Environmental Science Centre (PESC),	01-1-				
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via (mode of	f delivery / technique)					
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Person: Avrian S. Svanthen Signature: Anno Date: Oct. 3/03						
rnone: ( <u>604</u> )	20x-1276 Ven: 16041 328-5042 racsimile: 10041582-533.4					

MOE-2014-00237 Page 71 Page \_\_\_\_ of \_\_\_\_

#### CONTINUITY REPORT CONTINUED

#### **MOVEMENT OF ITEMS OR SAMPLES**

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CONTINUITY REPORT

Pacific Environmental Science Centre 2645 Dollarton Highway North Vancouver, BC, V7H 1B1

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Region: <u>40</u>	ER MAINLAND REGION District:	<u>/</u>
File / Location N	lame: MORNING STAR NUDSERIES   1380-176 th St. 2	SURPEY
At 1380	-176 th St. SURREY	
	c Environmental Science Centre (PESC), $S = S = He \Omega$ came into possession of the following item (s) on (c	late) Off 3/05
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via (mode of	delivery / technique)	
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	5 gallons plastic bio-assay container with white/	200501229
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	S yanton plastic 010-43541 contained with white GREA	/28/02 /
4d	LID CONTAINING A LIQUID AND SCRIBED" # Ad, MORNING	127122-1
	Cot. 3/05, 1805 HRS, UF/UP, AS	
	1-Litre AMBER OLASS BUTTLE, WITH WHITE LID	200501221
5	CONTAINING FILLIGUID AND SCRIBED, "S, MORNING	/29/23-1
	UCT. 3/05, 1810 HRS, UF/UP, AP.	
		· · · · · · · · · · · · · · · · · · ·
~	1-LITO AMBER GLASS BOTTLE WITH WHATE LID,	200501229
	CONTAINING A LIQUID AND SCRIBED, * #6, MORNING,	129124-1
6	Oct: 3/05, 1810 Hes, UF/UP, AS"	
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Person: Aurra	2.S. SUNDHER Signature: Date; Oct-3/05	
Phone: (////	<u>542-5376</u> Cell: $(604)$ <u>328-5295</u> Facsimile: $(604)$ <u>582-5334</u>	

MOE-2014-00237 Page 73 Page <u>3</u> of <u>4</u>

#### CONTINUITY REPORT CONTINUED

## **MOVEMENT OF ITEMS OR SAMPLES**

Item # or KKHARD From: AUTAR SSUNDHA From: JALK TRUDGIAN From : Sound Sample # ſ Joelying sig. And sig. : sig. а а Braining E Recip: TACK TRUDGIAN sig. : 1. ..... STUR n h Recip: Recip: Gran sig. 🧺 s sig. //// <u>4a-4d</u> 5,6 f @Locn.13 80.176 e @LOCN: PBC, NOLTH (JANENVERCe Date : Oct. 3/05 Date: (XY 3, 2005 DCT Ч Date : 200 → → Time : 19:05 Time :\_ hrs 2100 Time : 08:00 hrs hrs From: Oxana Blaikeritch sig. : 2. m for for Recip: Growt Schrocher From: Grant Schoopler From: C. BUDAY sig. Hant a sig. : C.B. Jan а <del>Oxa∧</del>A| а Recip: Craig Buday п Recip: DYDEF 005 Blajkutters s ſ sig. : //www.f/lun/ C. S. das sig. : 12, au sig. : 516 PESC @Locn: е e @Locn: PESCO Date : 044/05 Date : Novalos Date : 0400T2005 <del>)</del> -> 1400 900 1435 Time : hrs hrs Time : Time : hrs 56 т From: Grant Schroede From : From : Г S. TRYPGUA sig. : 🗸 sig. : а sig. : а Recip: n n Recip: Recip: 5 { s f sig. : <u>1</u>. @Locn. sig. : sig. 🗅 .... 40-40,5,6 DESC e @Locn: е @Locn: ٢ Date :\_ //ov. 18/05 Date : Date : → → Time : 930 hrs £ hrs Time : Time : hrs т т From : From : From : r Г sig. sig. : siq. : а а п Ο. Recip: Recip: Recip: s f ۲ ۲ sig. :\_ sig. : sig. : @Locn: e e @Locn: @Locn: r r Date : Date : Date : → → · . Time : hrs Time : hrs Time : hrs т From : From : From : r r sig. : sig. : sig. 1 а а n n Recip: Recip: Recip: 8 s f sig. : sig. : sig. : Ť e @Locn: e @Locn: @Locn: ٢ r Date : Date : Date : 4 → hrs Time : hrs Time : Time : hrs т т From: From : From: r sig. : sig. : а sig. : 8 n п Recip: Recip: Recip: s 8 sig. : sig. : sig. : f f e е @Locn: @Locn: @Locn: r Date : Date: Date : → ÷ Time : hrs hrs hrs Time : Time : **P**AI The Item(s) was / were returned sealed. Some (# None ١ C None The Item(s) was / were returned permanently scribed. Some (# The Item(s) was / were returned permanently initialled. C Some (# The Item(s) was / were returned permanently dated. O None 1 Some (# . The Item(s) #(s): \_\_\_\_ \_ was / were destroyed upon instruction from: Initials: Date: By:

MOE-2014-00237

Page 74 Page 4 of 4



November 8, 2005

Folder: 200501229

Mr. Avtar Sundher Toxic Management/Emergency Response Officer BC Ministry of Environment 10470 152<sup>nd</sup> St. Surrey, BC, V3R 0Y3

## Subject: Legal Analysis, Morning Star Nurseries

**General:** The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Richard Strub on October 4, 2005:

#### 200501229 129119-1:

A light brown and orange layered semi-transparent liquid with settled particulates and a strong diesel odour in four, five imperial gallon cube shaped plastic collapsible containers having grey plastic screw closures. Each container was almost full except the container marked "1a" which had a pin sized hole and a piece of silver duct tape covering the hole. Each screw closure was sealed with masking tape and was marked "AS". The first container was marked "1a" and inscribed "1a MORNING Oct 3/05 1350 HRS UF/UP AS" and its screw closure was marked "1a". The second container was marked "1b" and inscribed "1b MORNING Oct 3/05 1350 UF/UP AS" and its screw closure was marked "1b". The third container was marked "1c" and inscribed "1C MORNING Oct 3/05 1350 HRS UF/UP AS" and its screw closure was marked "1c". The fourth container was marked "1d" and inscribed "1d MORNING Oct 3/05 1350 HRS UF/UP AS" and its screw closure was marked "1d".

#### 200501229 129120-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 2 MORNING OCT. 3/05 1425 HRS UF/UP AS" plus other markings.

200501229 129121-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "3 MORNING OCT. 3/05 1430 HRS UF/UP AS" plus other markings.

#### 200501229 129122-1:

A light brown semi-transparent liquid with settled and floating particulates in four, five imperial gallon cube shaped plastic collapsible containers having grey plastic screw closures. Each container was almost full. Each screw closure was sealed with masking tape and was marked "AS". The first container was marked "4a" and inscribed "4a MORNING Oct 3/05 1805 HRS UF/UP AS" and its screw closure was marked "4a". The second container was marked "4b" and inscribed "4b MORNING Oct 3/05 1805 HRS UF/UP AS" and its screw closure was marked "4b". The third

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MOE-2014-00237 Page 75 container was marked "4c" and inscribed "4C MORNING Oct 3/05 1805 HRS UF/UP AS" and its screw closure was marked "4C". The fourth container was marked "4d" and inscribed "# 4d MORNING Oct 3/05 1805 HRS UF/UP AS" and its screw closure was marked "4d".

#### 200501229 129123-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialed tape. The container was almost full and inscribed "# 5 MORNING OCT. 3/05 1810 HRS UF/UP AS" plus other markings.

#### 200501229 129124-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialed tape. The container was almost full and inscribed "# 6 MORNING OCT 3/05 1810 HRS UF/UP AS" plus other markings.

#### Purpose:

- To analyse Sample 200501229 129119-1 and Sample 200501229 129122-1 for Acute Lethality to underyearling rainbow trout *Oncorhynchus mykiss*.
- To analyse Sample 200501229 129120-1, Sample 200501229 129121-1, Sample 200501229 129123-1 and Sample 200501229 129124-1 for Acute Lethality to *Daphnia magna*. See attached letter from Mr. Craig Buday.
- To analyse Sample 200501229 129120-1 and Sample 200501229 129123-1 for the presence of Petroleum Hydrocarbons.
- To identify the type(s) of any Petroleum Hydrocarbons found in Sample 200501229 129120-1 and Sample 200501229 129123-1.
- To analyse Sample 200501229 129121-1 and Sample 200501229 129124-1 to determine the concentration of Oils & Greases and Hydrocarbons.
- Procedure: Sample 200501229 129119-1 and Sample 200501229 129122-1 were analysed for:
  - Acute Lethality to underyearling rainbow trout Oncorhynchus mykiss using a 96-hour acute lethal static (no replacement) median Lethal Concentration (LC50) fish toxicity test performed following as appropriate, Environment Canada, Biological Test Methods, Report EPS 1/RM/9 (July 1990) amended May 1996 and Report EPS 1/RM/13 Second Edition (December 2000), and PESC LC50FF16.SOP.

#### Results:

## Fish Acute Lethality Test Results

- The 96-hour LC50 for Sample 200501229 129119-1 was determined by statistical analysis of the test data to be 20.16% concentration for exposure of underyearling rainbow trout *Oncorhynchus mykiss* (96-hour LC50 = 20.16%, where LC50 is the concentration of material in water that is estimated to be lethal to 50% of the test organisms). Note: There was 100% mortality in 48 hours to underyearling rainbow trout *Oncorhynchus mykiss* exposed at the 100% concentrations respectively.
- The 96-hour LC50 for Sample 200501229 129122-1 was not acutely lethal to underyearling rainbow trout Oncorhynchus mykiss over 96 hours of exposure (96hour LC50 = not acutely lethal, where LC50 is the concentration of material in water that is estimated to be lethal to 50% of the test organisms). Note: There was 0% mortality in 96 hours to underyearling rainbow trout Oncorhynchus mykiss exposed at 100% concentration.

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• There were no control fish mortalities during the toxicity tests.

Remarks:

- Ms. Heather Osachoff recorded the 24, 48, 72 and 96 hour cumulative mortalities, final dissolved oxygen, temperature and pH for Sample 200501229 129119-1 and Sample 200501229 129122-1. Ms. Osachoff also recorded the fish lengths and weights at 24, 48, 72 and 96 hours.
- · See attached letters from Mr. Craig Buday and Ms. Oxana Blajkevitch
- The samples were conveyed to Mr. Avtar Sundher.

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Grant Schroeder, Analyst Environmental Toxicology Section Phone: (604) 924-2515 Fax: (604) 924-2554

Attachments: (2)

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ACUTE LETHALITY TEST USING SALMONID FISH (96 HOUR LC50 / LT50): ANALYST LOG / REPORT

	Environment Cenede Peolitic Environmentel Science Centre (PESC)	. Comule	t com for an and an								
	Eovirenmental Taxicology Section 2645 Dollarlon Hwy , North Vancouver British Columbia, V7H 101	<u>CSR#</u>	11208								
	FOLDER NO.: 200501229 ALIQUOT NO.: 129119-1 SITE & SAMPLE LOCATION: Maching St. A.	CLIENT: Name / Address: Avfax Sundhev BC Ministry of Environments Phone: Conjes (0)									
	DESCRIPTION OF SAMPLE: (Type (e.g. chemical, effluent, leachate), appearance (e.g. transparency, floating or settled particulates), colour, amount and other properties (e.g. ocjour)). - a light proven semi-fransparent incural with softly partyculates and a storing diesel plane; there was a arange light layer on top of the brown light layer										
	SAMPLING POINT DESCRIPTION: Morning Star Nurseries #1										
	CONTAINER(S): (Description & labelling / inscriptions, <u>Hx Simperial callon whe shared p</u> alt press plastic plastic Scriw Cloque almost full except constainer marks 9 my cloque of silver duct to scrw cloque was sealed with marking <u>first container</u> was marked "Ia" and ins Inscribed in laboratory: <u>200501229</u> 1291	hattic collapsible containing s. The containing white "Ia" which had a pin it covering the wele. Fach tage marked "As" The corbest " Ia MORNING " were 19-1 Oct 4105 800 65"	SAMPLING METHOD: D GRAB D BATCH D COMPOSITE of Amt / Interval / Total Time								
	FIELD COLLECTION:	TRANSPORT: Specified time in transport:	urunniitered / Unpreserved								
	BY: 45 TIME: 1350 DATE: 03.1 0 10 Day Month	STORAGE:        05      @ :*C for (spectrum)        Year      LOCATION:C10000000000000000000000000000	ort: 3-4 ified time): over nug LF								
	RECEIVED: Sunfrozen pertially frozen BY: <u>Grant Schwarceler</u> TIME: <u>800</u> DATE: <u>41 Oct 1</u> Day Month FROM: <u>Richard Strub</u>	I frozen      Image: Specified        Image: OS      Specified        Year      Concentration(s):									
	ANALYSIS TYPE: D ROUTINE.		SPLIT Q OTHER								
		10 ‰) 🗆 SEA WAT	ER% Salinity								
	DILUTIONS MEASURED BY:	FISH SPECIES: Rainbow Trout (Oncorhynchus mykiss)									
·	□ VOLUME □ ACTIVE INGREDIENT	Construction of the second sec									
0469	SAMPLE (Upon Receipt): Date:	DILUTION WATER QUALITY:	PH 7.6								
STATH/05 5 1135 prior to pre-servicion	$\begin{array}{c cccc} pH & TEMP. & D.O. & CONDUCTIVITY & SALINI \\ (^{*C)}/S.3 & (mg/L) & (\mu S) & (\%) \\ \hline 7.5 & 2 & 9.5 & 2 & 0 & - \end{array}$	TY TEMP. D.O. CONDUCTI (°C) (mg/L) (μS) · /S.O 10.4 410	VITY SALINITY HARDNESS (%) (as myl. CaCO.) - ~/Od								
	BIOASSAY    CONTROL FISH    LOADING      TEMP.(°C):    DATA:    DENSITY	$M = \begin{bmatrix} FORK LENGTH (mean): \\ 5.39 \\ cm \\ s.D.: \pm 0.6 \\ min.: 4.2 \\ max : 65 \\ cm \\ max \\ cm \\ max \\ cm \\ c$	IGHT (mean):    CONDITION $1.50$ 9 $50.24$ 9								
	data	Street Stand	MOE-2014-00237 Page 78								

Page 78 Page 1 of 8\_65 Container description coult

"Oct 3/05 1350 HRS UF/UP AS" and its screw closure was marked "la". The second container was marked "16" and inscribed "16 MORNING OCT 3/05 1350 UF/UP AS" and its screw closure was marked "16". The third cantainer was marked "16" and inscribed "10 MORNING Oct 3/05 1350 HRS UF/UP AS" and its screw closure was marked "10". The fourth container was marked "101" and inscribed "101 MORNING Oct 3/05 1350 HRS UF/UP AS" and inscribed "101 MORNING Oct 3/05 1350 HRS UF/UP AS" and inscribed "101 MORNING Oct 3/05 1350 HRS UF/UP AS" and its screw closure was marked "101".

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# ANALYST LOG / REPORT (FISH)

FOLDER#200501229ALIQUOT#_	129/19-1	10: Arning	Star Nursines	#/
ENVIRONMENTAL CHAMBER #: C/OGa				

Notes (regarding treatment of sample from reception to test ser-up).

			<b>.</b>				·		T	r
Notes (rega	rting treatm	ieni of samp	ile from tece	iption to les	it set up).	,			Initials	OBSERVATION CODES (Appendix E
Positia	,₩	2	5	1	6	4	3	7		Report EPS1/RNV9 July 1990)
C. Item	onc.	Control	176	10%	1870	32%	567	10070		** immed. stress, coughing & erratic swimming
Test vessel	#	23	61	60	55	28	256	40		INTEGUMENT
Test amoun	t	Ø	0.35Kg	3.5Kg	6.3Kg	11.2.14	19.6Kg	35Kg		A Shedding
Final amoun	nt	35 Kg	·		·			<u> </u>		B Mucous
Start date		400105		······				>		C Hemorrhaging
Start of aera	Ition	1145						>		PIGMENTATION
Pre-aeration	ı time	Zhr						>		D Light
nitial cond.	Equip.ID	410	400	370	340	320	280	200	63	E Dark
nitial pH	28	7.6/7.7	7.6/7.7	7.6/7.6	7.6/7.6	7.6/7.6	7.6/7.6	7.4	67	F Mottled
nitial D.O.	11	10.4/10.4	10.4/	10.3	10.1	10.0	9.9/9.8	9.5/9.4	63	gen. Behav.
nitial temp.	(1	15.0/14.6	14.7/14.5	14.81	M.6/14.5	14.7/14.6	14.9/14.8	15.9	67	G Quiescent
Solution app change duri	ng prep.		*	pre-aera	tion 30m l	in/ahr				H Hyperexcitable
Holding tan	(#	1						1		I Irritated
# of fish / vessel		10	*				>	10		J Surfacing
Test start tir	Test start time		: Nanazar ani					1345		K Sounding
		Cumulative	Mortalities	/ Observati	ons (use o	odes al righ	9			L Twitching
0.08 hr (5 m	in)	0M	ÔΙ	0 Va	OWI	Our	Oui	Oru	65	M Tetanic
0.16 hr (10 i	min)	$O^{N}$	Οĭ	Our	Our	Our	OWI	Oru	65	N Normal
0.33 hr (20 i	min)	ON	OI	Dur	OuI	Our	Our	04	65	SWIMMING
0.67 hr (40 i	min)	ON	OI	Out	() <sup>U</sup> T	O <sup>U</sup> T.	O"I	$\mathcal{O}_{T}^{\prime}$	65	O Ceased
1.33 hr (80 i	min)	ÔN	ONT	14	Out	OTT	OTI	OTE	63	P Erratic
2.67 hr	<b>,</b>	ON	01	OIT	$\hat{O}^{\mu}_{T_{T}}$	Our	OUTO	OoI	65	Q Gyrating
5.33mf 518	3hr	ON	OUT	0 ůŦ	Oru	Ouw	10T	3°I	GS	R Skittering
alh	<u> </u>	ON	O4T	Own	Owi	Oau	lan	30I	65	S Inverted
24 hr	1	ON	OTT	$O_{ii,\omega}^{o_i \mp}$	$O_{\mu,\omega}^{0,\mp}$	$O_{u,w}^{0,I}$	1 μο μ,μ	30,I 30,w	HO	T On side
48 hr		01	O I	O uim	Oun	Ouw	9 u.w	10 °	HO	RESPIRATION
72 hr		ON	OUT	Ou,w	OUN	10	10		H.O.	U Rapid
96 hr		ON	DIT	Ouw	3 4,00	10	10	10	H.O.	V Stow
Final pH	Equip.ID 구성	9.8	7.8	7.6	7.6	7.7	7.6	7.7	HQ.	W Coughing
Final D.O.	11	9.4	8.7	7.8	6.7	7.3	4,2	6.8	Ho.	X Surface
Final temp.	<u> </u>	14.5	14.7	14.4	14.7-	14.7	14.6	14.9	HD.	Z Irregular
*****										

Report Flah FF16, May05

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#### **ANALYST LOG / REPORT (FISH)**

			,		
FOLDER#: 200501229	ALIQUOT#	129119-1	1D: Morning	Star Murrice	s#/
			_ /		

#### **DESCRIPTION OF TEST FACILITIES & CONDITIONS:**

Testing is performed in controlled (temperature, illumination level and photoperiod) environment rooms separate from the fish  $r^{\prime}$  culture area. Test vessels are ten gallon all-glass aquaria providing  $\geq$ 15 cm solution depth and covered with smoked Plexiglas<sup>®</sup> lids.

- Aeration: Oil-free air is delivered to test concentrations at a rate of 6.5 ± 1 mL/min/L by means of disposable borosilicate glass pasteur pipelles or small airstones as appropriate.
- pH adjustment: The samples are normally tested without adjustment to their pH. However, if both pH-adjusted and non -adjusted tests are run, a description of the pH adjustment procedure will be found in the NOTES section below.

#### **PROTOCOL USED:**

Report Fish FF16, May05

Tests are performed following our laboratory Standard Operating Procedures (SOPs) and where appropriate, the biological test methods, Report EPS 1/RM/9 (July 1990), amended May 1996 and Report EPS 1/RM/13 (July 1990), amended May 1996 and December 2000. Test organism 'good husbandry practices' followed are also described in our laboratory SOPs. Fish are acclimated for at least a 2 week period prior to their use in a bioassay.

#### SOP or TEST METHOD DEVIATION DETAILS:

/
<b>REFERENCE TOXICANT:</b> Chemical used: <i>Phund</i> Date of test: $Oct. 3/05$ 96 hr (Static) LC50 = $\overline{8.25mg/t}$ concentration.[95% confidence limits: $6.8$ & $10$ ]Historic geometric mean (n = $20$ )LC50 and warning limits ( $\pm 2SD$ ): $9.66mg/t$ ( $\pm 7.52 - 10.400$ )
ANALYSIS RESULTS: See below (
96 hr (Static) LC50 = $20.16\%$ concentration. [95% confidence limits: $17.03$ & $23.06$ ] Where the median lethal concentration (LC50) is the concentration of material in water that is calculated to be lethal to 50% of the test organisms over an exposure period of 96 hours.
96 hr (Static) LT50 =atconcentration. [95% confidence limits:&] Where the median lethal time (LT50) is the period of exposure calculated to be lethal to 50% of the lest organisms held in a particular test solution. % mortality at 96 hours =/0070at _32, 56 \mathcal{E} (00% concentration)
The statistical method used was: <u>Trimmed</u> Spearman Kaller The CETIS 1.1.1 computer program by Tidepool Scientific Software 2005 was used to calculate the test result.
NOTES: There was 30% montality in the 18% concentration and 100%
Status of control fish: <u>no morpelities, normal behaviour</u>
C Testing was subcontracted (with authorization) to:
☐ <u>Special for extreme low Dissolved Oxygen</u> : The Sample, at 100% concentration, with a dissolved oxygen level ofmg/l. (after 120 minutes of aeration) would be acutely lethal (LT50 = <96-hours) to underyearling rainbow trout <u>Oncorhynchus mykiss</u> . Fish toxicity tests conducted at low dissolved oxygen levels (below 3.0 mg/L) are acutely lethal to rainbow trout <u>Oncorhynchus mykiss</u> . <u>mykiss</u> . See Canadian Water Quality Guidelines, Canadian Council of Ministers of the Environment, 1987, Guidelines For The Protection of Freshwater Aquatic Life, Section 3.2.1.10 Dissolved Oxygen; and U.S. Environmental Protection Agency 1986 Ambient Water Quality Criteria for Dissolved Oxygen. Criteria and Standards Division, U.S. EPA, Washington, D.C. EPA 440/5 - 86-003. Therefore, due to ethical treatment guidelines for animal testing (Canadian Council on Animal Care), no salmonid fish were unduly sacrificed in this lethal sample, and no fish toxicity test was completed.
□ <u>Special for extreme pH</u> : The Sample, at 100% concentration, with a pH level of relative units. would be acutely lethal (LT50 = <96-hours) to underyearling rainbow trout <u>Oncorhynchus mykiss</u> . Fish toxicity tests conducted with sample pH values of less than 4.0 relative units or greater than 10.5 relative units, are rapidly lethal to salmonids <u>Oncorhynchus</u> spp See European Inland Fisheries Advisory Commission Working Party on Water Quality Criteria for European Freshwater Fish. in "Water Quality Criteria for European Freshwater Fish - Extreme pH Values and Inland Fisheries", in Water Research Pergamon Press, 1969, Vol. 3, pp 593-611. Therefore, due to ethical heatment guidelines for animal testing (Canadian Council on Animal Care), no salmonid fish were unduly sacrificed in this lethal sample, and no fish toxicity test was completed.
ANALYST: Man Alurala Date Oct. 20, 2005
RESULTS VERIFIED BY: Date Date Date

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										Spea	arman-Karbe	er: P	age 1 of 1
CETIS	Ana	alysis D	etail							Anal	vsis:	09-9311-2089/2	э 9:51 Ам 200501229
Fish 96-h	Acute	Lethality T								Pac	ific Environ	mental Scienc	
	Acute	Lethanty 1								Fat			
Test No:	(	07-6037-150	12	Test Type:	: Lethality-F	ish (96h)			Duratio	n: 9	6h		
Start Date	e: (	04 Oct-05 01	1:45 PM	Protocol:	EC/EPS 1	/RM/9			Species	: O	incorhynchu:	s mykiss	5.0
Ending Da	ate: (	J8 Oct-05 01	1:45 PM	Dil Water:	Well Wate	ſ			Source:	S	un Valley I n	out Farm, Missi	on, BC
Setup Dat		J4 Oct-05 11	1:45 AM	Brine:									
Comment	is: I	Morning Star		, Surrey, BC 7	7 1 RBT LC5	0							
Sample N	lo: (	02-3403-571	9	Material:	Spill Disch	arge			Client:	Р	3 A. Sundhe	r BCWALP	
Sample D	ate: (	03 Oct-05 01	1:50 PM	Code:	129119				Project:	N	lorning Star I	Nurseries Legal	
Receive L	Jate: (	)4 UCI-U5 U8 225 (12 6 °C	3:00 AM	Source: Station:	Moming S	tar Nurseries							
Comment	ts: I	Morning Star	/ r Nurseries	Surrev. BC /	# 1 RBT LC5	<u>,</u>							
Tu du cint			A				tural -	Cantrall	inte D	-4- 4		Maralan	
Enapoint	<u> </u>		An Tri	alysis Type	aan Karbor	15 4024 I		15 4024 (	-INK U	ate A	05 0 61 AM		1
90112030	, 					10-4024-	1997	15-4024-0		2 001-		CE (13¥ ). [	]
Spearmar	n-Karb	er Options						Point	t Estimat	es			
Threshold	d Optio	on Lowe	r Thresho	ld Trim	μ	σ		EC50	)/LC50		95% LCL	95% U	ICL
Control Th	resho	d 0		0.00%	1.3044	139 0.03	66015	9 ( 20.15	5760		17.03082	23.858	143
Data Sum	imary				Calcu	lated Variate	A/B)		$\geq$				
Conc-%	Сог	ntrol Type	Count	Mean	Minimum	Maximum	SE	SD		Α	В		
0	Dilu	tion Water	1	0.00000	0.00000	0.00000				0	10	1	
1			1	0.00000	0.00000	0.00000				0	10		
10			1	0.00000	0.00000	0.00000				0	10		
18			1	0.30000	0.30000	0.30000				3	10		
32			1	1.00000	1.00000	1.00000				10	10		
56			1	1.00000	1.00000	1.00000				10	10		
100			1	1.00000	1.00000	1.00000				10	10		
Graphics													
	1.00·@-	—ę											
	0.90												
	0.80												
	0.70												
	0.70	Ĭ											
2	0.60-												
96 H	0.50												
	0.40-												
	0.30	/											
	0.20 <sup>-</sup>	/	١										
	0.10												
	0.00 <sup>±</sup>	······	- <u>b</u> <u>i</u>										
	U	¥U ,	Tonc-	50 ¥o	60 IU.								

4/8 Analyst: 6 MOE-2014-00237 Page 82 Page 82

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<u> </u>	Morning St	ar Nurseries #	1	Folder #	200501229	Fish Type:	Rain	how trout	Source	Sun Valley Tr	out Farm	Initials	GS/HO
				Aliquot #	129119-1	Batch #	Sun Valley 0	50825T1/rbt-fw	Date	8-Oct-	2005	Volume (ka)	35
Concentration	Control	Tort Votcol #	23	/aiquot //	Concentration:	1%	Tast Vassal #	61		Concentration	10%	Test Vessel #	00
Concentration.	Length (cm)	Meight (a)	Condition Eartor		Concentration.	l ength (cm)	Weight (g)	Condition Factor		Concentration.	Lenoth (cm)	Weight (g)	Condition Eactor
- <u>-</u>	Senger (Gill)	1.81	1 03		1	51	1 16	0.93		1	60	201	<b>6 93</b>
2	65	2.58	0.94		2	50	1.02	0.82		2	50	1.54	1.23
3	59	1.97	0.96		3	6.3	2.45	89.0		3	5.4	1.62	1.03
4	51	1 31	0.99		4	5.4	1.72	1.09		4	5.3	1.45	0.97
5	50	113	0.90		5	5.7	1.89	1.02		5	5.0	1.16	0.93
6	5.5	1 34	0.81		6	4.7	1.06	1.02		6	6.3	2.40	0.96
7	55	2	0.90		7	5,8	170	0.87		7	4.2	0.88	1,19
8	5.5	1.71	1.03		8	5.2	1.27	0.90		8	4.8	0.99	0.90
.9	5.4	en de 1.38	0.88		9	4.8	Bar (109	0.99		9	5,5	1.66	1.00
10	4.2	0.91	1.23		10	5.5	1.58	0.95		10	5.0	1.08	0.86
Mean	5,39	1.50	0.96		Mean	5.32	1.44	0.95		Mean	5.22	1.41	0.99
SD	0,60	0.48	0.12		SD	0.50	0.46	0.08		SD	0.60	0.48	0.12
Min	4.20	0.91	0.81		Min	4.70	1.02	0.82		Min	4.20	0.88	0.86
Max	6.50	2.58	1.23		Max	6.30	2.45	1.09		Max	6.30	2,40	1.23
Loading Density	/ (g/L)	0.4	) –		Loading Density	(g/L)	0.4			Loading Density	/ (g/L)	0,4	
			/						•				
Concentration:	18%	Test Vessel #	55		Concentration:	32%	Test Vessel #	28		Concentration:	56%	Test V <b>esse</b> l #	256
	Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor
1	5.8	1,99	1.02 aver 1.1		1	4.6	1.26	1.29		1	5.0	1.17	0.94
2	5.0	1.5D	1.20		2	5.0	1.84	1.47		2	5.6	2.22	1.26
3	5.2	174	· 124		3	4.6	1.46	1.50		3	1.0 (China 10) (China	2.33	1.08
4	5.4	2.37	1.51		4	5.5	2.18	1.31		4	4.9	1.51	1.28
5	5.6	x x 1.60	1,02		5	54	1.66	1.05		5	5.0	1,95	1.56
6	5.4	1.46	0.93		6	4.4	1.25	1.47		6	5.0	2.14	1.71
7	5.2	1.51	35 March 107		7	10 JUL 10	2.00	1,08		7	5,4	1.88	1.19
8	5.2	1.30	0.92		8	5.1	1.85	1.39		8	5.1	1.93	1.45
9	5.7	Stern # 1.93	1104 AL		9	計2時11日16.0	jan 12.63	() <b>1/22</b>		9	5,4	2019 - 2019 - 2019 <b>1</b> 989	201.20 Alexandre
10	5.2	1.33	0.95		10	5.2	1,68	1.19		10	5.4	2.19	1.39
Mean	5,36	1.66	1.08		Mean	5.13	1.74	1.29		Mean	5.27	1.89	1.29
SD	0.26	0.34	0.18		SD	0.52	0.42	0.16		SD	0,35	0.35	0.23
Min	5.00	1.30	0.92		Min	4.40	1.25	1.05		Min	4,90	1.17	0.94
May	5,80	2.37	1.51		May	L 6.00	1 263	I 150		Max	I 6.00	I 2.33	1.71
INICA						0,00	2,00						

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8/5

Loading Density (g/L)

ID:	Morning Star	Nurseries # 1			Folder #	200501229	Aliquot #	129119-1
Fish Type:	Rainb	ow trout	Source	Sun Valley Tr	out Farm	Batch #	Sun Valley 0508251	1/rbt-fw
Initials	GS/HO	Volume (kg)	3!	5 Date	8-Oct	-2005		

Concentration:	100%	Test Vessel #	40		
	Length (cm)	Weight (g)	Condition Factor		
1	5.6	1,90	1.08		
2	5.2	1.45	1.03		
3	4.3	1,01	1.27		
4	4.5	1.29	1.42		
5	5.0	2.10	1,68		
6	4.1	1.03	1.49		
7	5.2	1.78	1.27		
8	6.0	2.64	1.22		
9	5.5	2,28	1.37		
10	5.2	1.73	1.23		
Mean	5.03	1.64	1.29		
SD	0.60	0.54	0.19		
Min	4.10	1.01	1.03		
Max	6.00	2.64	1,68		
Loading Density	/ (g/L)	0.5			

Concentration:		Test Vessel #						
	Length (cm)	Weight (g)	Condition Factor					
1								
2								
3								
4								
5		2						
6								
7								
8								
9								
10								
Mean								
SD		_						
Min								
Max			1					
Loading Density	/ (g/L)							

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ID: Morning	Ster Nu	196175		Folder #_;	(00501229	Fish Type:	RBT	<b>9</b> . 4	Source	Sur Valle	7	Initials 6	5
0				Aliquot #	29119-1	Batch # 5tr	Veller 050	82571/161-62	Date	Oct5/05	-	Volume (kg)	35
Concentration:	Control	Test Vessel #	+ 23		Concentration:	170	Test Vessel #	61		Concentration:	10%	Test Vessel #	60
	Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor
1	X5.60	4.8			1	50	1501. [10		$\gamma$	1	6.0	2_01	
2	6.5	2.58		]/	2	5.0	1.02		]/	2	5.0	1.54	
3	59	1.97		/	3	63	1.54 <b>9</b>			3	6.4	1.6a	
4	5.	1.31		11.5	4	5,4	172		<b>]</b>	4	53	1.45	
5	5.0			PH'O'	5	-5a	1 1 8 9		K Ho.	5	5.0	1.16	
6	5.5	1.34		(80CT	ô	4.7	1.06		1(8007	6	6:3	2.40	
7	1956 B.	1.49		12005	7	58	1.30		2005	7	42	0.88	
8	5.5	1.7-1			8	52	1.27			8	4.8	0.99	
9	Sec. 14	1.38			9	48	169			9	55	1.64	
10	4.2	0.91	Ý		10	5.5	1.58			10	5.0	1.08	
Mean					Mean					Mean			
SD					SD					SD			
Min					Min					Min			
Max			×		Max					Max			
Loading Densit	ty (g/L)				Loading Density	/ (g/L)			]	Loading Density	y (g/L)		
									-				
Concentration:	187	Test Vessel	\$ 5 <b>5</b>	7	Concentration:	32%	Test Vessel #	27	]	Concentration:	56%	Test Vessel #	256
				ר	[				<b>I</b> ^	1			A 84 8

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	Length (cm)	Weight (g)	Condition Factor	
1	332	1 99	a de Coléccier - Lise Fréd	$\cap$
2	5.0	1.50		
3	35.2	1.94		
4	54	2.37		6
5		1.90		
6	5.4	1.46		
7		11512		
8	5.2	1.30		
9		434		
10	5.2	[.33		J
Mean				
SD				
Min				
Max				

\*

Concentration:	3-2-70	Test Vessel #	20	
	Length (cm)	Weight (g)	Condition Factor	h
1	-4.6	126		
2	5,0	1.84		
3	-4.6	1.46		11:
4	5.5	2.18		K #>
5	54	1.66		႞႖ၹ
6	44	125		1300
7	54	2.00		
8	5.1	1.85	I	1
9	6.0	263		
10	5.2	1.68		1
Mean				]
SD				
Min				]
	1	T	1	1

Concentration:	56%	Test Vessel # o	256	
	Length (cm)	Weight (g)	Condition Factor	
1	50	1.17		
2	5.6	2.22		H.o.
3	6,0	2.33		H.O.
4	4.9	1.5		H.O. /
5	5.0	1.95		H.D. / 100
6	5.0	2.14		HO. SJOE
7	54	1.88		H.O.
8	5.1	1.93		4.0.
9	54	189		HOIJ
10	5.4	2.19		HC. 700T
Mean	-			2005
SD				
Min				
Max				
Loading Density	/ (g/L)			

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10: Morning Star Nurseries			Folder # 🤿	00501229	Fish Type:	RBT		Source	SunValley	(	Initials 65		
				Aliquot #	29119-1	Batch # 34	n Valley 0.3	10925TI/14-6	Date ()	d5/05 '		Volume (kg)	35
Concentration:	100%	Test Vessel #	40		Concentration:		Test Vessel #	1		Concentration:		Test Vessel #	
	Length (cm)	Weight (g)	Condition Factor			Longth (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Fac
1 .	Sau	1.90			1					1			
2	5.2	1.45			2				]	2			
3 `	43-	101			3					3			
1 4	4.5	1.29		1	4				1	4			
5	50	12.10			5					5			
6	4.1	1.03		]	6				]	6			
GOOT 7	95 C C C	R 78 -			7					7			
85002	6.0	2.64			8				]	6			
9		2.2.28			9					9		an a	
10	5.2	1.73	*		10		,			10			
Mean					Mean				]	Mean			
SD .	Į į				SD				]	SD			
Min					Min				]	Min			
Max					Max					Max			
Loading Densit	(g/L)			1	Loading Density	(g/L)			1	Loading Density	y (g/L)		

Concentration:		Test Vessel #	
	Length (cm)	Weight (g)	Condition Factor
1			
2			
3			
4			
5			
6			
7			
8			
8			
10			
Mean			
SD	1		
Min			
Max			
Loading Densit	y (g/L)		

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Concentration:		Test Vessel #	
	Length (cm)	Weight (g)	Condition Factor
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Mean			
SD			
Min			
Max			
Loading Density	/ (g/L)	-	

Concentration:		Test Vessel #								
	Length (cm)	Weight (g)	Condition Factor							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
Vlean	-									
SD										
Min										
Viax										
_oading Density	r (g/L)									

ACUTE LETHALITY TEST USING SALMONID FISH (96 HOUR LC5	50 / LT50): ANALYST LOG / REPORT
·	· P2

	Envronment Pecific Enviro	Caneda ⊻nm≑ntal Sci	eruce Contre .	(PESC)							Colletor	7)		
	Environmenta 2645 Divilado Antish Colum	ai Tuucology an Hwy, Nor itiai, V7H 18	r Section Iti Vancouver 1				CSP# (1205)							
		<b></b>	20050	1718			/							
		K NU.: <u></u>	129 122	1 <del>201</del> 2-1			ULIEN	ddraes	Juta.	Se alla				
	SITE &			<u>~ ⊢</u>			_	Name / A	ouress.	C M	ishy of	Fruir	orment	
	d/a		Star M	, reenter	¥4		Phone: Copios la	:						
	DESCRI particula	IPTION C ates), colo semi-s	F SAMPL	E: (Type ( nt and other /ight by	e.g. che propert	mical, effi lies (e.g. o <u>I ry u / ol</u>	uent, dour <u>)</u> w1	leachate ). /t.flo	), appeara	nce (e.g. mc/set	transparen Heck pa	cy, floating	g or settled	
					Marn	the st	mar (	Turner	irs 44					
	CONTA 4x Contai almost market Market	INER(S): 5 m fl mey w 1 full 1 full 1 NG 0 11NG 0	(Descrip Lital C The gree Fall The fill Ct 3105 44	tion & label	ling/ins culse close iner ú 183 C	scriptions) Staffe ewclose se way se way AF/UP	A p tur sur ad	lastre 25. The led w 49 "an and it	Collage contam the mask denserte screen	1 ble ing top ed "4 loguse		PLING MI RAB ATCH OMPOSIT	ETHOD:	
	Inscribe	d in labor	atory: <u>``</u> a	2005012	29 12	9122-1	Oct	4/05	800651	UISCHILL	— Erun	/ Interval . filtered / u	npreserved	
	FIELD C	COLLECT	'ION:				TRA Spec	NSPORT:	in transp	ort:		r		
	BY: TIME:	1805	1 <u>5</u>		<u>5 / Oc</u>	<u>F I C</u>	STORAGE: @: C for (specified time):							
						1101 1								
	BY:	Rich	<u>* f Son</u> <u>m</u> [ hand ]	n 🗆 pan <u>h. ver ele</u> DATE: <u>4</u> Dày	ually froz	cf	rozen 25 Year	Spei	THER: cified centration(	s):	90HR L150	@ 100%		
	ANALYS				TINE	<b>D</b> LE	GAI	.					) OTHER	
	DILUTIO	ON WATE	R.TYPE:		ESH WA		2.4 <u>–</u> 2.9‰1	$\frac{1}{2}$ $(1)$ $(2)$						
	SOURC		PESC WEI		CHLORI		/UNIC	inicipal D'Upstream' Receiving D Burrard Inlet						
	DILUTIONS MEASURED BY: WEIGHT WHOLE SAMPLE VOLUME ACTIVE INGREDIENT							SPECIE inbow Tr her salme her her m #: <u>Su</u> ortality for	S: out (Onco onid: <u>m Valle</u> 7d immed	rhynchus - 0501 liately pre	s mykiss) 5&371/Vi eceding test	67-fw	2% or	
	SAMPLE Sub-sam	E (Upon F poles Take	Receipt): an For Ch	Dat emical Anal	e:		ES	DILUTIO	N WATER	QUALIT	Y:	p	H 7.2	
4/08 5	ρH	темр. (°С)	D.O. (mg/L)	CONDUCT (µS)	rivity	SALINIT (%)	Y.	TEMP. (°C)	D.O. (mg/L)	CONDU (µS)	JCTIVITY	SALINITY (‰)	(as mg/L CaCO <sub>3</sub> )	
ov l prej	7.7	14.8	10.1	210				14.9	10.4	40	0	-	NIOD	
arati cu	BIOASS TEMP.(	SAY °C);	CONTR DATA: /	ol <b>F</b> ISH	LOAD DENS (mear	DING SITY 1):		FORK L	ENGTH (n 33	nean): _cm	WEIGHT  •44	(mean): /g	CONDITION FACTOR (mean):	
		$\frac{15}{4} \pm \frac{1}{10}$					Ľ	S.D.: ± min.: max.: _	<u> 4.9</u> <u>5.9</u>	_cm _cm	S.D.; ± <u>(</u> min.: <u></u> max.; <u>2</u> ,	<u>15 g</u> 02 g	<u>0.95</u> s.d.: <u>+</u> 0:09 MOE-2014-00237	
	Report Fish F	FF16, May05	08(8		L					_			Page 87 Page 1 of 7	

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Container description call

"46 MORNING Oct 3/05 1805 HRS UF/UP AS" and it's screw closure was marked "46". The third container was marked "40" and inscribed "40 MORNING Oct 3/05 1805 HRS UF/UP A5" and its screw closure was marked "40". The fourth container was marked "4d" and inscribed "#4d MORNING Oct 3/05 1805 HRS UF/UP AS" and its screw closure as marked "4d".

#### **ANALYST LOG / REPORT (FISH)**

ENVIRONMENTAL CHAMBER #: \_\_\_\_\_\_\_

129122-1

FOLDER# 200501229 ALIQUOT # 129+25-T ID .: Morning Star Nurseries \$4

Notes (regarding treatment of sample from reception to test set-up): Initials OBSERVATION CODES (Appendix E Report EPS1/RM/9 July 1990) Hositian 4 7 5 4 Ż 3 19/2 10% Control 1870 32% Conc. 56% \*\* immed, stress, 100% coughing & item erratic swimming 33 + 7 38 307 Test vessel # 11 14 INTEGUMENT 6 Test amount 0.35% Ø A Shedding 3.5Kg 11.216 19.6Kg 3514 6.3Kg Final amount 35Kg > B Mucous Start date C Hemorrhaging 400105 >1200 Start of aeration PIGMENTATION ~ Pre-aeration time Zhrs ~ D Light Equip.ID Initial cond. 400 220 400 380 370 350 300 GS E Dark 25 7.8, 7.7 7.6 7.7 Initial pH 28 65 F Mottled ב.ד' 10.3 /A Initial D.O. 0 10.5 GEN. BEHAV. 10.3 GS 10.2 11 10.0 Initial temp. 65 11 G Quiescent 44 47 ų Solution appearance 3₽ ation H Hyperexcitable 26~ pre-ac change during prep. > Holding tank # ł Irritated 1 # of fish / vessel > 10 J Surfacing  $14\infty$ Test start time ご κ Sounding Cumulative Mortalities / Observations (use codes at right) L Twitching 04 N  $\cap$ N ") N 0.08 hr (5 min) Tetanic 15 М A. ٨ N N  $\cap$ 0.16 hr (10 min) n Normal S Ν r A N N N 25  $\cap$ 0.33 hr (20 min) SWIMMING Á, ٨ n, 0.67 hr (40 min)  $\mathcal{N}$ <6 0 Ceased £. N N 55 Ο 1.33 hr (80 min) р Erratic N ~ N N N 65 2.67 hr Q Gyrating ON JN N 0N JN N N 53375 / 8 hr 3  $\frown$ R Skittering  $\cap$ 65 ON N ON N Ņ V N  $\sim$ S Inverted  $\cap$ "<u>5</u> 21 hr ON ON ON ٥N 0<sup>N</sup> ON ON 24 hr Ю Т On side DN QN N 0<sup>N</sup> 0<sup>N</sup> ON N 48 hr RESPIRATION  $\mathcal{O}$ HO 0" ON 0<sup>N</sup> 0" ON ON Ņ 72 hr  $\cap$ Ho U Rapid DN ON ON <u>0</u>~ ON ON 0<sup>N</sup> 96 hr ٧ Slow fto. Equip.ID Final pH 7.8 W Coughing 7.8 78 7.8 HЮ 28 80 **7.0** 8 Final D.O. 9.1 Surface 11 9.2 9.6 9.2 Х 9.4 9.0 9.3 H:O.

14.9

14.9

Report Fish FF16, May05

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14.7

14.8

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Final temp.

MOE-2014-002365 Page -Page 89

Irregular

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HD

14.6

14.7

#### ANALYST LOG / REPORT (FISH)

FOLDER#: 20050 1229 ALIQUOT# 29122-1

Morning Star Nurseries #4 ID.:

### **DESCRIPTION OF TEST FACILITIES & CONDITIONS:**

Testing is performed in controlled (temperature, illumination level and photoperiod) environment rooms separate from the fish  $\ell^2$  culture area. Test vessels are ten gallon all-glass aquaria providing  $\geq$ 15 cm solution depth and covered with smoked Plexiglas<sup>®</sup> lids.

- Aeration: Oil-free air is delivered to test concentrations at a rate of 6.5 ± 1 mL/min/L by means of disposable borosilicate glass pasteur pipettes or small airstones as appropriate.
- pH adjustment: The samples are normally lested without adjustment to their pH. However, if both pH-adjusted and non -adjusted tests are run, a description of the pH adjustment procedure will be found in the NOTES section below.

#### **PROTOCOL USED:**

Tests are performed following our laboratory Standard Operating Procedures (SOPs) and where appropriate, the biological test methods, Report EPS 1/RM/9 (July 1990), amended May 1996 and Report EPS 1/RM/13 (July 1990), amended May 1996 and December 2000. Test organism 'good husbandry practices' followed are also described in our laboratory SOPs. Fish are acclimated for at least a 2 week period prior to their use in a bioassay.

### SOP or TEST METHOD DEVIATION DETAILS:

REFERENCE TOXICANT: Chemical used:	05
6 hr (Static) LC50 = $\underline{8.25 \text{ mg/L}}_{\text{concentration.}}$ (95% confidence limits: $\underline{6.8}_{\text{concentration.}}$	_]
istoric geometric mean (n = $\underline{20}$ ) LC50 and warning limits (±2SD): $\underline{7,66}$ $\underline{mg}$ (± $\underline{7.53}$ - $\underline{12.42}$ )	
NALYSIS RESULTS: Grinal De Preliminary De Special, See below	,
Bhr (Static) LC50 = not a cutely lethal concentration. [95% confidence limits: &	
Where the median lethal concentration (LC50) is the concentration of material in water that is calculated to be lethal to 50! the test organisms over an exposure period of 96 hours.	% of
b hr (Static) LT50 =atatconcentration. [95% confidence limits: &	_}
here the median lethal time (LT50) is the period of exposure calculated to be lethal to 50% of the test organisms held in a miticular test solution.	
mortality at 96 hours = $\frac{0}{0}$ at $\frac{100}{3}$ concentration	
e statistical method used was:	
e CETIS 1.1.1 computer program by Tidepool Scientific Software 2005 was used to calculate the test result.	
DTES:	
atus of control fish: 10 mortalities normal behavior	
Testing was subcontracted (with authorization) to	
<u>Special for extreme low Dissolved Oxygen</u> : The Sample, at 100% concentration, with a dissolved oxygen level of	194 : i - rere
<u>Special for extreme pH</u> : The Sample, at 100% concentration, with a pH level of <u>relative units</u> , would be acutely it T50 = <96-hours) to undergoarding rainbow trout <u>Oncorrigencian mykiss</u> . Fish toxicity tests conducted with sample pH values ss than 4.0 relative units or greater than 10.5 relative units, are rapidly lethal to salmonids <u>Oncorrigencian</u> spp.: See Eurorient land Fisheries Advisory Commission Working Party on Water Quality Criteria for European Freshwater Fish, in "Water On riteria for European Freshwater Fish - Extreme pH Values and Inland Fisheries", in Water Research Pergamon Press, 1969, pp 593-611. Therefore, due to ethical treatment guidelines for animal testing (Canadian Council on Animal Care), no salm sh were unduly sacrificed in this lethal sample, and no fish toxicity test was completed.	ethal es of pean uulity Vol. nonid
19 11 1	
ANALYST: //and //moredn Date Oct. 20, 2005	
ANALYST: //and //moredin Date Oct. 20, 2005 SULTS VERIFIED BY: C. B. Jan Date 03 Nov 2005	

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ID:	Morning Sta	ar Nurseries -	! u	Folder #	200501229	Fish Type:	Rain	oow trout	Source	Sun Valley Tr	out Farm	Initials	GS/HO
			,	Aliquot #	129122-1	Batch #	Batch # Sun Valley 050825T1/rbt-fw D		Date	Date 8-Oct-2005		Volume (kg)	35
Concentration:	Control	Test Vessel #	7		Concentration:	1%	Test Vessel #	33		Concentration:	10%	Test Vessel #	11
	Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor
1.	53	. 141	0.95		1	5.7	1.74	0,94		1	6.0	2.17	1.00
2	5,4	1.51	0.96		2	5.8	2.05	. 1.05		2	5.4	1.53	0.97
3	5.4	1.37	0.87		З	4.3	0.70	0.88		з	.5.4	1.50	0,95
4	5.7	2.02	1.09		4	4.6	0.93	0.96		4	5.4	1.42	0.90
5	5.0	1.16	0.93		5	5.0	1.06	0.85		5	5,2	1,35	0.96
6	5.5	1.28	0.77		6	6.3	2.28	0.91		6	5.0	1,22	0.98
7	5.9	- 1.91	0,93		7	5.6	1.95	1.11		7	6.0	2.27	1.05
6	4.9	1.15	0,98		8	5.8	1.85	0.95		8	5.1	1.34	1.01
9	51	1.35	Sec. 1.02		9	4,6	0.94	0.97		9	5.8	1.60	0.82
10	5.2	1.46	1.04		10	5.6	1.47	0.84		10	5.5	1.59	0.96
Mean	5.33	1.44	0,95		Mean	5.29	1.40	0.94		Mean	5.47	1.57	0.96
SD	0.31	0.29	0.09		SD	0.66	0.55	0.09		SD	0.35	0.35	0.06
Min	4.90	1.15	0.77		Min	4.30	0.70	0.84		Min	5.00	1.22	0.82
Max	5.90	2.02	1.09		Max	6.30	2.28	1.11		Max	6.00	2.27	1.05
Loading Density	' (g/L)	0.4			Loading Density	(g/L)	0.4			Loading Density	r (g/L)	0.5	
												1	
Concentration:	18%	Test Vessel #	14		Concentration:	32%	Test Vessel #	67		Concentration:	56%	Test Vessel #	38
	Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor
1	- 5,4	1.47	0.93		1	4.5	1.11	1.22		1	5.5	1.66	1.00
2	4.9	1.05	0.89		2	5,0	1.26	1.01		2	5.5	1.85	1.11
3	4.9		0.94		3		10.000000000000000000000000000000000000	0.92		3	5.0	1.25	1.00 August 1.00
4	5.5	1.46	0.88		4	5.7	1.66	0.90		4	5.2	1.44	1.02
5	50	1.25	1.00		5	6.0	2.71	1.25		5	5.6	1.75	1.00
6	5.0	1.26	1.01		6	4.7	0.95	0.92		6	5.6	1.77	1.01
7	5.6	1./6	1.00			4,5	0.90	0.92		7	5.7	1.82	0,98
8	6.0	2.04	0.94		8	5.2	1.34	0.95		8	5.8	2,00	1.03
9	5.3	44	0.97		9 10		140	0.65		y 10	6.U E 7	2:10	1.00
10	5.6	1.74	0.99		10	4.9	1.12	0.95		10	5.7	1.85	1.00
mean	5.31	1.43	0.95		iviean ep	5,18	1.36	0.98		iviean	5.55	1.73	1.01
50	0.37	0.31	0.05		au Min	U.59	0.56	U.14		SU Min	U.29	0.25	0.04
May	4.90 6.00	2.04	0.00		May	4,50 B 20	2 71	1 25		Мах	6.00 6.00	2 10	0.97
Loadiac Desett	(01.)	2.04	1.01	4	Loading Doosity	(o/L)	2.71	1.20		Logding Density	0.00	2.10	1.14
Loading Density	' (g/L)	0.4		J	Loading Density	(g/L)	0.4			Loading Density	(g/L)	0.5	

63  $\mathcal{N}, \mathcal{N}$ 

ID:	Morning Star	Nurseries # 4			Folder #	200501229	Aliquot #	129122-1
Fish Type:	Rainb	ow trout	Source	Sun Valley T	rout Farm	Batch #	Sun Valley 050825	5T1/rbt-fw
Initials	GS/HO	Volume (kg)	35	Date	8-Oct	-2005		

Concentration:	100%	Test Vessel #	307	
	Length (cm)	Weight (g)	Condition Factor	
1	6.0	1.92	0.89	
2	5.5	1.63	0.98	
3	5.6	1,79	1.02	
4	5.6	1.60	0.91	
5	5.0	1.18	0.94	
6	5.0	1.26	1.01	
7	5.8	2.03	1.04	
8	5.0	.1.12	0,90	
9	5:5	1.48	0.89	
10	4.9	1.02	0.87	
Mean	5.38	1.47	0.94	
SD	0.39	0.35	0.06	
Min	4.90	1.02	0.87	
Мах	6.00	2.03	1.04	
Loading Density	/ (g/L)	0.4		

Concentration:		Test Vessel #	
	Length (cm)	Weight (g)	Condition Factor
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Mean			
SD			
Min			
Max			1
Loading Density	/ (g/L)		

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Printed 4:08 PM10/20/2005

N.

ID: Ma	ine Stac	Nucsacies	#4	Folder # d	200501229	Fish Type:	Rainbors	Kont	Source	Sun Valle		Initials H.C	).
1 101	de la			Aliquot #	129122-1	Batch # 5un	Valleyos	Basti the	Date 💡	0005	7	Volume (kg)	35
Concentrati	n: Control	Test Vessel #	7		Concentration:	1%	Test Véssel #	33		Concentration:	10%	Test Vessel #	11
	Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor			Length (cm)	Weight (g)	Condition Factor
1	5.3	8.4			1	5.7	1,74			1	6.0	2.17	
· 2	5.4	1.5			2	5.8	2.05			2	5,4	(.53	
3	5.4	137			3	4.3	e.70			3	54	1.50	
4	5.7	2.02			4	4.6	0.93			4	54	1.42	
5	5.0	-1.16			5	5.0	1.06			5	52	135	
6	5.5	1.28			6	6.3	2.28			6	5,0	1.22	
7	5.9	-1.91 -		and the second se	7	5.6	195			7	60	a.27	
8	4.9	1.15			8	5.8	1.85			8	51	1.34	
9	5	1.35			9	4.6	0.94			9	5.8	1,60	
10	5.2	146			10	5.6	1.47			10	5.5	1.59	
Mean					Mean					Mean			
SD	-				SD					SD			
Min				]	Min					Min			
Max					Мах					Max			
Loading De	isity (g/L)			]	Loading Density	(g/L)			]	Loading Density	/ (g/L.)		

Concentration:	18%	Test Vessel #	_ (4
	Length (cm)	Weight (g)	Condition Factor
1	54	149	
2	4.9	1.05	
3	49	321/1-	
4	5.5	1.46	
5	5.0	125	
6	5.0	1.26	
7	50	176	
8	6.0	2.04	
9	5.3	44	
<u> </u>	5.6	1.74	
Mean			
SD			
Min			
Max			
Loading Density	/ (g/L)		

Concentration:	321	Test Vessel #	67				
	Length (cm)	Weight (g)	Condition Factor				
1	45	1.16					
2	5.0	1.24					
3	53	1.37					
4	5.7	1.66					
5	6.0	2.7					
6	47	0.95					
7	4.6	0.90					
8	5.2	10225	L34 <sup>ther</sup>				
9	62	2.02					
10	4.9	1.12					
Mean							
SD							
Min							
Max							
Loading Density	Loading Density (g/L)						

Concentration:	56%	Test Vessel #	38			
	Length (cm)	Weight (g)	Condition Factor			
1	55	1.66				
2	55	1.85				
3	50	1,25				
4	5.2	1.44				
5	56	1.75				
6	5.6	1.77				
7	5.4	1.82				
8	5.8	2.00				
9	6.0	<u>a.</u>				
10	5,7	1.85				
Mean	~					
SD						
Min						
Max						
_oading Density (g/L)						

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ID: Morning Star Nu	rseries #4			Folder # 2	0050/229	Aliquo	t#129/22	-1
Fish Type: Rambow th	out	Source Sun	Valley		Batch # Seen	Velley	105082571	Withe
Initials HO.	Volume (kg)	35	Date Oct	8/05		/		

Concentration:	Control	Test Vessel #			
	Length (cm)	Weight (g)	Condition Factor		
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Mean					
SD					
Min					
Max					
Loading Density	/ (g/L)				

Concentration;	100%	Test Vessel #	307			
	Length (cm)	Weight (g)	Condition Factor			
1	6.0	1.92				
2	5,5	1.63				
3	5.6	1.79				
4	5.6	1.60				
5	5,0	1.18				
6	5.0	1.26				
7	5.8	2.03				
8	5,0	1.12				
9	5.5	1,48				
10	4,9	1.02				
Mean						
SD						
Min						
Мах			1			
Loading Density	Loading Density (g/L)					

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f.

Folder: 200501229

November 4, 2005

Grant Schroeder, Analyst Environmental Toxicology Section Pacific Environmental Science Centre Environment Canada 2645 Dollarton Highway North Vancouver, BC, V7H 1B1

Subject: Legal Analysis, Morning Star Nurseries

**General:** The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Grant Schroeder on October 4, 2005:

200501229 129120-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 2 MORNING OCT. 3/05 1425 HRS UF/UP AS" plus other markings.

200501229 129121-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "3 MORNING OCT. 3/05 1430 HRS UF/UP AS" plus other markings.

200501229 129123-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 5 MORNING OCT. 3/05 1810 HRS UF/UP AS" plus other markings.

200501229 129124-1

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 6 MORNING OCT 3/05 1810 HRS UF/UP AS" plus other markings.

## Purpose:

To analyse Sample 200501229 129120-1, Sample 200501229 129121-1, Sample 200501229 129123-1 and Sample 200501229 129124-1 for Acute Lethality to Daphnia magna.

Document \_\_\_\_\_ of 2

Page 1 of 2 <u>C.S.</u> MOE-2014-00237 Page 95

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# **Procedure:** The samples were analysed for:

• Acute Lethality to *Daphnia magna* using a 48-hour acute lethal static (no replacement) median Lethal Time (LT50) daphnia toxicity test, performed following as appropriate, Environment Canada, Biological Test Methods, Report EPS 1/RM/11 (July 1990), amended May 1996 and Report EPS 1/RM/14 Second Edition (December 2000) and PESC LC50DA15.SOP.

#### Results: Daphnia Acute Lethality Test Results

- At 100% concentration, the 48-hour LT50 for Sample 200501229 129120-1 was determined to be greater than 4 hours but less than 24 hours of exposure to *Daphnia* magna (48-hour LT50 = > 4 < 24- hours @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 100% mortality after 24 hours to *Daphnia* magna exposed at 100% concentration.
- At 100% concentration, the 48-hour LT50 for Sample 200501229 129121-1 was determined to be greater than 4 hours but less than 24 hours of exposure to *Daphnia* magna (48-hour LT50 = > 4 < 24- hours @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 100% mortality after 24 hours to *Daphnia* magna exposed at 100% concentration.
- At 100% concentration, Sample 200501229 129123-1 was not acutely lethal to *Daphnia magna* over 48-hours of exposure (48-hour LT50 = not acutely lethal @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 0% mortality after 48 hours to *Daphnia magna* exposed at 100% concentration.
- At 100% concentration, Sample 200501229 129124-1 was not acutely lethal to *Daphnia magna* over 48-hours of exposure (48-hour LT50 = not acutely lethal @ 100% concentration, where LT50 is the period of exposure estimated to be lethal to 50% of the test organisms held in a particular test solution). Note: There was 0% mortality after 48 hours to *Daphnia magna* exposed at 100% concentration.
- There were no Daphnia magna control mortalities during the toxicity tests.

## **Remarks:**

- Sample 200501229 129120-1 and Sample 200501229 129121-1 were conveyed to Mr. Grant Schroeder.
- Sample 200501229 129123-1 and Sample 200501229 129124-1 were conveyed to Ms. Oxana Blajkevitch.

C. Brodany

Craig Buday, Analyst Environmental Toxicology Section Phone: (604) 924-2514 Fax: (604) 924-2554

Document \_\_/ of 2

Page 2 of 2 \_\_\_\_\_

ACUTE LETHALITY TEST USING DAPHNIA MAGNA (48-HOUR LC50 / LT50): ANALYST LOG / REPORT

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	02 (7007.77 DE
Environment Canada Pacific Environmental Science Centre (PESC)	Calintor 1 3 Levy 3-42 FC
Environmental Foxeology Section 2045 Dollarian HayNerth Vancouver Althe Columbia VII (11)	CSR# 11.208
FOLDER NO.: <u>200501227</u>	- CLIENT: Artar Sundher
	- Name / Address: BC Water, hond + A , r Protect
SITE & SAMPLE LOCATION:	10470-15250 56. Phone:
MORNING STAR NURSERIES - # 2	Copies to: SV(1en, BC
DESCRIPTION OF SAMPLE: (Type (e.g. chemical, elliue particulates), colour, amount and other properties (e.g. odd a 2-lappiec a light brows	nt, leachate), appearance (e.g. transparency, floating or settled bur)). - se mi - transpace & ligu & with se Hed
SAMPLING POINT DESCRIPTION: #2	
CONTAINER(S): (Description & labelling / inscriptions) <u>A one ×//_ arbs glass fotto</u> <u>The botto was almost fill vin</u> <u>MORNING OCT. 3/05 /425 NK</u> Inscribed in laboratory: <u>MO4007 2005 09000</u>	SAMPLING METHOD: SCI. bed "#2 SCI. bed "#2 SUF/UP AS" BATCH COMPOSITE of Amj. / Interval / Total Time
	TRANSPORT: Specified time in transport:
BY: <u>A. Sundhal</u> TIME: <u>1425</u> DATE: <u>03</u> OCT 10 Day Month Yea	STORAGE:    @    #    C for (specified lime):
	ANALYSIS REQUIRED
RECEIVED: Unfrozen D partially frozen D fro	zen 🖸 48HR LC50 🐮 48HR LT50 @ 100%
BY: $(190)$ DATE: $0.9$ $0.7$ $(2)$	
Day Month Ye	ar. Concentration(s):
FROM: <u>6.SCHROEDER</u>	
	AL DAUDIT DISPLIT DOTHER
DILUTION WATER TYPE: 2 NATURAL D REC SOURCE: 2 PESC WELL D DEIONIZED	CONSTITUTED WATER DUPSTREAM RECEIVING BIOASSAY TEMP.(°C): 20 ± 2-
DILUTIONS MEASURED BY: TEST OF	RGANISM & CULTURING INFORMATION:
WEIGHT    WHOLE SAMPLE    Daphnia (~100mg, 20±2°C u of approx      VOLUME    ACTIVE INGREDIENT    20±2°C u of approx      On Mono exchange	magna (Freshwater Crustacean) are cultured in moderately hard /L CaCO <sub>2</sub> ) well water supplemented with vitamin B12 and Selenium at inder full spectrum lighting (16 hour Light : 8 hour Dark) at an intensity (mately 500 lux. day, Tuesday, Wednesday and Friday, 100% of the culture water is ed and the Daphnia are fed algae; Selenastrum: and YT mixture (yeast- w)
SAMPLE (Upon Receipt): Date: 04007	DILUTION WATER QUALITY:
Were Sub-samples Taken For Chemical Analysis? D NO	
$\begin{array}{c c} p_{H} & \text{IEMP.} \\ \hline $	$\begin{array}{c c} \mathcal{O} & $
TEST CULTURE HEALTH:	Daphnia magna Culture Lot #AN 01/ABS
Age of adults supplying    % mortality 7 days prior      neonates    2-3    weeks	to Time to first brood Average number of neonates % days per brood
Report Daphnia LC50DA15,Jun.05	

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C.B.

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ANALYST LOG / REPORT (DAPHNIA MAGNA) - LT50

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FOLDER #: 20507229 ALIQUOT # 129120-1 ID.: MORNING STAR NURSERIES - # 2 ENVIRONMENTAL CHAMBER #: CLO9

SAMPLE MANIPULATIO	NS BINC	T REQUIRED	
	INITIAL	FINAL	
рН	not re	ouired	1N HCI 1N NaOH
D.O.	1		Pre-aeration Rate - 25-50 mL/minute/L Manner of application - glass pasteur pipette Time of pre-Aeration minutes
Hardness	$\checkmark$		Adjusted according to Reference Method EPS 1/RM/14 Second Edition - December 2000.

# TEST CONCENTRATIONS AND OBSERVATIONS

START DATE 04 OCT 2005

f.

Conc	entration	Cor	ntrol		/0	0%	1												
lest amount			Ø	_	20	Inc													
final amount		20	Dml		290	)(													
initial cond.	Equip.ID	48	0	-	22	D		7									-		
initial pH	28	8.0	)		7.6	2		30	B.										,
initial D.O.	11	8.9	}		78	3													
Initial temp.	4	20	.3		20	5		)											
start time		11:	50		1/5	0						-							
solution appear	rance	cle	ar	,	light langer	brou	sn idy												
# of neonates			10		10	>													
# of replicates			3		3	5											_		
cumulative mor	rtalities	aí	a2	83	b1	b2	Ь3	c1	c2	c3	d1	d2	d3	e1	e2	e3	f1	12	13
1 hour																			
4 hours		0	0	0	0	0	0	e.	3,										
24 hours		0	0	0	10	10	(Ő	e.	<u>3</u> .										
48 hours		0	0	0			1	H	<u>.</u>										
number immob	ile	a1	82	<b>a</b> 3	b1	b2	ьз	c1	c2	£3	d1	d2	d3	e1	e2	e3	f1	12	13
1 hour	_																		
4 hours		0	0	0	18	ıð	jŧ,	C.L	3.										
24 hour		0	0	0	-	-	-	e.	ß,										
48 hours		0	0	0	_	1		He	).										
total dead & Im	mobile	0	0	0	10	10	10												
final cond.	Equip.1D	L	150	7		80	7	<b>١</b>		<b></b> _									
final pH	28		8.1	( AC	, ;	26		Sc.	в.					-					
finai D,O,	11 .	.	<u>.</u> 8.5		5	8		)											
final temp.	11	a	.0.7	)	2	0.7	<u>.</u>	/											
eport Daphnia LC50D	A15,Jun.05	te:*	se	verl	in it		6.	/rea	/,~	0 t s	້ນຳ	-mi	31	, ba	rely	Pagb⁄l AR	0 <b>15</b> -20 agi <b>e 8</b>	<u>۱۹۲۵</u> ۲. ۲. ۲	)237 <b>)</b>

C.B.

ANALYST LOG / REPORT (DAPHN/A MAGNA)

FOLDER #: 20050/229\_ ALIQUOT # 129120-1 ID.: \_\_\_\_\_ORNING\_\_\_

# **DESCRIPTION OF TEST FACILITIES & CONDITIONS:**

Testing is performed in controlled (temperature, illumination level and photoperiod) environment rooms adjacent to the daphnia culture area. Test vessels are 250 mL borosilicate glass beakers covered with plastic Petn<sup>®</sup> dish lids. Ten neonates are introduced in 200 mL of test solution per test vessel to achieve 20 mL of solution per daphnid.

STAR

NURSERIES -

Aeration: There is no aeration of the test vessels during the 48 hour test period.

pH adjustment: The samples are normally tested without pH adjustment. However, if both pH-adjusted and non-adjusted tests are run, a description of the pH adjustment procedure will be found in the NOTES section below.

## **PROTOCOL USED:**

Tests are performed following our laboratory Standard Operating Procedures (SOPs) and where appropriate, the Environment Canada Biological Test methods, Report EPS 1/RM/11 July, 1990, amended May, 1996 and Reference Method EPS 1/RM/14 Second Edition - December 2000. Test organism "good husbandry practices" followed are also described in our laboratory SOPs.

# SOP or TEST METHOD DEVIATION DETAILS:

		/		
	/	/		
	/		<u> </u>	
REFERENCE TOXICANT:	Chemical used: Z	Vaci (Sodium G	Date of test:	120072005
48 hr (Static) LC50 =	5.9 <u>g/c</u>	concentration.	[95% confidence limits: 5.2	2g/L& 6.7g/4
Historic geometric mean (n = 20	_) LC50 and warning	limits (±2SD):	<u>g /L 0.Zg / L</u>	.)
ANALYSIS RESULTS:	Final	🗆 Preliminary	🗅 Special, See below	
48 hr (Static) LC50 =		concentration.	[95% confidence limits:	
Where the median lethal con	centration (LC50) is I	the concentration of ma	erial in water that is calculated	to be lethal to 50% of
the test organisms over an ex	oposure period of 48 h	ours.		
18  br (Static) + TSO = > 4 < 24	house a IR	0% concentration	195% confidence limiter	
Where the median lethal time	$\frac{1}{1}$ $\frac{1}$	<u>d of exposure calculate</u>	d to be letted to 50% of the las	t organisms hold in a
particular test solution.				r organionio nelo m a
		100'		
Mean percentage mortality at 10	0% sample concentr	ration: /00 %		
The statistical method used was: _				
The CETIS 1.1.1 computer program	m by Tidepool Scientif	fic Software 2005 was u	ed to calculate the test result.	
Status of Control daphnia:	> nortalit	ies normal	behavior	
Agan percentage mortality in the C	Control: 0 %			
wear percentage monainy in the c	/onitiol /o	•		
	1 1 1	111. 1	0.0	
NOTES: Sample	had dead	boolies of	amph poas	
· · · · ·				<u> </u>
The sarply	had loof	a mortality	to daphria ma	zgra
at tes 241	loves al 10	0% concert	ration.	
") Taoliga waa aybaanta dada				
resting was subcontracted (wit)	authorization) to:			
ANALYST:	3 day	Date 140	CT2005	
	CIII I	Data Nor 2	105	
	- I//WILL	Date /		7 7

Report Daphnia LC50DA15, Jun.05

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# ACUTE LETHALITY TEST USING DAPHNIA MAGNA (48-HOUR LC50 / LT50): ANALYST LOG / REPORT

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invironment Conada ucilia Environmental Science Centre (PESC)			Collai	or <u>P3</u>	7003-72
wronmanlai Toxicology Section i45 Dollarton Hwy., North Vancouver itish Columbia, V7H 181			CSR#	1120	8
FOLDER NO .: 20050/22	29	CLIENT:	01	- 11	/ _
ALIQUOT NO .: 12912	/-/	Name / Address:	HATAL	_ Sundhi	er Pa
SITE & SAMPLE LOCATION:	· · · · · ·		BCWal	er, Lang	JOAN TID
MORNING STAR NU	RSERIES - #3	Phone: Copies to:	10470 Surren	SZ~S NBC	-0
DESCRIPTION OF SAMPLE: (1) particulates), colour, amount and a 2-large rola light particulates	pe (e.g. chemical, effluent, li other properties (e.g. odour)) Orown Szmi- (of 9 ~ strong U	eachate), appear Franspar History	ance (e.g. transf ent ligu Solou la	barency, floating	or settled
SAMPLING POINT DESCRIPTIO	* #3				
CONTAINER(S): (Description & <u>A grack/Land</u> <u>Contained in laboratory</u>	abelling / inscriptions) 26 g/uss both both 2 uss of me oct. 3/05 /43 007205 0960	ui & a u 56 / 4/ 2 0 HRS V 8 B. 9	<u>kte hd.</u>	SAMPLING M GRAB BATCH COMPOSI of Amt. / Interval	ETHOD:
FIELD COLLECTION:		TRANSPOR		a unintereu /	unpreserveu
Article and a second		Specified I	ime in transport	<u> </u>	
BY: <u>A. Sund Kar</u> TIME: <u>1430</u> DATE:	031 <i>0CT 105</i>	STORAGE:	PC for (spec	ified time):	
BY: <u>C.B.VDA</u> TIME: <u>0900</u> DATE: FROM: <u>C.SCH R</u>	04 <u>0CT</u> 05 Day Month Year DEDER	Specified Concentratio	n(s):	· <u>· · · · · · · · · · · · · · · · · · </u>	
ANALYSIS TYPE:			7	SPLIT	DOTHER
DILUTION WATER TYPE:	NATURAL DRECON	STITUTED WAT UPSTREAM RI	er Eceiving	BIOASS	SAY TEMP.(°C): ±_ <b>2</b>
DILUTIONS MEASURED BY	TEST ORGA	NISM & CHI THE			
U WEIGHT WHOLE SA	MPLE NGREDIENT On Monday, exchanged a trout chow).	gna (Freshwate aCO <sub>3</sub> ) well wate er full spectrum lig tely 500 lux. Tuesday. Wedn nd the Daphnia a	er Crustacean) Supplemented ghting (16 hour esday and Frid re fed algae; Se	are cultured in with vitamin B1 Light : 8 hour D lay, 100% of the	n moderately hard 2 and Selenium at ark) at an intensity ne culture water is YT mixture (yeast-
SAMPLE (Upon Receipt): Were Sub-samples Taken For Che	Date: 0400710 mical Analysis? D NO		N WATER QUA		<sup>pH</sup> 8.0
pH TEMP, D.O. H (°O) (mg/L) (a 20.9 7.4	IARDNESS CONDUCTIV smg/L CaCO∂ (49) > 2.5 220	(ITY D.O. (mg/L) 8.9	темр. (°С) 20: <u>3</u>	HARDNESS (as mg/L CaCOy) ~ / <del>CO</del>	солдистіvітү <sup>(µS)</sup> <b>480</b>
TEST CULTURE HEALTH:		Daphnia mag	na Culture Lot	# JANON	ABS
Age of adults supplying neonates 2-3 weeks	% mortality 7 days prior to testing %	Time to first bi	ood days	Average nun per brood	nber of neonates
aport Daphnia LC50DA15,Jun.05		<u> </u>		Pa	ige 1 of <u>3</u>

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ANALYST LOG / REPORT (DAPHNIA MAGNA) - LT50 FOLDER #: 200501229 ALIQUOT # 129121-10: MORNING STAR NURSERIES - #3 ENVIRONMENTAL CHAMBER # \_\_\_\_\_C109

SAMPLE MANIPULATIC	INS UNO	T REQUIRED	
	INITIAL	FINAL	· · · · · · · · · · · · · · · · · · ·
pH	nobi	equired	1N HCI
D.O.	]	1	Pre-aeration Rate - 25-50 mL/minute/L Manner of application - glass pasteur pipette Time of pre-Aeration minutes
Hardness	L	J	Adjusted according to Reference Method EPS 1/RM/14 Second Edition - December 2000.

# TEST CONCENTRATIONS AND OBSERVATIONS

START DATE OYOCT 2005

Concentr	ration	Co	ntrol		10	0%	7	404 404 IIII - 444 - 444 - 444 - 444 - 444 - 444											
test amount			ø		20	0,(													
final amount		2	COm	C	25	TO me						*****							
initial cond. Ec	quip,ID	49	30		22	0		5			ľ						1		
initial pH 7	2Ð	8.	0		7	5		Se	.в.						************		a frankriger og er en generale		<u>،</u>
initial D.O.	<i> </i>	8.	1		7.1	6		$\sum$											,
initial temp. /	rt	21	2,3		20	8		7			e.						ĺ		
start time		12	$\infty$		120	90													
solution appearance	ce	cla	ral	-	fight	biom	lage												
# of neonates			10		10	2	-0												
# of replicates			3		3	3													
cumulative mortali	ties	<b>P1</b>	82	a3	bi	b2	b3	c1	c2	c3	d1	d2	43	e1	e2	e3	п	12	13
1 hour				İ	1												1		
4 hours		0	0	0	0	0	0	C.1	P.		<b>†</b>							1	
24 hours		0	0	0	10	10	10	e.	B.		<b> </b>								l
48 hours		0	0	0	<b> </b>	İ		1	<b> </b>	1		<b> _</b>							
number immobile		£1	a2	a3	b1	b2	b3	c1	c2	<b>c</b> 3	d1	d2	d3	e1	e2	e3	rt	12	13
1 hour					1		ľ				<b>F</b>								
4 hours		0	0	0	10*	18	10*	e.	B.				<b> </b>						
24 hour		0	0	6	-	-	-	e.	B.				1		<b></b>	<b> </b>	1		1
48 hours		0	0	0	-		-	_			[	<b></b>			1		1		
total dead & Immol	blie	0	0	0	10	10	10											Ì	
final cond. Ec	quíp.ID	L	50	$\overline{)}$		90	-	$\overline{h}$	ŧ	·	<b>†</b>		4			1		1	1
final pH 2	8	5	<u></u>	-t <sub>a</sub>	6. 7	<u>, -</u> ! 5		17.	•								<u> </u>		
final D.O.			<u>የ</u> ም	ſſ	5	5		Re.	6										
final temp. //	,	ጎር	<u> </u>	-)	7	07	!	1											

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ANALYST LOG / REPORT (DAPHNIA MAGNA)

FOLDER # 20050/229 ALIQUOT # 129121-1 ID.: MORNING STAR NURSERIES - # 3

# **DESCRIPTION OF TEST FACILITIES & CONDITIONS:**

Testing is performed in controlled (temperature, illumination level and photoperiod) environment rooms adjacent to the daphnia culture area. Test vessels are 250 mL borosilicate glass beakers covered with plastic Petri<sup>®</sup> dish lids. Ten neonates are introduced in 200 mL of test solution per test vessel to achieve 20 mL of solution per daphnid.

Aeration: There is no aeration of the test vessels during the 48 hour test period.

pH adjustment: The samples are normally tested without pH adjustment. However, it both pH-adjusted and non-adjusted tests are run, a description of the pH adjustment procedure will be found in the NOTES section below.

#### **PROTOCOL USED:**

Tests are performed following our laboratory Standard Operating Procedures (SOPs) and where appropriate, the Environment Canada Biological Test methods, Report EPS 1/RM/11 July, 1990, amended May, 1996 and Reference Method EPS 1/RM/14 Second Edition - December 2000. Test organism "good husbandry practices" followed are also described in our laboratory SOPs.

SOP or TEST METHOD DEVIATION DETAILS:
<i>'</i>
REFERENCE TOXICANT: Chemical used: Nac ( (Sadium Chloride) Date of test: 120CT 7005
48 hr (Static) LC50 = $5.99/L$ concentration. [95% confidence limits: $5.2g/L \ge 6.7g/K$ ]
Historic geometric mean (n = $\frac{20}{LC50}$ and warning limits (±2SD): $\frac{5.9g/L}{2.2g/L}$
· · · · · · · · · · · · · · · · · · ·
ANALYSIS RESULTS: D Final D Preliminary D Special, See below
48 hr (Static) LC50 = concentration. [95% confidence limits:&]
Where the median lethal concentration (LC50) is the concentration of material in water that is calculated to be lethal to 50% the test organisms over an exposure period of 48 hours.
$\frac{19 \text{ br}}{(\text{Statio})   \text{TEO} - 24/cc} + \frac{24/cc}{24/cc} = \frac{100\%}{200\%} = \text{constration} = \frac{195\%}{200\%} = \frac{100\%}{200\%}$
Where the median lethal time (LT50) is the period of exposure calculated to be lethal to 50% of the test organisms held in particular test solution
Mean percentage mortality at 100% sample concentration:%
The statistical method used was:
The CETIS 1.1.1 computer program by Tidepool Scientific Sonward 2005 was used to calculate the result.
Status of Control daphnia: Mo (121, 100, 101 max Derut 101
Mean percentage mortality in the Control:%
NOTES: <u>Sample had dead bodies of amphipods</u>
astor 24 hours at 100% concart ration
Testing was subcontracted (with authorization) to:
ANALVOT PP 1 1 1 140000000000000000000000000000
AIVALYSI: <u>C.D. Jang</u> Dato <u>Junio</u>
RESULTS VERIFIED BY: // Milling Date Nov 2/03
Report Daphnia LC50DA15, Jun.05

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NOUTE LETHALITY TEST USING DAPHNIA WAGN nvironment Cenera acilie Environmental Science Centra (PESC) nvironmental Toxicology Section 845 Dollanon Hwy, North Vancouver ritish Columbia, V7H 181	<b>4 ( 48-ноон LC50 / LT</b> с	50): ANALYST officier <u>P3 (3</u> SR#2	2007 REPORT 2003-72 P
FOLDER NO: 280 SO 1229 ALIQUOT NO: 129123-1 SITE & SAMPLE LOCATION: MORNING STAR NURSERIES - # S	CLIENT: Nanie / Address: BC No Phone: 10470 Copies to: 500	(Sundhe ter land -15200 5 ex BC	BAir Piote
DESCRIPTION OF SAMPLE: (Type (e.g. chemical, effluent, le particulates), colour, ainquint and other properties (e.g. odour)).	achate), appearance (e.g. tra <u>sp. / - tra-opere</u> lionel	A with s	or settled ethe I
		· · · · · · · · · · · · · · · · · · ·	
CONTAINER(S): (Description & labelling & inscriptions) A gree × 1.6 a feel gloss for the 1.9 bottle uses for the 1.4 5 MORNING OCT 3105 Inscribed in laboratory <u>"OYOCT 2005 0900 C</u>	With a white 1 1 & in section 1810 HRS VILLE 8 M	SAMPLING M GRAB CAS / D BATCH COMPOSIT of Amt. / Interval B unfiltered /	ETHOD: FE / Total Time unpreserved
FIELD COLLECTION	TRANSPORT: Specified lime in transi	iont:	
BY: A. SUNDARY TIME: 1810 DATE: 03 1 DCT 1 85 Day Month Year	STORAGE: @*C for (s LOCATION:	pecified lime).	
© LABORATORY: RECEIVED: Q <sup>2</sup> unfrozen □ partially frozen. □ frozen BY: <u>C.BUDAY</u> TIME: <u>0900</u> DATE: <u>04   0CT   05</u> Day Monith Year FROM: <u>C.SCHROEDER</u>	ANALYSIS REQUIRED 48HR LC50 4 4 COTHER: Specified Concentration(s):	8/IR1150 © 100%	
	E AUDIT	D' <i>SPLIT</i>	d other
DILUTION WATER TYPE: NATURAL CRECONS SOURCE: Presc Well Creconized C	TITUTED WATER UPSTREAM RECEIVING	BIOASS	SAY TEMP.(°C): ±
DILUTIONS MEASURED BY: UWEIGHT WHOLE SAMPLE VOLUME U ACTIVE INGREDIENT On Monday, exchanged an trout chew).	<b>IISM &amp; CULTURING INFOR</b> Ina (Freshwater Crustace (CO <sub>3</sub> ) well water supplement full spectrum lighting (16 hi ely 500 lux. Tuesday, Wednesday and id the Daphnia are fed algae	MATION: an) are cultured in ted with vitamin B1. bur Light - 8 hour D Friday, 10D% of th ; Selenastrum; and	a moderately hard 2 and Selenium at ark) at an intensity ne culture water is YT mixture (yeast-
SAMPLE (Upon Receipt): Date: 0/007200 Were Sub-samples Taken For Chemical Analysis? DI NO 4		QUALITY:	<sup>рн</sup> 8.0
oH TEMP, D.O. HARDNESS CONDUCTIVI (***) 7.8 19.2 9.0 >25 250	TY: D.O. (mg/L) 8.9 20.3	C) HARDNESS (as mg/L CaCO <sub>0</sub> )	CONDUCTIVITY (45) <b>480</b>
TEST CULTURE HEALTH:	Daphnia magna Culture I	ot # JAN 01	1/ABS
Age of adults supplying% mortality 7 days prior toneonates 2~3weekstesting2%	Time to first brood days	Average nun per brood	nber of neonates
nord Dasheis I CEOD51E Jun DE			

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C.S.

# ANALYST LOG / REPORT (DAPHN/A MAGNA) - LT50

FOLDER #: 200501229 ALIQUOT # 129123-10. MORNING STAR NURSERIES - #5 ENVIRONMENTAL CHAMBER #: C109

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SAMPLE MANIPULATIO	NS UNO	T REQUIRED	
	INITIAL	FINAL	
рН	robri	gried	1N HCI 1N NaOH
D.O.	/	/	Pre-aeration Rate - 25-50 mL/minute/L Manner of application - glass pasteur pipette Time of pre-Aeration minutes
Hardness	J	V -	Adjusted according to Reference Method EPS 1/RM/14 Second Edition - December 2000.

# TEST CONCENTRATIONS AND OBSERVATIONS

# START DATE 04 OCT 2005

¢

Conc	entration	Сог	ntrol		10	0%													
Item			<u> </u>		, -														_
test amount		4	Ø		20	Oml													
final amount		<i>Z</i> .	$\mathcal{D}_{r}$	$\sim$	2a	DAL	-												
initial cond.	Equip.ID 25	48	30		25	0		)											
initial pH	28	8	.0		7.8	3		Se	B.			_							,
initial D.Q.	11	8,	8_		8.8	5		$\int$	.•										
initial temp.	11	20.	4		19.	4		ノ											
start time		12	10		12	10													
solution appear	ance	cl	ear	-	pale no la	yelli	rus msu(	face											
# of neonates			0		10	D													
# of replicates	-		3		3	<u>}</u>													
cumulative mor	talities	B1	a2	<b>a</b> 3	b1	b2	b3	c1	62	<b>c</b> 3	d1	d2	d3	e1	e2	eJ	41	f2	f3
1 hour																			
4 hours		0	0	0	0	0	0	e B	•										
24 hours		0	0	0	0	0	Ó	C.B.											
48 hours		0	0	0	0	0	0	HO											
number immobi	ile	a1	a2	a3	ь1	b2	<b>b</b> 3	c1	c2	c3	d1	d2	d3	e1	e2	e3	n	f2	f3
1 hour																			
4 hours		0	0	0	0	0	0	e.£	3.										
24 hour		0	0	0	0	0	0	C.B	_										
48 hours		0	0	0	0	D	0	4o	•										
total dead & Imi	mobile	0	0	0	0	0	0	₩0.											
final cond.	Equip.ID	Ц	150	)	9	4C	)	)											
final pH	28		8.1		4	<u>.</u> 4		(H.	<u>).</u>										
		-						17.5											
final D.O.	11		8.5	)	<	8.5		(											

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ANALYST LOG / REPORT (DAPHNIA MAGNA)

FOLDER #: 20301229 ALIQUOT # 129123-1 ID .: MORNING STAR NURSERIES - #5

#### **DESCRIPTION OF TEST FACILITIES & CONDITIONS:**

Testing is performed in controlled (temperature, illumination level and photoperiod) environment rooms adjacent to the daphnia culture area. Test vessels are 250 mL borosilicate glass beakers covered with plastic Petri<sup>®</sup> dish lids. Ten neonates are introduced in 200 mL of test solution per test vessel to achieve 20 mL of solution per daphnid.

Aeration: There is no aeration of the test vessels during the 48 hour test period.

pH adjustment: The samples are normally lested without pH adjustment. However, if both pH-adjusted and non-adjusted tests are run, a description of the pH adjustment procedure will be found in the NOTES section below.

## **PROTOCOL USED:**

Tests are performed following our laboratory Standard Operating Procedures (SOPs) and where appropriate, the Environment Canada Biological Test methods, Report EPS 1/RM/11 July, 1990, amended May, 1996 and Reference Method EPS 1/RM/14 Second Edition - December 2000. Test organism "good husbandry practices" followed are also described in our laboratory SOPs.

SOP or TEST METHOD DE	VIATION DETAILS	Sin .		
	$ \longrightarrow  $			
REFERENCE TOXICANT:	Chemical used: <u>//</u>	CI (Godin	~ Chloridef Dat	e of test: <u><b>a</b>ct 12/05</u>
48 hr (Static) $LC50 = 3.9$	<u>1914</u> cor	ncentration.	[95% confidence	imits: <u>5,2g/ &amp; 6,7g/4</u>
Historic geometric mean (n = <u>20</u>	) LC50 and warning limi	its (±2SD):		<u> </u>
		<u> </u>		
<u>ANALYSIS RESULTS:</u>	🗹 Final	Preliminary	🗆 Special, Se	e below
48 hr (Static) LC50 =		concentration.	[95% confidence	imits: &]
Where the median lethal conditions are an area	entration (LC50) is the	concentration of ma	terial in water th <mark>a</mark> t is i	alculated to be lethal to 50% of
ine lest organisms over an exp		s. 67		
48 hr (Static) LT50 = <u>Not Acの</u>	ly lethalat 180	<u>concentration</u>	. [95% confidence l	imits: & ]
Where the median lethal time particular test solution.	(LT50) is the period of	l exposure calculate	d to be lethal to 50%	of the test organisms held in a
		6		
mean percentage mortality at 100	% sample concentratio	on: <u> </u>		
The statistical method used was:				
The CETIS 1.1.1 computer program	by Fidepool Scientific S	Sofiwaro 2005 was u	sed to calculate the to	ist result.
Status of Control daphnia:// d	mortalitie	3, norma	<u>e pene</u> v / ~	, ,
Mean percentage mortality in the C	pritrol:%			
NOTES:				
j				
	and the second second			
I esting was subcontracted (with	authorization) to:			
ANALYST:	Endany	Date <u>140C1</u>	2005	
	X Martin	Date Maria	2/05	
Report Daphnia LC50DA15 Jun 05			(	$Page 3_{ot}$

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TEST CULTURE HEALTH:		Dapi	hnia magni	a Culture Lot		
	,	1				m//de-
10 (10) (mg/L) (as mp/L GaCO) 18 285 86 225	(45) 240		(mg/L) 8.9	20.3	(as mgA. CaCO <sub>3</sub> )	(45) <b>480</b>
off TEMP: D.O. HARDNESS	CONDUCTIVI	res- Ty	D.O.	TEMP. (°C)	HARDNESS	CONDUCTIVITY
AMPLE (Upon Receipt):	01007200	<u>\$</u>	DILUTION	WATER QUA	LITY:	pH 8.0
I VOLUME CI ACTIVE INGREDIENT	of approximate On Monday, exchanged an trout chow).	aly 500 Tuesda d the [	lux. ay, Wednes Daphnia are	sday and Frid a fed algae; Si	ay, 100% of th elenasicum; and	e culture water is YT mixture (yeast-
	(~100mg/L Ca 2012°C under	(CO <sub>3</sub> ) v full sp	weil water s iectrum ligh	supplemented iting (16 hour	with vitamin B1: Light : 8 hour D	2 and Selenium at ark) at an intensity
DILUTIONS MEASURED BY:	TEST ORGAN	na (1	CULTURII Freshwater	NG INFORMA Crustacean)	rion: are cultured in	moderately hard
SUUKCE: LE PESC WELL DD DEK		UPST	HEAM REC	JEIVING		** #****
DILUTION WATER TYPE:		τιτυτ	ED WATE	R	BIOASS	SAY TEMP.(°C):
ANALYSIS TYPE:	LEGAL			<u>.</u>	ș <sup>i</sup> țți j	D OTHER
FROM: G.SCHROEDER			centration(	Sec		
TIME: 0100 DATE: 01 100	r 105	- Spe	cified			
RECEIVED: Wintrozen Dipartialiy froze BY: C.BUDAY	m ⊔ frozen		IBHR LC50 DTHER:		1 L 150 @ 100%	
@ LABORATORY:		AN	ALYSIS RE	QUIRED:		
TIME: <u>/8/0</u> DATE: <u>05/0C</u> Day Mon	<u>1 / 03</u> Ih Year	LO	CATION:			Charles and a second seco
BY: A. Sundhel		ST	DRAGE:		(fied fime)	
		B	ANSPORT: pecified (in	e in transport		
	2 0100				Kunfiltered / u	Inpreserved
					ol Amt, / Interval	/ Total Time
elesseribed "46 Mo. HRS UF/UP AS"	RNING	ÖC	T. 3/0	E BP		
A me × 11- ander a)	luss both	the S	with	Kan		
CONTAINER(S): (Description & labelling / insc	riptions)	*/ -	and the water in the		SAMPLING M	ETHOD:
SAMPLING POINT DESCRIPTION	<u>, sandar sandar</u>		<u>the states of the states of t</u>	<u>-</u> -	<b>.</b>	<u></u>
- 3ekled particulate	<u> </u>		et iset	and par	<u>a (pita</u>	
DESCRIPTION OF SAMPLE; (Type (e.g. chem particulates), colour, amount and other propertie	ical, effluent, les s (e.g. odour))	achate	), appearan , , /	co (e.g. transp	arency, floating	or settled
MORNING STAR NURSERIES -	· · · · · · · · · · · · · · · · · · ·	Copies	<u>لا المعام المعام المعام المعام المعام المعام المعام المعام المعام المعام المعام المعام المعام المعام المعام ال</u>	rrey	BC	1. Status I. Status
SITE & SAMPLE LOCATION:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Diana	10	1470-15	2~56.	
ALIQUOT NO.: 29124-1	<u> </u>	Narrie /	Addréss:	Notal S	oundras	Potection
Insh Columbia. V711181			<b>іТ•</b> ;	<u> </u>	- 11	
145 Dollarton Hwy., North Vancouver				CSR#	11209	3
wang environmentul solence centre (1955.) wijonmental Toxicology Socion						

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Pege 1 of \_\_\_\_

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# ANALYST LOG / REPORT (DAPHNIA MAGNA) - LT50

FOLDER #: 200501229 ALIQUOT # (29124-) ID .: MORNING STAR NURSERIES - #6 ENVIRONMENTAL CHAMBER #: \_\_\_\_\_\_

SAMPLE MANIPU		T REQUIRED	
	INITIAL	FINAL.	
рН	not w	quired	1N HCI
D.O.			Pre-aeration Rate - 25-50 mL/minute/L Manner of application - glass pasteur pipette Time of pre-Aeration minutes
Hardness	4	Ţ	Adjusted according to Reference Method EPS 1/RM/14 Second Edition - December 2000.

# TEST CONCENTRATIONS AND OBSERVATIONS

START DATE OYOCT2005

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Conc	entration	Control		100%															
		a		200 (						_									
				allal							4								
initial cond	Equin ID	200ml			200mC														
	25	480			250														
	28	8.0			7.8														ſ
initial D.O.	11	8.8			20.6														
initial temp.	11	20.4		8.5															
start time		1220		1220															
solution appea	rance	d	ear	-	pole no la	, yell .yelo	ow nsurf	oce											
# of neonates		10		jÔ															
# of replicates			3		3	•													
cumulative mo	rtalities	à1	a2	<b>a</b> 3	b1	b2	ы	c1	c2	c3	d1	d2	d3	e1	e2	e3	11	f2	13
1 hour																			
4 hours		0	0	0	0	0	0	C.B	<u>.</u>										
24 hours		0	0	$\mathcal{O}$	0	0	0	C.B	r				_						
48 hours		0	Ô	0	0	0	0	HO											
number immob	ile	<b>a</b> 1	a2	аЭ	ь1	b2	b3	c1	c2	c3	d1	d2	d3	e1	e2	e3	f1	<b>f</b> 2	f3
1 hour																			
4 hours		0	0	0	0	0	0	C.C	3.										
24 hour		0	0	0	0	0	0	e.	s.										
48 hours		0	0	0	0	0	0	H.O					- <u> </u>						
total dead & im	mobile	0	0	0	0	0	0	Hic	).					-					
final cond.	Equip.ID		450	)		250	) /	Б		-									
final pH	28	8.			8.4		(4.0.												
final D.O.	1	8.5			8.5		$\left \right $												
final temp.	1	6	20.0			90'	6	J											
eport Daphnia LC50D	A15,Jun.05			-	-									-		Page <sup>V</sup> P	IOE-2 age 1	07	0 <u>2</u> 37

ANALYST LOG / REPORT (DAPHNIA MAGNA)

FOLDER #: 29050/229 ALIQUOT # / 29124 / ID .: \_\_\_

MORNING STAR NURSERIES - #6

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### **DESCRIPTION OF TEST FACILITIES & CONDITIONS:**

Testing is performed in controlled (temperature, illumination level and photoperiod) environment rooms adjacent to the daphnia culture area. Test vessels are 250 mL borosilicate glass beakers covered with plastic Petri® dish lids. Ten neonates are introduced in 200 mL of test solution per test vessel to achieve 20 mL of solution per daphnid.

Aeration: There is no aeration of the test vessels during the 48 hour test period.

pH adjustment: The samples are normally lested without pH adjustment. However, if both pH-adjusted and non-adjusted tests are run, a description of the pH adjustment procedure will be found in the NOTES section below.

#### **PROTOCOL USED:**

Tests are performed following our laboratory Standard Operating Procedures (SOPs) and where appropriate, the Environment Canada Biological Test methods, Report EPS 1/RM/11 July, 1990, amended May, 1996 and Reference Method EPS 1/RM/14 Second Edition - December 2000. Test organism "good husbandry practices" followed are also described in our laboratory SOPs.

SOP or TEST METHOD DEVIATION DETAILS:
/
REFERENCE TOXICANT: Chemical used: Nacl (Sodium Chloride) Date of test: Oct 12/05
48 hr (Static) LC50 = $5.9 g/L$ concentration. [95% confidence limits: $5.2g/L & 6.7g/L$ ]
Historic geometric mean (n = <u>20</u> ) LC50 and warning limits (±2SD): <u><math>5.9_3/L</math> (± 0.2<math>g/L</math>)</u>
· · · · · · · · · · · · · · · · · · ·
ANALYSIS RESULTS: E Final D Preliminary D Special, See below
48 hr (Static) LC50 =& concentration. [95% confidence limits:&]
Where the median lethal concentration (LC50) is the concentration of material in water that is calculated to be lethal to 50% of the lest organisms over an exposure period of 48 hours.
48 hr (Static) LT50 = Not Ac tely Lethal at 100% concentration. [95% contidence limits: &]
Where the median lethal time (LT50) is the period of exposure calculated to be lethal to 50% of the test organisms held in a particular test solution.
Mean percentage mortality at 100% sample concentration:%
The statistical method used was:
The CETIS 1.1.1 computer program by Tidepool Scientific Software 2005 was used to calculate the test result.
Status of Control daphnia: No mortalities normal behavior
Mean percentage mortality in the Control: $ 20 $ %
NOTES:
i
Testing was subcontracted (with authorization) to:
ANALVET. PR-10 0. Dela Martzart
AIVALTOI Date
HESULIS VEHIFIED BY: ////// Date //////

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November 2, 2005

Folder: 200501229

Mr. Grant Schroeder, Analyst Environmental Toxicology Section Pacific Environmental Science Centre 2645 Dollarton Hwy North Vancouver, BC, V7H 1B1

#### Subject: Legal Analysis, Morning Star Nurseries

**General:** The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Grant Schroeder on October 4, 2005:

#### 200501229 129120-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 2 MORNING OCT. 3/05\_1425 HRS UF/UP AS" plus other markings.

#### 200501229 129121-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "3 MORNING OCT. 3/05 1430 HRS UF/UP AS" plus other markings.

The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Craig Buday on October 4, 2005:

#### 200501229 129123-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 5 MORNING OCT. 3/05 1810 HRS UF/UP AS" plus other markings.

#### 200501229 129124-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 6 MORNING OCT 3/05 1810 HRS UF/UP AS" plus other markings.

#### Purpose:

- To analyse Sample 200501229 129120-1 and Sample 200501229 129123-1 for the presence of Petroleum Hydrocarbons.
- To identify the type(s) of any Petroleum Hydrocarbons found in Sample 200501229 129120-1 and Sample 200501229 129123-1.
- To analyse Sample 200501229 129121-1 and Sample 200501229 129124-1 to determine the concentration of Oils & Greases and Hydrocarbons.

Document \_\_\_\_\_ of 2

Page 1 of 2 OB

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**Procedure:** The samples were analysed for:

- Petroleum Hydrocarbons using High Résolution Gas Chromatography with Flame Ionization Detection (HRGC-FID) in accordance with PESC Hydrocarbons & Petroleum Products Identification Method V 3.5.
- Oils & Greases and Hydrocarbons using Infrared Spectrophotometry (IR) guided by PESC Oils & Greases and Hydrocarbons Method V 3.1.

#### **Results:**

#### **Petroleum Hydrocarbons Identification Results**

Note: All nC hydrocarbon designations represent approximate ranges and not absolute values.

- Sample 200501229 129120-1 provided a "HRGC-FID" pattern characteristic of Petroleum Hydrocarbons predominantly within the range of Diesel fuel (with a hydrocarbon range from nC-9 to nC-24).
- Sample 200501229 129123-1 did not provide a "HRGC-FID" pattern characteristic of Petroleum Hydrocarbons.

#### Table 1: Oils & Greases and Hydrocarbons Results\*

Parameter	200501229 129121-1 (mg/L)	200501229 129124-1 (mg/L)
Oils & Greases (O&G)	985,000	<0.5
Hydrocarbons (HC)	985,000	<0.5

\*Note:

 The "<" indicates that no determined amount was found above the Method Detection Limit (MDL) or Limit of Quantitation (LOQ) shown.

#### Conclusions:

- Sample 200501229 129120-1 contains Petroleum Hydrocarbons.
- The Petroleum Hydrocarbons found in Sample 200501229 129120-1 provided a chromatogram characteristic of Diesel fuel and were within the range of standards currently in use at PESC. Other types of fuels such as Furnace oil or mixtures of fuels may also fall within the Hydrocarbon range of this sample.

Remarks:

The samples were conveyed to Mr. Grant Schroeder.

Oxana Blajkevitch, Analyst Chemistry Section Phone: (604) 924-2595 Fax: (604) 924-2555

Page 2 of 2

November 2, 2005

Folder: 200501229

Mr. Grant Schroeder, Analyst Environmental Toxicology Section Pacific Environmental Science Centre 2645 Dollarton Hwy North Vancouver, BC, V7H 1B1

#### Subject: Legal Analysis, Morning Star Nurseries

**General:** The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Grant Schroeder on October 4, 2005:

#### 200501229 129120-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 2 MORNING OCT. 3/05\_1425 HRS UF/UP AS" plus other markings.

#### 200501229 129121-1:

A two layer liquid comprised of a small opaque upper layer and a large semi-clear lower layer having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "3 MORNING OCT. 3/05 1430 HRS UF/UP AS" plus other markings.

The following were received at the Pacific Environmental Science Centre (PESC) from Mr. Craig Buday on October 4, 2005:

#### 200501229 129123-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 5 MORNING OCT. 3/05 1810 HRS UF/UP AS" plus other markings.

#### 200501229 129124-1:

A clear liquid having settled particulate, in a one litre cylindrical amber glass container having a white plastic screw closure, sealed with initialled tape. The container was almost full and inscribed "# 6 MORNING OCT 3/05 1810 HRS UF/UP AS" plus other markings.

#### Purpose:

- To analyse Sample 200501229 129120-1 and Sample 200501229 129123-1 for the presence of Petroleum Hydrocarbons.
- To identify the type(s) of any Petroleum Hydrocarbons found in Sample 200501229 129120-1 and Sample 200501229 129123-1.
- To analyse Sample 200501229 129121-1 and Sample 200501229 129124-1 to determine the concentration of Oils & Greases and Hydrocarbons.

Document \_\_\_\_\_ of 2

Page 1 of 2 <u>*OB*</u> MOE-2014-00237 Page 111

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**Procedure:** The samples were analysed for:

- Petroleum Hydrocarbons using High Résolution Gas Chromatography with Flame Ionization Detection (HRGC-FID) in accordance with PESC Hydrocarbons & Petroleum Products Identification Method V 3.5.
- Oils & Greases and Hydrocarbons using Infrared Spectrophotometry (IR) guided by PESC Oils & Greases and Hydrocarbons Method V 3.1.

#### **Results:**

#### **Petroleum Hydrocarbons Identification Results**

Note: All nC hydrocarbon designations represent approximate ranges and not absolute values.

- Sample 200501229 129120-1 provided a "HRGC-FID" pattern characteristic of Petroleum Hydrocarbons predominantly within the range of Diesel fuel (with a hydrocarbon range from nC-9 to nC-24).
- Sample 200501229 129123-1 did not provide a "HRGC-FID" pattern characteristic of Petroleum Hydrocarbons.

#### Table 1: Oils & Greases and Hydrocarbons Results\*

Parameter	200501229 129121-1 (mg/L)	200501229 129124-1 (mg/L)
Oils & Greases (O&G)	985,000	<0.5
Hydrocarbons (HC)	985,000	<0.5

\*Note:

 The "<" indicates that no determined amount was found above the Method Detection Limit (MDL) or Limit of Quantitation (LOQ) shown.

#### Conclusions:

- Sample 200501229 129120-1 contains Petroleum Hydrocarbons.
- The Petroleum Hydrocarbons found in Sample 200501229 129120-1 provided a chromatogram characteristic of Diesel fuel and were within the range of standards currently in use at PESC. Other types of fuels such as Furnace oil or mixtures of fuels may also fall within the Hydrocarbon range of this sample.

Remarks:

The samples were conveyed to Mr. Grant Schroeder.

Oxana Blajkevitch, Analyst Chemistry Section Phone: (604) 924-2595 Fax: (604) 924-2555

Page 2 of 2

# **Document Transmittal**



Suite 250 – 1380 Burrard Street Vancouver, B.C., V6Z 2H3 Telephone: (604)669-0424 FAX: (604)669-0430

To: BC Minist	ry of Environment		DATE	: Novembe	r 22, 2005							
ATTENTION: ]	Mr. Greg Kanya		OUR	FILE: 647-001.0	1							
			PAGE	: 1/1	A							
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Project Director:	Jolui Taylor		Project Mana	iger: Stefan Quaglia	Xen							
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# Please sign Transmittal and return VIA Mail or Facsimile to Hemmera

**RECEIVED BY:** 

Date:



November 21, 2005 File: 647-001.01 Ministry File: DGIR501860

Morning Star Nurseries Ltd. 1350 176<sup>th</sup> Street Surrey, BC V3S 9S7

#### Attention: Mr. Peter Denhaam

Dear Mr. Denhaam,

## RE: Post-Spill Investigation and Monitoring 1350 & 1380 176<sup>th</sup> Street, Surrey, BC

On the morning of October 4<sup>th</sup>, 2005, Hemmera Envirochem Inc. (Hemmera) was retained' by Morning Star Nurseries Ltd. (Morning Star) to provide guidance during the course of an emergency spill clean up. The following letter provides a summary of steps taken to address the off-site migration of fuel oil, monitoring results and recommendations. The letter comprises the following sections:

Section 1	Background
Section 2	Initial Assessment – October 4, 2005
Section 3	Post-Emergency Program
Section 4	Follow-up Assessment and Rationale
Section 5	Results
Section 6	Discussion
Section 7	Conclusions and Recommendations

# 1.0 BACKGROUND

A release occurred on or shortly after the evening of September 30<sup>th</sup>, 2005 when a valve was accidentally left open during the transfer of fuel oil (No. 2 Fuel Oil) from a main tank to an auxiliary tank. Between 1000 and 6000 litres of fuel oil was released in the vicinity of the boiler room until the valve was shut on the morning of October 3<sup>rd</sup>, 2005. The fuel oil (product)



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migrated from the release location primarily via a network of drain tile beneath the southwest corner of the greenhouses at 1380 176<sup>th</sup> Street and east along drain tile/storms sewer lines towards a ditch. An emergency spill response ensued, involving several parties, to recover product from the ditch and to halt the discharge of product into the ditch. Morning Star Nurseries provided a detailed statement describing these events to Mr. Jack Trudgian, Conservation Officer with the BC Ministry of Environment.

# 2.0 INITIAL ASSESSMENT – OCTOBER 4, 2005

On October 4<sup>th</sup>, 2005 Hemmera conducted an initial walk-through of the affected area beginning at the release site, along the drain tile to the ditch and downstream to Sam Hill Creek. Observations suggested that product entered the ditch from a single discharge pipe and was transported downstream towards Sam Hill Creek.

The discharge pipe at the ditch had been blocked with a 90° elbow and a total of six sandbag berms functioning as product skimmers had been installed on the ditch and Sam Hill Creek. The berms served to slow the downstream movement of product and to facilitate in its collection.

The ditch conveys water a distance of approximately 475 metres before discharging into the creek. The ditch channel is constrained between well-defined banks with a gradually increasing gradient toward Sam Hill Creek. Ditch substrates consist of mixed gravelly fines with some organic detritus. From the ditch confluence, Sam Hill Creek conveys water approximately 930 metres eastwards before discharging into the Little Campbell River. The channel of the creek is wider with slower moving water and substrates have a high proportion of silty fines and organic material. At approximately 100 metres from the ditch/creek confluence, Sam Hill Creek becomes a wet grassy depression between two pasture fields with the channel as wide as 50 metres in places. These waterbodies are depicted in relation to the release location on Figure 1.

A rapid watercourse assessment showed that evidence of surface oiling was present in the ditch from the discharge pipe to Sam Hill Creek (approx. 475 metres), and in the creek from the confluence to approximately 130 metres downstream. Qualitative stream oiling observations in the ditch and creek are provided in Table 1. Product recovery efforts (i.e. use of skimmer berms and absorbent pads/booms) in combination with the shallow gradient of Sam Hill Creek limited migration of product further downstream. On October 4<sup>th</sup>, surface oiling ranged from a visible

-2-

layer of oil in the ditch near the point of discharge, to a thin layer of brown mousse with strong diesel-like odours at the confluence of the ditch and creek (Photo 1), to coloured sheens with no odours at the most downstream extent. A sixth and last boom was installed in the creek downstream of the last evidence of product as a preventative measure (Photo 2). Substrate oiling on the banks of the ditch and creek appeared limited and was characterized by thin films and sheens.

-3-

Sediment and surface water samples were obtained at various locations along the ditch and creek for analysis of petroleum hydrocarbons associated with diesel-type fuels. Samples were collected in order to characterize potentially affected downstream locations. Sampling was conducted according to BC field sampling guidance<sup>1</sup>. A total of seven sediment/bank soil samples and six surface water samples were collected along the ditch and creek. Sediment samples were analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), volatile petroleum hydrocarbons (VPH), light and heavy extractable petroleum hydrocarbons (LEPH/HEPH) and polycyclic aromatic hydrocarbons (PAH). Sediments appeared to contain naturally occurring organics, which can interfere with analysis of petroleum hydrocarbons and cause false positive results; therefore, a silica-gel cleanup method<sup>2</sup> was requested for LEPH/HEPH. Sampling locations are shown on Figures 2 and 3.

# 3.0 POST-EMERGENCY PROGRAM

By end of day, October 4<sup>th</sup>, 2005 Morning Star developed a plan to install a temporary oil/water separator. Construction of the temporary oil/water separator was completed on October 5<sup>th</sup>, 2005.

A post-emergency plan was discussed with Morning Star, which included the following tasks, in order of priority:

 Continue product recovery efforts in the ditch and Sam Hill Creek by monitoring the effectiveness of absorbent pads/booms at the six skimmer berms. A summary of these on-going activities is not provided in this report.

<sup>&</sup>lt;sup>1</sup> BC Ministry of Water, Land and Air Protection. January 2003. British Columbia Field Sampling Manual – For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples. Water, Air and Climate Change Branch.

<sup>&</sup>lt;sup>2</sup> Examples of naturally occurring organics removed by silica-gel include lipids, plant oils, tannins, lignins, animal fats, proteins, humic acids, fatty acids, and resin acids.

- 2. Collect surface water samples to momitor ditch and creek water quality to determine potential impacts, if any, on downstream receptors including aquatic life (fisheries resources) and drinking water for cattle on a nearby farm. The location and rationale of surface water sampling is provided in Section 4.
- 3. Monitor stormwater discharging from the site to determine whether it is compliant with the applicable surface water guidelines set out by the BC Ministry of Environment. The location and rationale of stormwater effluent sampling is provided in Section 4.

# 4.0 FOLLOW-UP ASSESSMENT AND RATIONALE

Hemmera visited the site on October 6<sup>th</sup>, at which point the temporary oil/water separator had been installed and storm/groundwater was being discharged to the ditch. The separator consisted of a three-stage skimmer system fabricated within a poly-lined trench.

Surface water samples were obtained from four of the previously sampled locations in the ditch and creek, with concentration on downstream locations (SW01, SW02 and SW03) and one upstream reference location (SW07). In addition, an effluent sample (EFF01) was collected from the pipe discharging to the ditch.

The following day (October 7<sup>th</sup>) the surface water was sampled and then again one week later (October 14<sup>th</sup>) to provide a total of four monitoring events. The frequency of the monitoring events aimed to sample often (three times in four days) soon after the initial release when petroleum hydrocarbon concentrations could potentially be high, and then again one week later to assess whether concentrations were attenuating over time. Table 2 describes the locations and rationale of each sediment and surface water sample. On October 14<sup>th</sup> surface water was collected from an additional location, SW08, further downstream of SW01 towards the Little Campbell River (see Figure 3).

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Ţ	Sam	ples	Description	Rationale
Ī	Sediment	Water		
dowastream	-	SW08	Sam Hill Creek approx. 750 metres downstream of confluence	Obtained on Oct. 14 <sup>th</sup> in response to elevated concentrations at SW01
	SED01	SW01	Sam Hill Creek approx. 320 m downstream of confluence, between pasture fields	Approximate location where cattle drink from creek
	SED02	SW02	Sam Hill Creek approx. 130 m downstream of confluence, and downstream of last boom	Immediately downstream of last evidence of product
	SED03	SW03	Sam Hill Creek at confluence of ditch	Beginning of affected portion of Sam Hill Creek
	SED04	-	Sam Hill Creek at confluence of ditch	Blind field duplicate of SED03
	SED08	-	Sam Hill Creek approx. 20 m upstream of confluence	Upstream creek reference sample
	SED05	SW05	Ditch approx. 15 m downstream of 12 <sup>th</sup> Ave and downstream of 4 <sup>th</sup> skimmer berm	Ditch sample to determine effectiveness of ditch skimmer berms
discharge	-	EFF01	Ditch at discharge pipe	Stormwater effluent flowing into ditch
Ţ	SED06	SW06	Ditch approx. 5 m upstream of discharge pipe	To determine if ditch was affected immediately upstream of discharge
upstream	SED07	SW07	Ditch approx. 60 m upstream of discharge pipe	Upstream ditch reference sample

## Table 2. Description and Rationale for Sampling Locations

-5-

Additional information was required regarding off-site fisheries resources and toxicity information for downstream cattle in order to accomplish Tasks 2 and 3 above. Fisheries habitat information was researched through online databases to determine the value of the ditch and creek as fish habitat, particularly with respect to fish presence and potential spawning habitat. The available fish habitat information is necessary to help focus monitoring efforts to priority areas without conducting a detailed stream survey. Also, since standard or criteria specific to the protection of livestock drinking water have not been established, health-based drinking water

concentrations were developed for the protection of downstream cattle. This information is provided in the following section.

# 5.0 RESULTS

## **Fisheries Resources**

The City of Surrey's Mapping Online System<sup>3</sup> indicates that north of 12<sup>th</sup> Avenue, the ditch is classified as being inhabited or potentially inhabited by salmonids only during the overwintering period [Class A(O) stream]. The ditch south of 12<sup>th</sup> Avenue and Sam Hill Creek are classified as being inhabited or potentially inhabited by salmonid species year-round (Class A stream).

The BC Ministry of Sustainable Resource Management (BC MSRM) Fisheries Information Summary System (FISS) online database<sup>4</sup> indicated that Sam Hill Creek is a fish-bearing stream in which several salmonid and non-salmonid species have been documented. Limited coho salmon spawning has been documented at two locations: a reach upstream and northwest of the ditch/creek confluence around 14<sup>th</sup> Avenue and at a reach approximately 200 metres downstream of 176<sup>th</sup> Street. The second location is near the confluence of the ditch in question and the creek. Observations of the streambed in this portion of the creek indicated that it is characterized silty substrates with little to no gravel deposits and/or riffle-run development. Therefore this section of the creek is not considered good quality spawning habitat. The FISS report also notes that most sections of the creek have silty streambeds limiting spawning habitat but that lower reaches (near the Little Campbell River) have excellent spawning habitat. A potential constraint to fisheries production is disturbance by cattle using adjacent pasture fields that may cross and disturb the streambed, particularly on the lower reaches. Information regarding the ditch was not available from the FISS database.

# Sediment Analytical Results

Sediment analytical results were compared to the BC Contaminated Sites Regulations (CSR) sediment quality criteria for 'typical' and 'sensitive' freshwater sites (see Table 3). Parameters for which sediment criteria are not available (i.e. BTEX, VPH, LEPH/HEPH) were compared to

<sup>&</sup>lt;sup>3</sup> City of Surrey Mapping On-line System, available at http://www.city.surrey.bc.ca

<sup>&</sup>lt;sup>4</sup> MSRM Fisheries Inventory Data Queries accessed from http://srmapps.gov.bc.ca/apps/fidq/main.do

the CSR agricultural land use (AL) soil standards. Concentrations were less than their respective r criteria or standard with the exception of one PAH, 2-methylnapthalene at SED01, with a concentration slightly greater than the CSR sediment criteria for sensitive sites. A review of the data suggests that 2-methylnaphthlene was present at lower concentrations upstream of SED01 and may possibly be attributed to another source or an organic interference.

-7-

The analytical results of a blind field duplicate sediment sample (SED04 duplicate of SED03) suggested that the analytical variability was well within a typically acceptable level for soil and sediment (see Table 3).

## Surface Water Analytical Results

Water quality was monitored at specific locations along the ditch and creek between October 4<sup>th</sup> and 14<sup>th</sup>, 2005 (see Tables 1 and 4). Surface water was monitored at four of the original locations sampled on October 4<sup>th</sup> (SW01, SW02, SW03 and SW07) as well as end-of-pipe effluent samples (EFF01). Blind field duplicates were not collected for surface water. Livestock drinking water criteria/standards have not been set for the majority of analyzed parameters, therefore health-based concentrations (HBCs) specific to domestic cows were developed using a US EPA-style methodology in order to gauge potential health hazards to downstream cattle. HBCs specific to domestic cows were calculated as follows<sup>5</sup>:

where:

$$HBC = \frac{TB \times BW}{IR_{water}}$$

HBC	=	Health-based concentration for drinking water ( $\mu$ g/L);
ГВ	=	Toxicological benchmark (µg/kg/day);
BW	=	Body weight (kg); and
IR <sub>water</sub>	=	Ingestion rate of water (L/day).

Surface water analytical results were also compared to the BC Water Quality Guidelines for the protection of fresh water aquatic life  $(AW_{FW})$ .

<sup>&</sup>lt;sup>5</sup> Where toxicity data was available, HBCs were estimated by conservatively assuming livestock receptor was a heifer cow weighing 300 kg and consuming water at a rate of 60 L/day.

Qualitative observations and analytical results for surface water indicated that liquid phase hydrocarbon (product) and dissolved concentrations steadily decreased over the period of October 4<sup>th</sup> to 14<sup>th</sup>, 2005. Visual and olfactory evidence of hydrocarbons in the ditch and creek decreased from floating product and strong petroleum hydrocarbon odours in places, to no perceivable petroleum hydrocarbons in most places (Table 1). The most recent observations taken on November 1<sup>st</sup>, 2005 revealed evidence of a thin product film and odours at the ditch near the stormwater pipe but not at locations further downstream. Analytical results indicate that petroleum hydrocarbon concentrations did not exceed the HBCs derived for cattle drinking water between October 4<sup>th</sup> and October 14<sup>th</sup> (Table 4).

On October 4<sup>th</sup>, constituents including  $EPH_{10-19}/LEPH^6$ , naphthalene, phenanthrene, anthracene and pyrene exceeded the  $AW_{FW}$  guidelines downstream of the discharge. Upstream samples (SW06 and SW07) showed that background concentrations in the ditch were below the reported detection limits. By October 14<sup>th</sup> concentrations in downstream ditch and creek samples were less than the reported detection limits including at an additional downstream location closer to the Little Campbell River (SW08).

# 6.0 **DISCUSSION**

Much of the clean up efforts have concentrated on product recovery from the ditch and Sam Hill Creek and with source control. A temporary oil/water separator system has been installed on-site to control further discharge of petroleum hydrocarbons to the ditch. It is understood that plans include the replacement of this infrastructure with a permanent pre-cast oil/water separator.

The results of qualitative observations and chemical analysis indicate that the results of the offsite emergency cleanup efforts appear to have substantially contributed in the attenuation of petroleum hydrocarbon concentrations in the water of the ditch and Sam Hill Creek. Surface water monitored between October 4<sup>th</sup> and November 1<sup>st</sup> at established locations suggests that qualitative evidence of product and dissolved hydrocarbon concentrations have attenuated to appropriate levels. The majority of the petroleum hydrocarbon attenuation in surface water had taken place within one week of the release (by October 7<sup>th</sup>, 2005).

<sup>&</sup>lt;sup>6</sup> Water quality guidelines are not available for  $VH_{6-10}$ , VPH, EPH<sub>10-19</sub> and LEPH therefore they were compared to their respective CSR AW<sub>FW</sub> groundwater standards divided by a factor of 10 to remove an implied groundwater-to-surface water allowance for dilution.

Results from seven sediment samples obtained on October 4<sup>th</sup>, soon after the product release, were generally within criteria set for the protection of sensitive freshwater sites. Potential off-site contamination related to the release may remain in some portions of the ditch and/or creek. Since petroleum hydrocarbons tend to bind readily to organic carbon-rich sediments, it is recommended that ditch/creek sediment quality be assessed in areas that have not been sampled. Sediment sampling should focus on ditch locations (between SED05 and SED06) where product was able to pool (such as behind skimmer berms), and the lower reaches of Sam Hill Creek with potential salmonid spawning habitat.

Residents downstream of the release site that live adjacent to the ditch (17683 12<sup>th</sup> Avenue) have reported lingering petroleum hydrocarbon odours (see Figure 1). The source of this odour is presently unclear, but appears related to minor drips and spills that occurred on an asphalt driveway by the emergency spill response crew. The source of odours on this property, if still present, should be assessed, and if necessary, remedied.

Since an emergency spill was reported it is understood that a subsequent notice of independent remediation is not required in accordance with Section 57(2) of the *Contaminated Sites Regulation*.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the decreasing trend in petroleum hydrocarbon concentrations in surface water, the potential for adverse effects to aquatic life present in the water column of the ditch and/or creek is considered low. The sediment characterized to date suggests that effects to benthic organisms in the ditch and creek are also low; however, streambed substrates have not been characterized at all reaches of the ditch and at potential fish-spawning habitat in the lower reaches of Sam Hill Creek. In addition, the source and concentration of petroleum hydrocarbon odours at 17683 12<sup>th</sup> Avenue, south of the site, has not been characterized. It is recommended that the following tasks be considered at this stage:

1. Continue monitoring stormwater effluent discharging from the site to the creek to document the effectiveness of the oil/water separator, particularly during and after significant rain events.



- 2. Collect sediment along the ditch and creek at locations not previously sampled to determine whether sediments are potentially contributing a residual source of petroleum hydrocarbons. Sediment sampling should focus on locations where product was able to pool (such as behind skimmer berms) and at the potential fish-spawning habitat on lower reaches of Sam Hill Creek.
- Assess and possibly remedy the source of petroleum hydrocarbon odours at 17683
   12<sup>th</sup> Avenue located downstream of the site particularly where product recovery efforts were taking place during the emergency spill response.

The above recommendations are specific to off-site areas. The on-site property (1350 & 1380  $176^{th}$  Street) is being remediated under the independent remediation process.

We trust that this provides you with the information required to proceed with the recommended tasks. Feel free to contact our office with any questions you may have.

Yours truly,

### HEMMERA ENVIROCHEM INC.

John R. Taylor, P.E.

Project Manager

Stefan Quaglia, B.Sc. Risk Assessor

#### Attachments:

Figure 1. Site Location Plan
Figure 2. Sediment Sampling Location Plan
Figure 3. Surface Water Sampling Location Plan
Table 1. Summary of Observations at Surface Water Sampling Stations
Table 3. Sediment Analytical Results
Table 4. Surface Water Analytical Results
Photographs
Analytical Laboratory Reports

Cc: Mr. Grey Kanya, Ministry of Environment, Surrey office

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# 8.0 STATEMENT OF LIMITATIONS

This report ("Report") was prepared by Hemmera Envirochem Inc. ("Hemmera"), for the sole benefit and exclusive use of Morning Star Nurseries Ltd. and the BC Ministry of Environment. The material in it reflects Hemmera's best judgement in light of the information available to them at the time of preparing the Report. Any use that a third party makes of this Report, or any reliance on or decision made based on it, are the responsibility of such third parties. Hemmera accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this Report.

-11-

Hemmera has made the findings and conclusions set out in this Report in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession practising under similar conditions at the time the work was performed.

This Report was prepared by Hemmera for Morning Star Nurseries Ltd., and represents a reasonable review of the information available to Hemmera given the work schedule and budgetary constraints. It is therefore possible that currently unrecognised contamination or potentially hazardous materials may exist at the site(s) and that the levels of contamination or hazardous materials may vary across the site(s). No warranty, expressed or implied, is given concerning the presence or level of contamination on the site. The conclusions and recommendations contained in this Report are based upon applicable legislation existing at the time the Report was drafted and changes in the legislation may alter the conclusions and/or recommendations. Further, any discussion of regulatory implications is based on the applicable legislation existing at time of drafting the Report.

In preparing this Report, Hemmera has relied in good faith on information provided by others as noted in this Report, and has assumed the information provided by those individuals is both factual and accurate. Hemmera accept no responsibility for any deficiency, misstatement or inaccuracy in this Report resulting from the information provided by those individuals.

The liability of Hemmera to Morning Star Nurseries Ltd. shall be limited to injury or loss caused by the negligent acts of Hemmera. The total aggregate liability of Hemmera related to this agreement shall not exceed the lesser of the actual damages incurred, or the total fee of Hemmera for their services rendered on this project.

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LI HEMMERA	Post-Spill Investigation and Monitoring 1350 & 1380 176 <sup>th</sup> Street, Surrey, BC								
Client: Morning Star Nurseries Ltd.	Surfa	ace Water Sampling	g Location Plan						
Scale: (approx.) 1:5,000	Project No. 647-001.01	November 2005	Figure 3						

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# Table 1. Summary of Observations at Surface Water Sampling Stations(Morning Star Nurseries Ltd.,1350-1380 176th Street, Surrey, BC)

		Sampling Date													
Sampling Station	4-Oct-05	6-Oct-05	7-Oct-05	14-Oct-05	1-Nov-05										
SW8	-	-	-	no product; no odour	· _										
SW1	no product; no odour	по product; ло odour	no product; no odour	no product; no odour	no product; no odour										
SW2	minor sheen; no odour	very minor sheen; no odour	no product; no odour	no product; no odour	no product; no odour										
SW3	brown product mousse; hydrocarbon odour	brown product mousse; hydrocarbon odour	thin product film; mild hydrocarbon odour	thin product film on south banks; no odour	no product; no odour										
SW5	flowing water - cloudy; hydrocarbon odour	thin brown mousse product; mild hydrocarbon odour	thin product film; hydrocarbon odour	no product; no odour	no product; no odour										
EFF01	visible layer of product on surface; strong hydrocarbon cell	sheen present; strong hydrocarbon odour	brown product mousse; hydrocarbon odour	thin product film on banks; mild hydrocarbon odour	• thin product film; mild hydrocarbon odour										
SW6	sheens on banks; hydrocarbon odour	sheens on banks; hydrocarbon odour	-	-	-										
SW7	no product; no odour	no product; no odour	no product; no odour	no product; no odour	no product; no odour										

- = observations not made

#### Table 3. Sediment Analytical Results (Morning Star Nurseries Ltd., 1350-1380 176th Street, Surrey, BC)

Sample ID         SectO2s Bearth         SectO4         SED04         SED03         of SED04         SE		CSR	CSR				SED04 (dup				/
Date Sampled         948s         sites         04-Oct-05         04-O	Sample ID	SedQC <sub>sca</sub> Sensitive	SedQC <sub>TC9</sub> Typical	SED01	SED02	SEDGS	of SED03)	SED06	SED06	SED07	SED08
Physicial Tests         NS         NS         NS         73.1         74.2         46.2         46.7         57.1         37.0         47.5         39.0           Midatas         MS         NS         NS         106         -40.060         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040	Date Sampled	sites	sites	04-Oct-05	04-Oct-05	04-Oct-05	04-Oct-05	04-Oct-05	04-Oct-05	04-Oct-05	04-Oct-05
Pipylactar         Image: Constraint of the second sec						3	<u>-</u>				
Missions %         NS         NS         73.1         74.2         46.2         46.7         37.1         37.0         47.5         39.0           Non-Hatogenated Voltilies         NS         00.080         <0.080	Physical Tests										
Non-Habegenated Voltables         Image: Constraint of the second se	Moisture %	NS	NS	73.1	74.2	46.2	46.7	37.1	37.0	47.5	39.0
Beruzane         NS         10a         0.0800         <0.080         <0.040         <0.040         <0.040         <0.040         <0.040           Eltlybenzone         NS         0.000a         <0.10	Non-Halogenated Volatiles										1
Ehybonzone         NS         6000a         -0.10         -0.10         -0.050 <td>Benzene</td> <td>NS</td> <td>10a</td> <td>&lt;0.080</td> <td>&lt;0.060</td> <td>&lt;0.040</td> <td>×0,040</td> <td>&lt;0.040</td> <td>&lt;0,040</td> <td>&lt;0,040</td> <td>&lt;0.040</td>	Benzene	NS	10a	<0.080	<0.060	<0.040	×0,040	<0.040	<0,040	<0,040	<0.040
Symme         NS         0.1a         <0.10         <0.10         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050	Ethylbenzene	NS	601X0a	<0.10	<0,10	<0.050	<0.050	<0.050	<0.060	<0.050	<0.050
Tellurene         NS         40a         q.0,10         0.13         0.072         0.062         40,050         40,050         40,050           meta-B para-Xylene         NS         NS         40,10         -0,10         -0,050         -100	Styrene	NS	0.1a	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
meters bytens         NS         NS         v0.10         v0.000         v0.050         v0.050 <td>Toluane</td> <td>NS</td> <td>40a</td> <td>&lt;0.10</td> <td>0.13</td> <td>0.072</td> <td>0.062</td> <td>&lt;0.050</td> <td>&lt;0.050</td> <td>&lt;0.050</td> <td>&lt;0.050</td>	Toluane	NS	40a	<0.10	0.13	0.072	0.062	<0.050	<0.050	<0.050	<0.050
ortico-Xylene         NS         NS         Q1.0         Q1.0         Q0.00         Q0.50         Q0.60         Q0.60 <th< td=""><td>meta- &amp; para-Xylene</td><td>NS</td><td>NS</td><td>&lt;0,10</td><td>&lt;0.10</td><td>&lt;0.050</td><td>&lt;0.050</td><td>&lt;0.050</td><td>&lt;0.050</td><td>&lt;0.050</td><td>&lt;0.050</td></th<>	meta- & para-Xylene	NS	NS	<0,10	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes         NS         NS  <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <         <<	ortho-Xylene	NS	NS	<0.10	<0.10	<0,050	<0.050	<0.050	<0.050	<0.050	<0.050
Volatile Hydrocarbons (VH <sub>810</sub> )         NS         NS         C100         C100 <t< td=""><td>Total Xylenes</td><td>NS</td><td>NS</td><td>&lt;0.20</td><td>⊲0.20</td><td>&lt;0.10</td><td>&lt;0.10</td><td>⊲0.10</td><td>&lt;0.10</td><td>&lt;0,10</td><td>&lt;0.10</td></t<>	Total Xylenes	NS	NS	<0.20	⊲0.20	<0.10	<0.10	⊲0.10	<0.10	<0,10	<0.10
VPH         NS         200a         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <100         <1	Volatile Hydrocerbans (VH <sub>s-to</sub> )	NS	NS	<100	<100	<100	<100	<100	<100	<100	<100
Polycyclic Anomatic Hydrocarbons         v         <	VPH	NS	200a	<100	<100	<100	<\$00	<100	<100	<100	<100
Acenaphiltene         0.055         0.11         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.040         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.	Polycyclic Aromatic Hydrocarbons										·
Acenaphihylene         0.08         0.15         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.	Acenaphthene	0,055	0.11	<0.040	<0.040	<0,040	<0.040	<0.040	<0.040	<0,040	≪0,04Ω
Anthracene         0,15         0,29         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050         <0,050<	Acenaphthylene	0,08	0,15	<0.050	<0.050	<0.050	<0,050	<0,050	<0.050	<0.050	<0.050
Benz(a)anthracene         0.24         0.46         <0.050         0.056         <0.050         <0.050         0.146         <0.050         <0.050         <0.050           Benz(a)pyrene         0.48         0.48         0.04         <0.050	Anthracene	0,15	0.29	<0.050	-0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0,050
Benzo(a)pyrene         0.48         0.94         <0.050         0.069         <0.050         <0.050         0.137         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.05	Benz(a)anthracene	0.24	0.46	<0,050	0.056	<0.050	<0.050	0.146	<0.050	<0.050	<0.050
Benzo(b)fluoranthane         0.24b         NS         0.08         0.14         <0.050         <0.050         0.197         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.	Benzo(a)pyrene	0.48	0.94	<0.050	0.069	<0.050	<0.050	0.137	<0.050	<0,050	<0,050
Benzo(g,h,i)perylene         0.17b         NS         0.052         0.11         <0.050         <0.050         0.086         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0	Benzo(b)fluoranthene	0.240	NS	0.00	0,14	<0.050	<0.050	0.197	<0.050	<0.050	<0,050
Benzo(k)#uoranthene         0.24b         NS         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050 <th< td=""><td>Benzo(g,h,i)perylene</td><td>0.17b</td><td>NS</td><td>0.052</td><td>0.11</td><td>×0,050</td><td>&lt;0.050</td><td>0.086</td><td>&lt;0.050</td><td>&lt;0.050</td><td>&lt;0.050</td></th<>	Benzo(g,h,i)perylene	0.17b	NS	0.052	0.11	×0,050	<0.050	0.086	<0.050	<0.050	<0.050
Chrysene         0.53         1         0.06         0.096         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050	denzo(Kituoranthene	0.24b	NS	<0.050	<0,050	×0,050	<0.050	0.072	<0.050	<0.050	<0.050
Dibenz(s,h)antifracene         0.084         0,16         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050	Chrysene	0.53	1	0.06	0.096	×0,050	<0.050	0,169	<0.050	<0.050	<0.050
Fluorenthene         1.5         2.9         0.075         0.13         <0.050         0.054         0.340         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050	Dibenz(ā,h)anihracene	0.084	0,16	<0.050	⊲0.050	<b>&lt;0,050</b>	<0.050	<0,050	<0,050	<0.050	<0.050
Fluorene         0.089         0.17         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050 </td <td>Fluxranthene</td> <td>1.5</td> <td>2.8</td> <td>0.079</td> <td>0.13</td> <td>&lt;0.050</td> <td>0.054</td> <td>0,340</td> <td>&lt;0.050</td> <td>&lt;0.050</td> <td>&lt;0.050</td>	Fluxranthene	1.5	2.8	0.079	0.13	<0.050	0.054	0,340	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene         0.20b         NS         <0.050         0.073         <0.050         <0.050         0.099         <0.050         <0.050         <0.099         <0.050         <0.050         <0.099         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <	Fluorene	0.089	0.17	<0.050	<0,050	<0.050	<0.050	<0.050	<0.050	<0.060	<0.050
2-Methylnaphthalene         02122         0.24         0.19         0.08         <0.050         <0.050         0.073         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0	Indano(1,2,3-o,d)pyrana	0.20b	NS	<0.050	0,073	<0.050	<0.050	0.099	<0,050	<0,060	<0.050
Naphthalene         0.24         0.47         0.055         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050<	2-Methylnaphthaiene	0.12	0.24	0.19	0.08	<0.050	<0.050	0.073	<b>&lt;</b> 0.050	<0.050	≪0.050
Phenanthrane         0.32         0.62         0.663         0.085         <0.050         0.062         0.182         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050         <0.050 <td>Naphthalene</td> <td>0,24</td> <td>0.47</td> <td>0.055</td> <td>⊲0.050</td> <td>&lt;0,050</td> <td>&lt;0,050</td> <td>&lt;0.050</td> <td>&lt;0,050</td> <td>&lt;0.050</td> <td>&lt;0.050</td>	Naphthalene	0,24	0.47	0.055	⊲0.050	<0,050	<0,050	<0.050	<0,050	<0.050	<0.050
Pyrene         0.54         1.1         0.677         0.14         <0.050         0.063         0.297         <0.050         <0.050         <0.050           Extractable Hydrocarbons         Image: Construction of the the the the the the the the the the	Phenanthrene	0.32	0.62	0.063	0.085	<0.050	0,052	0,182	<0.050	<0.050	<0.060
Extractable Hydrocarbons         NS         NS   <	Pyrene	0.54	1.1	0.077	0.14	<0.050	0.063	0.297	<0.050	<0.050	⊲0.050
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Estractable Hydrocarbons	[									
EPH <sub>19-32</sub> NS         NS         410         570         220         230         20	EPH (p.ts	NS	NS	<200	<200	<200	<200	<200	<200	<200	<200
EPH <sub>10-19</sub> (sg)         NS         x200	EPHISAR	NS	NS	410	570	220	230	<200	<200	~200	<200
EPH <sub>1932</sub> (sg)         NS         NS         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200         <200	EPH(10-19 (sg)	NS	NS	<200	<200	<200	<200	<200	<200	<200	<200
LEPH NS 1000a <200 <200 <200 <200 <200 <200 <200	EPH <sub>19-32</sub> (sg)	NS	NS	<200	<200	<200	<200	<200	<200	<200	<200
	LEPH	NS	1000a	<200	<200	<200	<200	<200	<200	<200	<200
HEPH NS 1000a 410 570 220 230 <200 <200 <200 <200	HEPH	NS	1000a	410	570	220	230	<200	<200	<200	<200

#### Footnotes:

Results are expressed as micrograms per g (ug/g) except where noted.

NS = No standard is available for this parameter.

< = Less then the reported detection limit.

CSR SedQC<sub>tres</sub> = Contaminated Siles Regulation Sediment Quality Criteria for Typical Sites (freshwater)

CSR SedOCscs = Contaminated Sites Regulation Sediment Quality Criteria for Sensitive Sites (freshweter)

VPH = Volatile Petroleum Hydrocarbons.

EPH = Extractable Petrolaum Hydrocarbons.

(sg) = Silica get clean-up was performed on sample.

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LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons,

a = Values are from BC CSR soil starklards (Schedules 4 and 5)

b = Values are from Ontario's Low Sediment Screening Benchmarks

#### Table 4. Surface Water Monitoring Results (Morning Star Nurseries Ltd., 1350-1380 176th Street, Surrey, BC)

Sample ID	BC WQG	HBCs for	BC WQG						SW02				SV	SW05	SW06		
	Human	Adult Cow	Aquatic Life													1	
	Drinking	Drinking	(freshwater)														
Date Sampled		Water	(	04-Oct-05	06-Oct-05	07-Oct-05	14-0ct-05	04-Oct-05	06-Oct-05	07-Oct-05	14-Oct-05	04-Oct-05	06-Oct-05	07-Oct-05	14-Oct-05	04-Oc1-05	04-Oct-05
Volatiles														_		1	
Benzene	5	4520	NG	-	< 0.1	< 0,1	< 0.1	- 1	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	· ·	
Ethylbenzene	2.4	2965	200	-	< 0,1	< 0.1	< 0.1	-	< 0.1	< 0,1	< 0.1	-	< 0.1	< 0.1	< 0.1	í -	-
Styrene	NG	11977	NG	-	< 0,1	< 0.1	< 0.1	- 1	< 0.1	< 0.1	≪ 0,1	-	< 0 1	< 0,1	< 0.1	-	-
Toluene	24	6869	39	-	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	-	- 1
Total Xylenes	300	16541	NG	-	1,5	0,3	< 0.1	-	1.4	0.5	< 0.1	-	< 0.1 ·	0.4	< 0.1		-
Volatile Hydrocarbons (VH <sub>46-10</sub> )	15000	3801	1500a	-	< 100	< 100	< 100	-	< 100	< 100	< 100	-	< 100	< 100	150	-	-
VPH.	NG	NA	150a	-	< 100	< 100	< 100	-	< 100	< 100	< 100		× 100	< 100	150	- 1	
Extractable Hydrocarbons	1																
EPH	5000	4874	500a	390	< 250	< 250	< 100	480	× 250	< 250	< 100	2390	740	< 250	< 100	1080	<300
EPH, 18.32	NG	13400	NG	<1000	< 250	< 250	≺ 100	<1000	< 250	< 250	< 100	<1000	310	< 250	< 100	<1000	<1000
LEPH	NG	NA	50a. 🦳	380	< 250	< 250	< 100	470	< 250	< 250	< 100	2370	740	< 250	< 100	1060	<300
HEPH,	NG	NA	NG	<1000	< 250	< 250	<b>× 100</b>	<1000	< 250	< 250	< 100	<1000	310	< 250	< 100	<1000	<1000
Polycyclic Aromatic Hydrocarbons	ſ																
Acenaphthene	NG	2917	5	1.51	0.68	0,23	< 0.1	1,73	0,65	0,40	< 0.1	2.30	0.70	0.13	< 0.1	2.63	<0.05
Acenaphthylene	NG	NA	102b	0.256	< 0.1	< 0.1	< 0.1	0,285	< 0.1	< 0,1	< 0.1	0.411	< 0.1	< 0.1	< 0.1	0.466	<0,05
Acridine	NG	NA	0.5	<0.1	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0,05	<0,5	< 0.05	< 0.05	< 0.05	⊲0,2	<0.05
Anthracene	NG	16667	0.1	0.190	0.280	< 0.01	< 0,01	0.220	0.320	< 0.01	< 0.01	0.572	0.660	< 0.01	< 0,01	0.457	⊲0,05
Benz(a)anthracene	NG	NA	0.1	<0.05	< 0.01	< 0.01	< 0.01	⊲0.05	< 0.01	< 0.01	< 0.01	<0,05	< 0.01	< 0.01	< 0.01	<0.05	<0.05
Benzo(a)pyrene	0.01	NA	0.01	<0.01	< 0.01	< 0.01	< 0,01	<0.01	< 0.01	< 0.07	< 0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.01	⊲0.01
Benzo(b)fluoranthene	NG	NA	0,235	<0,05	< 0.01	< 0.01	< 0.01	<0.05	< 0,01	< 0.01	< 0.01	<0.05	< 0.01	< 0.01	< 0.01	⊲0.05	<0.05
Ввяzo(g,h,i)perylene	NG	NA	0.15b	<0.05	< 0.01	< 0.01	< 0.01	⊲0.05	< 0.01	< 0.01	< 0.01	<0.05	< 0.01	< 0.01	< 0.01	⊲0.05	<0.05
Benzo(k)fluoranthene	NG	NA	0.22b	⊲0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	<0.05
Chrysene	NG	NA .	0.7b	⊲0.05	< 0.01	< 0.01	< 0.01	<0.05	< 0.01	< 0.01	< 0.01	<0.05	< 0.01	< 0.01	< 0.01	<0.05	<0.05
Dibenz(a,h)anthracene	NG	NA	0.16	<0.05	< 0.01	< 0.01	< 0.01	<0.05	< 0.01	< 0.01	< 0.01	<0.05	< 0.01	< 0,01	< 0.01	<0.05	<0.05
Fluoranthene	NG	2083	0,2	⊲0.05	< 0,04	< 0.04	< 0.04	<0.05	< 0.04	< 0.04	< 0.04	0.124	0,140	< 0.04	< 0.04	<0.05	<0.05
Fluorene	NG	2063	12	2.11	1.40	0.47	< 0.05	2.35	1,30	0.67	< 0.05	3.41	1.50	0.25	< 0.05	3.80	<0.05
Indeno(1,2,3-c,d)pyrene	NG	NA	0.09b	<0.05	< 0.01	< 0.01	< 0,01	<0,05	< 0.01	< 0.01	< 0.01	<0.05	< 0.01	< 0.01	< 0.01	<0,05	<0.05
Naphthalene	NG	2187	1	8.40	< 0.3	< 0.3	< 0.3	8.67	< 0.3	< 0,3	< 0.3	8.11	< 0.3	< 0,3	< 0,3	13.5	⊲0.05
Phenanthrene	NG	NA	<b>0,3</b>	3.09	2.30	0.50	< 0,05	3.84	2.60	0.96	< 0.05	9.35	4.70	0.38	< 0.05	6.08	<0.05
Pyrene	NG	1250	0.02	<0.05	0.03	0.02	< 0.02	<0.05	0.03	0.03	< 0.02	0.30	0.140	< 0.02	< 0,02	0.079	<0.05
Quincline	NG	NA	NG	<0.05	< 0.5	< 0,5	< 0,5	<0,06	< 0.5	< 0.5	< 0.5	<0.05	< 0.5	< 0.5	< 0,5	<0.119	<0,05

Footnotes:

Results are expressed as micrograms per litre (ug/L) except where noted

- = Not analyzed for this parameter

< = Less than the reported detection limit

BC WQG = BC Water Quality Guidelines

HBC = Health-based concentration

AW<sub>FW</sub> = Guideline for the protection of heatwaler aquatic life

VPH, = Volatile Petroleum Hydrocarbons in water

EPH. = Extractable Petroleum Hydrocarbons în waler

LEPH<sub>w</sub> & HEPH<sub>w</sub> = Light and Heavy Extractable Petroleum Hydrocarbons in water corrected for PAHs

NG = No guideline for this parameter

NA = No HBC created for this parameter due to limited toxicity data.

a = Values are modified from CSR Schedule 6: (AWey, standard) / 10

b = Values are toxicity reference values currently being proposed by BC MOE

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#### Table 4. Surface Water Monitoring Results (Morning Star Nurseries Ltd., 1350-1380 176th Street, Surrey, BC)

Sample ID	BC WQG	HBCs for	BC WQG		SV	/07		SW08		EFF01	
	Human	Adult Cow	Aquatic Life								
	Drinking	Drinking	(freshwater)								
Date Sampled		Water		04-Oct-05	06-Oct-05	07-Oct-05	14-Oct-05	14-Oct-05	06-Oct-05	07-Oct-05	14-Oct-05
Volatiles											
Benzene	5	4620	NG	-	< 0.1	< 0,1	< 0,1	< 0,1	< 0.1	< 0.1	< 0.1
Ethylbenzene	2.4	2968	200	-	<b>≺</b> 0.1	< 0.1	< 0.1	< 0.1	0.7	< 0.1	< D.1
Styrene	NG	11977	NG	-	< 0.1	< 0.1	< 0,1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	24	6869	39	-	< 0.1	< 0.1	< 0,1	< 0,1	0,8	< 0.1	< 0.1
Total Xylenes	300	16541	NG	-	<b>~ 0.1</b>	< 0.1	< 0.1	< 0,1	B.4	D,3	< 0.1
Volatile Hydrocarbons (VH <sub>e6-10</sub> )	15000	3501	1500a	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100
VPH,	NG	NA	150a	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Extractable Hydrocarbons	1	}		}							
EPH <sub>w10-19</sub>	5000	4674	500a	<300	< 250	< 250	< 100	< 100	1000	450	< 100
EPH	NG	13400	NG	<1000	< 250	< 250	< 100	< 100	390	250	< 100
LEPH,	NG	NA	50a	<300	< 250	< 250	< 100	< 100	1000	450	< 100
HEPH.	NG	NA	NG	<1000	< 250	< 250	< 100	< 100	390	250	< 100
Polycyclic Aromatic Nydrocarbons											
Acenaphthene	NG	2917	6	<0.05	< 0.1	< 0.1	< 0.1	< 0.1	0,95	0,29	< 0.1
Acenaphthylene	NG	NA	1025	<0.05	< 0.1	< 0,1	< 0,1	< 0,1	< 0.1	< 0.2	< 0.1
Acridine	NG	NA	0.5	<0,05	< 0.05	< 0.05	< 0,05	< 0.05	< 0.05	< 0,1	< 0.05
Anthracene	NG	16667	0.1	<0.05	< 0.01	< 0.01	< 0.01	< 0,01	0.65	< 0.02	< 0,01
Benz(a)anthracene	NG	NA	0.1	<0.05	< 0.01	< 0,01	< 0.01	< 0.01	< 0.01	< 0.02	< 0,01
Benzo(a)pyrene	0,01	NA	0.01	-0,01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	NG	NA	0.23b	<0.05	< 0.01	< 0 <u>.</u> 01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01
Benzo(g,h,i)perylene	NG	NA	0,15b	<0.05	< 0.01	< 0.01	10_0 >	< 0.01	< 0.01	< 0.02	< 0.01
Benzo(k)fluoranthene	NG	NA	0.22Ь	<0.05	-	•	-	-	-		-
Chrysene	NG	NA	0.7Ь	<0,05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-< 0.02	< 0.01
Dibenz(a,h)anthracene	NG	NA	0.1b	<0,05	< 0.01	< 0.01	< 0.01	< 0,01	< 0.01	< 0.02	< 0,01
Fluoranthene	NG	2083	0,2	<0,05	< 0.04	< 0.04	< 0.04	< 0.04	0,13	< 0,08	< 0.04
Fluorene	NG	2083	12	<0.05	< 0,05	< 0.05	< 0,05	< 0,05	2	0.63	< 0.05
Indeno(1,2,3-c,d)pyrene	NG	NA	0,09b	<0,05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 010.1
Naphthalene	NG	2187		<0.05	< 0.3	< 0,3	< 0,3	< 0,3	< 0.3	< 0.5	<03
Phenanthrene	NG	NA	0.3	<0.05	< 0.05	< 0.05	< 0.05	< 0,05	4.9	1.3	< 0.05
Pyrene	NG	1250	0.02	<0.05	< 0.02	< 0.02	< 0.02	< 0,02	0.13	0.06	< 0.02
Quinoline	NG	NA	NG	<0.05	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5

#### Footnotes:

Results are expressed as micrograms per litre (ug/L) except where noted

- < Not analyzed for this parameter

 $\prec$  = Less than the reported detection limit

BC WQG = BC Water Quality Guidelines

HBC = Health-based concentration

 $\mathsf{AW}_{\mathsf{FW}}$  = Guideline for the protection of freshwater aquatic life

VPH, = Volatile Petroleum Hydrocarbons in water

 $EPH_w \approx Extractable Petroleum Hydrocarbons in water$ 

LEPH, & HEPH, = Light and Heavy Extractable Petroleum Hydrocarbons in water corrected for PAHs

NG = No guideline for this parameter

NA = No HBC created for this parameter due to limited loxicity data.

a = Values are modified from CSR Schedule 6: (AW<sub>FW</sub> standard) / 10

b = Values are toxicity reference values currently being proposed by BC MOE

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#### Table 4. Surface Water Monitoring Results (Morning Star Nurseries Ltd., 1350-1380 176th Street, Surrey, BC)

						<b>\$111</b> .000											
Sample ID	BC WQG Human Drinking	HBCs for Adult Cow Drinking	BC WQG Aquatic Life (freshwater)		SV	101		*****	ŞVi	/02			SV	V03		SW05	SW06
Date Sampled	_	Water		04-Oct-05	06-Oct-05	07-Oct-05	14-Oct-05	04-Oct-05	06-Oct-05	07-Oct-05	14-Oct-05	04-Oct-05	06-Oct-85	07-Oct-05	14-Oct-05	04-Oct-05	04-Oct-05
Volatiles	T																
Benzene	5	4520	NG	•	≤∄.t	× 0.1	< ¢.1	•	< 0.1	≺ ⊉,1	< 0.1	•	< 0,1	< 0.1	< 0.1	-	•
Eshylbergene	2.4	2988	200	•	< 0.1	< 6.1	< 0.1	•	< 0.1	< 0.1	< 0,1	-	< 5.1	< 0.1	< 0.1		-
Styrene	NG	11077	NG		< 0.1	< Ç.7	< <b>9.1</b>	-	< 0,1	< 0.1	< D, T	-	< 0.1	< 0.1	≪ 3.1	•	-
Toluene	24	6869	39	•	< 0.1	* D.1	≺û.1	-	< 0.1	< 0.1	< 0,1	-	× 0.1	*,0 >	< 0,1	-	-
Total Xylence	300	16541	NG	-	1,5	0.3	× 0.1	-	1.4	0,6	♦ 0,1	-	4 0.1	10,4	× 0.1	•	-
Volatile Hydrocarbons (VH <sub>wb10</sub> )	15000	3501	1600a	•	× 100	< 100	× 100	-	< 100	< 10P	~ 100	-	× 190	× 10¢	150	-	-
VPH,	NG	NA	150a	•	< 100	< 10D	< 100	-	< 100	< 100	< 100	~	< 100	<100	150	-	-
Extractable Hydrocarbons		1															
EFH.(b)	5000	4874	<b>500</b> a	390	< 250	< 250	< 100	480	< 250	< 250	< 100	2390	740	< 250	< 100	1090	<300
EPK	NG	13400	NG	<1000	< <u>25</u> 0	< 250	< 100	<1000	< 250	< <u>2</u> 59	< 100	~1000	310	< 250	× \$00	≪1608	<1000
LEPH,	NG	NA	50a	380	< 250	< 250	< 100	470	< 250	< 250	< 100	2370	740	< 250	< 100	1060	<300
KEPH.	NG	NA	NG	<1000	< 250	4 250	< 100	<1000	< 250	< 250	< 100	<1000	310	< 250	< 160	×1000	<1000
Polycyclic Aromatic Hydrocarbons	ł																
Apenaphtune	NG	2917	5	1,51	0.66	0.23	≪0.1	1,73	0,65	0,40	<0,1	2.30	6,70	0.13	< <u>0.1</u>	2.63	×0,05
Acceptions	NG	, NA	102b	0.255	< 0.1	< 0.1	< 0,1	G.285	< 5.1	< €.1	<b>∢ 0,1</b>	0.411	< 2.1	<0.1	< 0.1	9,466	<0.05
Accidine	NG	NA	Ď.Ś	<0.1	× 0,05	< 0,05	< 0,05	-0,05	< 0.02	< 0.05	× 0.05	<0.5	< 0.05	< 0,05	< 0.05	~0.Z	<0,05
Antivacene	NG	15667	0,1,-	0.190	0,280	< 0.01	< 0,01	0.220	0.326	< 0,01	< 0.01	0.572	0.660	<0,01	< 0,01	0.457	<0,05
Benz(a)antirecene	NG	NA	0.1	≪0.05	< 0.01	<0.01	< 0.0K	<0.05	< 0.01	< 0.Q1	-< 0.01	+0.05	< 0.01	<0.01	< 0.01	<0,05	<0.05
Benze(a)pyrene	Q.01	NA	0,01	<0,01	4 0.01	< 0,01	< 0,01	×0.01	< 0.01	< 0.01	< 0.01	<0.01	*0.01	< 0.01	< 0.01	<0,0f	<0,01
Benzo(b)iluoranihene	NG	NA	0,236	<5.05	< 0,01		< 0,01	<9.05	< 0,01	< 0,01	< 0.01	×0.05	×0.01	< 0.01	< 0.01	<0,05	<0.05
Senza(g,b,)perylene	NG	NA	0.15b	~0.05	< 0,01	< 0 <u>.01</u>	< 0.01	<0.05	≪ 0.01	≪ 0.01	× 0.01	SQ 25	< 0.01	< 0.01	< 0.01	<0.05	<0.05
Benzo(k)fluoranthane	NG	NA -	0.226	<0.05	-	•	-	<0.05	•	-	-	<0.05	•	•	-	≪0,05	<0.05
Chrysene	NG	NA	0.76	<b>-0.05</b>	< 0.01	× 0.01	×0.01	×Q.C\$	< 0.01	< 0.01	< 0.61	~0.05	< 0,01	< 0,01	< 0,01	<0.05	<0.05
Dibenz(a,h)antixacene	NG	NA.	0.16	×0.05	~ 0,01	< 0.01	< 0.C1	×0.05	< 0.01	< 9,01	< 0.01	<0.05	< 0.01	< 0.61	< 0,01	<0.05	<0,05
Fluoranthene	NG	2083	0,2	~D,05	« 0,64	-4 0,04	< 0,04	<q.q\$< td=""><td>&lt; 0.04</td><td>&lt; 0.04</td><td>&lt; 5,04</td><td><b>0.124</b></td><td>0.140</td><td>&lt; 0.04</td><td>&lt; 6,84</td><td>&lt;0.65</td><td>&lt;0.05</td></q.q\$<>	< 0.04	< 0.04	< 5,04	<b>0.124</b>	0.140	< 0.04	< 6,84	<0.65	<0.05
Fluorene	NG	2063	12	2.11	1.40	0,A7	< 0,65	2,36	1.30	0,67	≺ 0.05	3,41	1,59	0.75	< 0.05	3,50	<0.05
indeno(1,2,3-o,d)pyream	NG	NÄ	0.096	≪0.05	« 0.01	< 0.01	< 0.01	40,05	≪ Ø.01	< 8,01	< 0.01	<0,05	⇒ 0.01	< 0.01	≪0.01	≪0,05	<0.05
Naphthelene	NG	2187	<b>1 1 1</b>	8.40	¢0,3	< 0,3	< 9.3	8.67	< 0,3	< 0,3	< 0.3	8,11	< 0,3	< 0.3	< 0.3	13,5	<1,05
Phenandrene	NG	NA	0.3	3.09	2.30	0.50	< 0.05	3.84	2.60	0,96	< 0.05	9.35	4.70	0.38	< 0.05	6.08	<0,06
Pyrene	NG	1250	0.02	<0.05	0.03	0.02	≤0.02	<0,05	0.03	0.03	< 0.02	0.30	0.140	< 0.02	< 0.02	0.079	<0.05
Cliénolitre	NB	NA	NG	<0,05	< 0,5	< 0,5	≺0.5	<0.05	< 0.5	< 0,5	< 0.5	<0.05	< 0,5	< ¢.5	< 0.5	<b>⊲0.</b> 119	≪0,65

Footpotes:

Results are expressed its micrograms per itte (upit) except where noted

- - Noi analyzed for this parameter

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<= Least then the reported dateston limit</p>

BC WQG = BC Water Qualty Guidelines

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a = Values are modified from CSR Schedule 5: (AWges standard) / 10

b = Values are foxibily reference values currently being proposed by BC MOE

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Photos

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# Photographs

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Photo 1. Sam Hill Creek at the ditch confluence, 04-Oct-2005.



Photo 2. Last boom placed at Sam Hill Creek, 04-Oct-2005



Photo 1. Sam Hill Creek at the ditch confluence, 04-Oct-2005.



Photo 2. Last boom placed at Sam Hill Creek, 04-Oct-2005

Laboratory Reports

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# **Analytical Laboratory Reports**

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# **ALS Environmental**

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# CERTIFICATE OF ANALYSIS

**Date:** October 21, 2005

ALS File No. W5500

Report On: 647-001.01 (1893) Water & Soil Analysis

- Report To:Hemmera Envirochem Inc.Suite 250, 1380 Burrard StreetVancouver, BCV6Z 2H3
- Attention: Mr. Stefan Quaglia

Received: October 5, 2005

ALS ENVIRONMENTAL

per:

amber Springer

Amber Springer, B.Sc. - Project Chemist Natasha Markovic-Mirovic, B.Sc. - Project Chemist

# File No. W5500 REMARKS

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The detection limits for some Polycyclic Aromatic Hydrocarbons and Non-Halogenated Volatiles were increased for the samples reported due to interferences encountered during analysis.

# File No. W5500 **RESULTS OF ANALYSIS - Water<sup>1</sup>**

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Sample ID	SW01	SW02	SW03	SW05	SW06
Sample Date ALS ID	05-10-04 1	05-10-04 2	05-10-04 3	05-10-04 4	05-10-04 5
Polycyclic Aromatic Hydrocarbons Acenaphthene Acenaphthylene Acridine Anthracene Benz(a)anthracene	0.00151 0.000258 <0.00010 0.000190 <0.000050	0.00173 0.000288 <0.000050 0.000220 <0.000050	0.00230 0.000411 <0.00050 0.000572 <0.000050	0.00263 0.000466 <0.00020 0.000457 <0.000050	<0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050
Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene	<0.000010 <0.000050 <0.000050 <0.000050 <0.000050	<0.000010 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050	<0.000010 <0.000050 <0.000050 <0.000050 <0.000050	<0.000010 <0.000050 <0.000050 <0.000050 <0.000050	<0.000010 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050
Dibenz(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3-c,d)pyrene Naphthalene	<0.000050 <0.000050 0.00211 <0.000050 0.00840	<0.000050 <0.000050 0.00236 <0.000050 0.00867	<0.000050 0.000124 0.00341 <0.000050 0.00811	<0.000050 <0.000050 0.00380 <0.000050 0.0135	<0.000050 <0.000050 <0.000050 <0.000050 <0.000050 <0.000050
Phenanthrene Pyrene Quinoline	0.00309 <0.000050 <0.000050	0.00384 <0.000050 <0.000050	0.00935 0.000300 <0.000050	0.00608 0.000079 0.000119	<0.000050 <0.000050 <0.000050

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. 'Results are expressed as milligrams per litre except where noted.

# File No. W5500 **RESULTS OF ANALYSIS - Water'**

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Sample ID	SW01	SW02	SW03	SW05	SW06
Sample Date ALS ID	05-10-04 1	05-10-04 2	05-10-04 3	05-10-04 4	05-10-04 5
Extractable Hydrocarbons EPH10-19 EPH19-32 LEPH HEPH	0.39 <1.0 0.38 <1.0	0.48 <1.0 0.47 <1.0	2.39 <1.0 2.37 <1.0	1.08 <1.0 1.06 <1.0	<0.30 <1.0 <0.30 <1.0

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons, EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. <sup>1</sup>Results are expressed as milligrams per litre except where noted.
## File No. W5500 **RESULTS OF ANALYSIS - Water'**

1



Sample ID	SW07
Sample Date	05-10-04
ALS ID	6

Polycyclic Aromatic Hydrocarbons	
Acenaphthene	<0.000050
Acenaphthylene	<0.000050
Acridine	<0.000050
Anthracene	<0.000050
Benz(a)anthracene	<0.000050
Benzo(a)pyrene	<0.000010
Benzo(b)fluoranthene	<0.000050
Benzo(g,h,i)perylene	<0,000050
Benzo(k)fluoranthene	<0.000050
Chrysene	<0.000050
Dibenz(a,h)anthracene	<0.000050
Fluoranthene	<0.000050
Fluorene	<0.000050
Indeno(1,2,3-c,d)pyrene	<0.000050
Naphthalene	<0.000050
Phenanthrene	<0.000050
Pyrene	<0.000050
Quinoline	<0.000050

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. 'Results are expressed as milligrams per litre except where noted.

## File No. W5500 **RESULTS OF ANALYSIS - Water'**



Sample ID	SW07
Sample Date ALS ID	05-10-04 <del>6</del>
Extractable Hydrocarbons EPH10-19 EPH19-32 LEPH HEPH	<0.30 <1.0 <0.30 <1.0

Remarks regarding the analyses appear at the beginning of this report. <= Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. 'Results are expressed as milligrams per litre except where noted.

## File No. W5500 **RESULTS OF ANALYSIS - Sediment/Soil**

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Sample ID	mple ID SED01 SED02 SED03   mple Date 05-10-04 05-10-04 05-10-04 05-10-04 9   S ID 7 8 9 9 10<		SED04	SED05	
Sample Date ALS ID			05-10-04 9	05-10-04 <i>10</i>	05-10-04 <i>11</i>
Physical Tests Moisture %	73.1	74.2	46.2	46.7	37.1
<u>Non-Halogenated Volatiles</u> Benzene Ethylbenzene Styrene Toluene meta- & para-Xylene	<0.080 <0.10 <0.10 <0.10 <0.10	<0.080 <0.10 <0.10 0.13 <0.10	<0.040 <0.050 <0.050 0.072 <0.050	<0.040 <0.050 <0.050 0.062 <0.050	<0.040 <0.050 <0.050 <0.050 <0.050
ortho-Xylene Total Xylenes Volatile Hydrocarbons (VH6-10) VPH	<0.10 <0.20 <100 <100	<0.10 <0.20 <100 <100	<0.050 <0.10 <100 <100	<0.050 <0.10 <100 <100	<0.050 <0.10 <100 <100
Polycyclic Aromatic Hydrocarbons Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene	<0.040 <0.050 <0.050 <0.050 <0.050 <0.050	<0.040 <0.050 <0.050 0.056 0.069	<0.040 <0.050 <0.050 <0.050 <0.050	<0.040 <0.050 <0.050 <0.050 <0.050 <0.050	<0.040 <0.050 <0.050 0.146 0.137
Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenz(a,h)anthracene	0.080 0.052 <0.050 0.060 <0.050	0.142 0.107 <0.050 0.096 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050	0.197 0.086 0.072 0.159 <0.050
Fluoranthene Fluorene Indeno(1,2,3-c,d)pyrene 2-Methylnaphthalene Naphthalene	0.079 <0.050 <0.050 0.185 0.055	0.130 <0.050 0.073 0.080 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050 <0.050	0.054 <0.050 <0.050 <0.050 <0.050 <0.050	0.340 <0.050 0.099 0.073 <0.050
Phenanthrene Pyrene	0.063 0.077	0.085 0.140	<0.050 <0.050	0.052 0.063	0.182 0.297

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons, EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. 'Results are expressed as milligrams per dry kilogram except where noted.

## File No. W5500 **RESULTS OF ANALYSIS - Sediment/Soil**<sup>1</sup>



Sample ID	SED01	SED02	SED03	SED04	SED05	
Sample Date ALS ID	05-10-04 7	05-10-04 8	05-10-04 9	05-10-04 <i>10</i>	05-10-04 11	
Extractable Hydrocarbons EPH10-19 EPH19-32 EPH10-19 (sg) EPH19-32 (sg) LEPH	<200 410 <200 <200 <200	<200 570 <200 <200 <200	<200 220 <200 <200 <200	<200 230 <200 <200 <200	<200 <200 <200 <200 <200 <200	
НЕРН	410	570	220	230	<200	

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. <sup>1</sup>Results are expressed as milligrams per dry kilogram except where noted.

## File No. W5500 **RESULTS OF ANALYSIS - Sediment/Soil**<sup>1</sup>



Sample ID	SED06	SED07	SED08	
Sample Date ALS ID	05-10-04 <i>12</i>	05-10-04 13	05-10-04 14	
<u>Phγsical Tests</u> Moisture %	37.0	47.5	39.0	
Non-Halogenated Volatiles Benzene Ethylbenzene Styrene Toluene meta- & para-Xylene ortho-Xylene Total Xylenes Volatile Hydrocarbons (VH6-10)	<0.040 <0.050 <0.050 <0.050 <0.050 <0.050 <0.10 <100	<0.040 <0.050 <0.050 <0.050 <0.050 <0.10 <100	<0.040 <0.050 <0.050 <0.050 <0.050 <0.050 <0.10 <100 <100	
Polycyclic Aromatic Hydrocarbons Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene	<0.040 <0.050 <0.050 <0.050 <0.050 <0.050	<0.040 <0.050 <0.050 <0.050 <0.050 <0.050	<0.040 <0.050 <0.050 <0.050 <0.050	
Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenz(a,h)anthracene	<0.050 <0.050 <0.050 <0.050 <0.050 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050 <0.050	
Fluoranthene Fluorene Indeno(1,2,3-c,d)pyrene 2-Methylnaphthalene Naphthalene	<0.050 <0.050 <0.050 <0.050 <0.050 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050 <0.050	<0.050 <0.050 <0.050 <0.050 <0.050	
Phenanthrene Pyrene	<0.050 <0.050	<0.050 <0.050	<0.050 <0.050	

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. 'Results are expressed as milligrams per dry kilogram except where noted.

## File No. W5500 **RESULTS OF ANALYSIS - Sediment/Soil**<sup>1</sup>



Sample ID	SED06	SED07	SED08		
Sample Date	05-10-04	05-10-04	05-10-04		
ALS ID	12	<i>13</i>	14		
Extractable Hydrocarbons	<200	<200	<200		
EPH10-19	<200	<200	<200		
EPH19-32	<200	<200	<200		
EPH10-19 (sg)	<200	<200	<200		
EPH19-32 (sg)	<200	<200	<200		
LEPH	<200	<200	<200		
HEPH	<200	<200	<200		

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. 'Results are expressed as milligrams per dry kilogram except where noted.

## File No. W5500 **Appendix 1 - QUALITY CONTROL - Replicates**

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Sediment/Soil 1	SED02	SED02			
	05-10-04	QC # 467787			
<u>Physical Tests</u> Moisture %	74.2	72.8			
<u>Extractable Hydrocarbons</u> EPH10-19 EPH19-32	<200 570	<200 650			

Remarks regarding the analyses appear at the beginning of this report. < = Less than the detection limit indicated. VPH = Volatile Petroleum Hydrocarbons. EPH = Extractable Petroleum Hydrocarbons. EPH10-19 is equivalent to EHw10-19. LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons. Results are expressed as milligrams per dry kilogram except where noted.

## File No. W5500 Appendix 2 - METHODOLOGY



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

#### Polycyclic Aromatic Hydrocarbons in Water

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time: Sample: 7 days Extract: 40 days Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

#### Extractable Hydrocarbons in Water

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

Recommended Holding Time: Sample: 7 days Extract: 40 days Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

#### Light and Heavy Extractable Petroleum Hydrocarbons in Water

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids or Water". According to this method, LEPH and HEPH are calculated by subtracting selected Polynuclear Aromatic Hydrocarbon results from Extractable Petroleum Hydrocarbon results. To calculate LEPH, the individual results for Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene, and Phenanthrene are subtracted from EPH(C10-19). To calculate HEPH, the individual results for Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene are subtracted from EPH(C19-32). Analysis of Extractable Petroleum Hydrocarbons adheres to all prescribed elements of the BCMELP method "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 20, 1999).

## Appendix 2 - METHODOLOGY - Continued



Recommended Holding Time: Not Applicable

Laboratory Location: ALS Environmental, Vancouver

#### 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

Laboratory Location: ALS Environmental, Vancouver

#### Volatile Organic Compounds in Sediment/Soil

Volatile Organic Compounds (VOC) are extracted from sediment or soil with methanol, following a procedure from the British Columbia Ministry of Water Land and Air Protection (BCWLAP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1 July 1999). Aliquots of the extract are analyzed by direct injection capillary column gas chromatography with mass spectrometric detection (GC/MS), using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260B, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time: Sample: 14 days Extract: 40 days Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

## Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the sum of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver

## Volatile Hydrocarbons in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for Volatile Hydrocarbons (VH) by capillary column gas chromatography with flame-ionization detection (GC/FID). The methanol extraction and VH analysis are carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1 July 1999).

## File No. W5500 Appendix 2 - METHODOLOGY - Continued



Recommended Holding Time: Sample: 7 days Extract: 40 days Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

#### Volatile Petroleum Hydrocarbons (VPH) in Solids

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water" (Version 2.1, July 20, 1999). According to this method, the concentrations of specific Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, Xylenes and Styrene) are subtracted from the collective concentration of Volatile Hydrocarbons (VH) that elute between n-hexane (nC6) and n-decane (nC10). Analysis of Volatile Hydrocarbons adheres to all prescribed elements of BCMELP method "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1, July 20, 1999).

Recommended Holding Time: Not Applicable

Laboratory Location: ALS Environmental, Vancouver

#### Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3545 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses an automated system (Accelerated Solvent Extractor - ASE) to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time: Sample: 14 days Extract: 40 days Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

## Extractable Hydrocarbons in Sediment/Soil

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Solids by GC/FID, Version 2.1 July 1999". The procedure uses an automated system (Accelerated Solvent Extractor - ASE) to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone at high temperature and pressure. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable

## File No. W5500 Appendix 2 - METHODOLOGY - Continued



Petroleum Hydrocarbons (LEPH/HEPH).

Recommended Holding Time: Sample: 14 days Extract: 40 days Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

#### EPH in Sediment/Soil with Silica Gel Cleanup - EPH(sg)

This analysis is carried out using British Columbia Ministry of Water, Land and Air Protection (BC WLAP) methods. Sediment/Soil samples are extracted and analzyed in accordance with the BC WLAP method "Extractable Petroleum Hydrocarbons in Solids by GC/FID, Version 2.1 July 1999". The procedure uses an automated system (Accelerated Solvent Extractor - ASE) to extract the sediment/soil with a 1:1 mixture of hexane and acetone at high temperature and pressure.

Prior to analysis by capillary gas chromatography with flame ionization detection (GC/FID), a silica gel cleanup procedure is applied. The cleanup, which is intended to selectively remove most naturally occurring organics, follows the BC WLAP method "Silica Gel Cleanup of Extractable Petroleum Hydrocarbons" (Draft, October 23, 2003). Note that EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH). This analysis is sometimes also referred to as Total Petroleum Hydrocarbons.

Recommended Holding Time: Sample: 14 days Extract: 40 days Reference: BC WLAP

Laboratory Location: ALS Environmental, Vancouver

#### Light and Heavy Extractable Petroleum Hydrocarbons in Solids

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids or Water". According to this method, LEPH and HEPH are calculated by subtracting selected Polycyclic Aromatic Hydrocarbon results from Extractable Petroleum Hydrocarbon results. To calculate LEPH, the individual results for Naphthalene and Phenanthrene are subtracted from EPH(C10-19). To calculate HEPH, the individual results for Benz(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-c,d)pyrene, and Pyrene are subtracted from EPH(C19-32). Analysis of Extractable Petroleum Hydrocarbons adheres to all prescribed elements of the BCMELP method "Extractable Petroleum Hydrocarbons in Solids by GC/FID" (Version 2.1, July 20, 1999).

Recommended Holding Time: Not Applicable

## File No. W5500 Appendix 2 - METHODOLOGY - Continued

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Laboratory Location: ALS Environmental, Vancouver

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

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

**End of Report** 



Sample Amount = 530.0 (g or mL)

Dilution Factor = 1.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.



Sample Amount = 525.0 (g or mL)

Dilution Factor = 1.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

Printed on 11/10/2005 11:52:34 PM



Sample Amount = 520.0 (g or mL)

Dilution Factor = 1.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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Sample Amount = 530.0 (g or mL)

Dilution Factor = 1.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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Sample Amount = 2.5 (g or mL)

Dilution Factor = 1.3

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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Sample Amount = 2.5 (g or mL)

Dilution Factor = 10.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

Printed on 13/10/2005 2:06:17 PM



Sample Amount = 5.0 (g or mL)

Dilution Factor = 10.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

Printed on 14/10/2005 3:44:17 PM



Sample Amount = 5.6 (g or mL)

Dilution Factor = 1.3

The Hydrocarbon Distribution Report is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Depending on the amount of hydrocarbons present in the sample, a C36 surrogate compound may be visible. Surrogate compounds are added to all samples as a component of quality control.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

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(ALS)		excelle	ence in analy	tical testing

1988 Triumph Street, Vancouver, BC Canada V5L 1K5 Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700 #2 - 21 Highfield Circle SE, Calgary, AB Canada T2G 5N6 Tel: 403-214-5431 Toll Free: 1-866-722-6231 Fax: 403-214-5430 #2 - 8820 100th Street, Fort St. John, BC Canada V1J 3W9 Tel: 250-785-8281 Fax: 250-785-8286

# CHAIN OF CUSTODY FORM

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## CHAIN OF CUSTODY FORM

PAGE 2 OF 2

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Analysis Kepo	rt	
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Analysis of Water Samples

Hemmera Envirochem Inc.

1380 Burrard Street

Att'n: Stefan Quaglia

Vancouver, B.C.

# CANTEST

#### CANTEST LTD.

Prolessiona) Analytical Services

4606 Canada Way Burnaby, B.C. V5G 1K5

Fax: 604 731 2386

Tel: 604 734 7276

1 800 665 8566

#### CHAIN OF CUSTODY: PROJECT NAME: PROJECT NUMBER: P.O. NUMBER:

**REPORT ON:** 

**REPORTED TO:** 

120334 Morning Star 647-001.01 1893

Suite 250

V6Z 2H3

#### NUMBER OF SAMPLES: 5

DATE SUBMITTED: October 6, 2005

REPORT DATE: October 19, 2005

RECEIVED OCT 2 5.2005

#### GROUP NUMBER: 61007002

SAMPLE TYPE: Water

**NOTE:** Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

#### TEST METHODS:

Volatile Organic Compounds in Water and Soil - analysis was performed using procedures based on U.S. EPA Methods 624/8240/8260, involving sparging with a Purge and Trap apparatus and analysis using GC/MS.

Volatile Hydrocarbons (VH) and Volatile Petroleum Hydrocarbons (VPH) in Water - analysis was performed using B.C. MOELP CSR-Analytical Method 2 "Volatile Hydrocarbons In Water by GC/FID" and CSR-Analytical Method 5 "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water (VPH)" approved August 12, 1999. The method Involves sparging/collection using a Purge & Trap apparatus with GC/MS analysis; VH components ranging from C6 to C10 are quantified against m-xylene and 1,2,4-trimethylbenzene. VPH is calculated by subtraction of specified MAH compounds from VH concentrations.

Extractable Petroleum Hydrocarbons and Light and Heavy Extractable Petroleum Hydrocarbons in Water analysis was performed using B.C. MOELP CSR-Analytical Method 4 "Extractable Petroleum Hydrocarbons In Water by GC/FID" and CSR-Analytical Method 6 "Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids or Water (LEPH & HEPH)". The method Involves DCM extraction and GC/FID analysis. EPH components ranging from C10 to C19 and C19 to C32 are quantified against eicosane (n-C20). LEPH & HEPH are calculated by subtraction of specified PAH's.

Polynuclear Aromatic Hydrocarbons - analysis was performed using procedures based on U.S. EPA Methods 625/8270, involving extraction, clean-up steps, and analysis using GC/MS.

TEST RESULTS:

(See following pages)

CANTEST LTD.

Zhenyong Gao, M.Sc. Coordinator, Trace Organics Page 1 of 14

**REPORT DATE:** October 19, 2005

GROUP NUMBER: 61007002

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## Polycyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE	SW01	SW02	SW03	SW07	
IDENTIFICATION:					
DATE SAMPLED:	Oct 6/05	Oct 6/05	Oct 6/05	Oct 6/05	
CANTEST ID:	510070003	510070004	510070005	510070006	
ANALYSIS DATE:	Oct 13/05	Oct 13/05	Oct 13/05	Oct 13/05	LIMIT
Naphthalene	<	<	<	<	0.3
Acenaphthylene	<	<	<	<	0.1
Quinoline	<	<	<	<	0.5
Acenaphthene	0.68	0.65	0.70	<	0.1
Fluorene	1.4	1.3	1.5	<	0.05
Phenanthrene	2.3	2.6	4.7	<	0.05
Anthracene	0.28	0.32	0.66	<	0.01
Acridine	<	<	<	<	0.05
Total LMW-PAH's	4,66	4.87	7.56		
Fluoranthene	<	<	0.14	<	0.04
Pyrene	0.03	0.03	0.14	<	0.02
Benzo(a)anthracene	<	<	<	<	0.01
Chrysene	<	<	<	<	0.01
Benzo(b)fluoranthene	<	<	<	<	0.01
Benzo(k)fluoranthene	<	<	<	<	0.01
Benzo(a)pyrene	< .	<	<	<	0.01
Indeno(1,2,3-cd)pyrene	<	<	<	<	0.01
Dibenz(a,h)anthracene	<	<	<	<	0.01
Benzo(g,h,i)perylene	<	<	<	<	0.01
Total HMW-PAH's	0.03	0.03	0.28		
Total PAH's	4.69	4.90	7.84		

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Results expressed as micrograms per liter ( $\mu$ g/L) < = Less than detection limit

#### **REPORTED TO:**

Hemmera Envirochem Inc.

**REPORT DATE:** October 19, 2005

GROUP NUMBER: 61007002

## Polycyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	EFF01	
DATE SAMPLED:	Oct 6/05	
CANTEST ID:	510070007	DETECTION
ANALYSIS DATE:	Oct 13/05	LIMIT
Naphthalene	<	0.3
Acenaphthylene	<	0.1
Quinoline	<	0.5
Acenaphthene	0.95	0.1
Fluorene	2.0	0.05
Phenanthrene	4.9	0.05
Anthracene	0.65	0.01
Acridine	<	0.05
Total LMW-PAH's	8.50	
Fluoranthene	0.13	0.04
Pyrene	0.13	0.02
Benzo(a)anthracene	< 	0.01
Chrysene Barra (Is) fluorentia		0.01
Benzo(b)fluorantnene		0.01
Benzo(k)nuorantnene	[3] 5] (**********************************	0.01
benzo(a)pyrene		0.01
Dibonz(a b)anthracana		0.01
Bonzo (a b linondano		
	0.26	<b>8.4.4</b> 722323334
Total PAH's	8.76	

CAN**TEST**®

Results expressed as micrograms per liter ( $\mu$ g/L) < = Less than detection limit

Page 3

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**REPORT DATE:** October 19, 2005



**GROUP NUMBER: 61007002** 

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#### Monocyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SW01	SW02	SW03	SW07	
DATE SAMPLED:	Oct 6/05	Oct 6/05	Oct 6/05	Oct 6/05	
CANTEST ID:	510070003	510070004	510070005	510070006	
ANALYSIS DATE:	Oct 7/05	Oct 7/05	Oct 7/05	Oct 7/05	LIMIT
Benzene Ethylbenzene Toluene Xylenes Volatile Hydrocarbons VHw6-10 VPHw Styrene Surrogate Recovery	< < 1.5 < <	< < 1.4 < <		× × × × × ×	0.1 0.1 0.1 0.1 100 100 0.1
Toluene-d8 Bromofluorobenzene	96 98	98 99	99 102	101 104	-

Results expressed as micrograms per liter ( $\mu$ g/L) Surrogate recoveries expressed as percent (%)

< = Less than detection limit

#### Page 4

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#### **REPORTED TO:**

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Hemmera Envirochem Inc.

**REPORT DATE:** October 19, 2005

GROUP NUMBER: 61007002

## Monocyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	EFF01	
DATE SAMPLED:	Oct 6/05	
CANTEST ID:	510070007	DETECTION
ANALYSIS DATE:	Oct 7/05	LIMIT
Benzene Ethylbenzene Toluene Xylenes Volatile Hydrocarbons VHw6-10 VPHw Styrene Surrogate Recovery	0.7 0,8 8.4 <	0.1 0.1 0.1 0.1 100 100 0.1
Toluene-d8 Bromofluorobenzene	101 107	-

Results expressed as micrograms per liter ( $\mu$ g/L) Surrogate recoveries expressed as percent (%) < = Less than detection limit

Page 5

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**REPORT DATE:** October 19, 2005

**GROUP NUMBER: 61007002** 

## Extractable Petroleum Hydrocarbons (EPH) in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	EPHw10-19	EPHw19-32
SW01 SW02 SW03 SW07 EFF01	Oct 6/05 Oct 6/05 Oct 6/05 Oct 6/05 Oct 6/05	510070003 510070004 510070005 510070006 510070007	< 740 < 1000	< 310 < 390
DETECTION LIMIT			250 μg/L	250 μg/L

 $\mu$ g/L = micrograms per liter < = Less than detection limit

#### Page 6

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**REPORT DATE:** October 19, 2005

GROUP NUMBER: 61007002

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#### Extractable Petroleum Hydrocarbons - PAH Corrected in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	LEPHw (corrected for PAH's)	HEPHw (corrected for PAH's)
SW01 SW02 SW03 SW07 EFF01	Oct 6/05 Oct 6/05 Oct 6/05 Oct 6/05 Oct 6/05	510070003 510070004 510070005 510070006 510070007	< 740 5 1000	< 310 390
DETECTION LIMIT			250 μg/L	250 μg/L

 $\mu$ g/L = micrograms per liter < = Less than detection limit

REPORT DATE: October 19, 2005



GROUP NUMBER: 61007002

#### Batch Quality Control for Monocyclic Aromatic Hydrocarbons in Water (QC# 71524)

Parameter	Blank (ug/L)	Blank Limits	Duplicate (R.P.D.) 510070007	Duplicate Limits	Volatiles Water Spike (% Recovery)	Volatiles Water Spike Limits
Benzene	< 0.1	0.1	NC	20	100	79 - 117
Ethylbenzene	< 0.1	0.1	0	20	97	76 - 124
Toluene	< 0.1	0.2	11.8	20	96	83 - 118
Xylenes	< 0.1	0.1	3.6	20	97	75 - 125
Volatile Hydrocarbons VHw6-10	< 100	100			+	

ug/L = micrograms per liter

R.P.D. = Relative Percent Difference

NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.



REPORT DATE: October 19, 2005

GROUP NUMBER: 61007002

## Instrument Quality Control for the GC/MS/FID (344) w/ P&T (341) (QC# 144163)

QC Type: Detection Limit Check Standard

Parameter	% Recovery	Limits
Volatile Hydrocarbons VHw6-10	91	50-150



**REPORT DATE:** October 19, 2005

GROUP NUMBER: 61007002

#### Batch Quality Control for Extractable Petroleum Hydrocarbons (EPH) in Water (QC# 71386)

Parameter	Blank (ug/L)	Blank Limits
F		
EPHw10-19 EPHw19-32	< 250 < 250	250 250

ug/L = micrograms per liter



REPORT DATE: October 19, 2005

GROUP NUMBER: 61007002

## Instrument Quality Control for the HP5890GC +ECD(PCB) or FID(EPH) (QC# 143981)

QC Type: Detection Limit Check Standard

Parameter	% Recovery	Limits
EPHw10-19	80	50 - 150
EPHw19-32	84	50 - 150

**REPORT DATE:** October 19, 2005



GROUP NUMBER: 61007002

## Batch Quality Control for Polycyclic Aromatic Hydrocarbons in Water (QC# 71391)

Parameter	Blank (ug/L)	Blank Llmits	Spike (% Recovery)	Splke Limits
Naphthalene	< 0.3	0.3	84	43 - 125
Acenaphthylene	< 0.1	0.1	84	64 - 116
Acenaphthene	< 0.1	0.1	84	62 - 116
Fluorene	< 0.05	0.05	86	70 - 108
Phenanthrene	< 0.05	0,05	98	74 - 118
Anthracene	< 0.01	0.05	98	73 - 117
Acridine	< 0.05	0.05	106	63 - 120
Fluoranthene	< 0.04	0.05	102	75 - 121
Pyrene	< 0.02	0.02	102	78 - 120
Benzo(a)anthracene	< 0.01	0.01	96	76 - 118
Chrysene	< 0.01	0.01	104	71 - 127
Benzo(b)fluoranthene	< 0.01	0.01	92	59 - 138
Benzo(k)fluoranthene	< 0.01	0.01	106	72 - 114
Benzo(a)pyrene	< 0.01	0.1	98	80 - 120
Indeno(1,2,3-cd)pyrene	< 0.01	0.01	96	61-123
Dibenz(a,h)anthracene	< 0.01	0.01	106	58 - 126
Benzo(g,h,i)perylene	< 0.01	0.01	90	64 - 116

ug/L = micrograms per liter

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REPORT DATE: October 19, 2005

GROUP NUMBER: 61007002

#### Batch Quality Control Frequency Summary

#### TEH/EPH Water Preparation (Batch# 71386)

QC Туре	No. Samples
Blank	1
Method Performance Check Spike	<b>,</b>

## PAH's in Water Sample Prep (Batch# 71391)

QC Туре	No. Samples
Blank	<b>1</b> 867 ( ), 8888
Spike	1

#### Volatiles Analysis (Batch# 71524)

QC Туре	No. Samples
Blank	1
Volatiles Soll Spike	1
Volatiles Water Spike	1
Duplicate	2

## TEH/EPH Water Preparation (Batch# 71386)

QC Type	No. Sampies
Batch Size	17

#### PAH's in Water Sample Prep (Batch# 71391)

QC Type	No. Samples
Batch Size	18

(Continued on next page)



REPORT DATE: October 19, 2005

GROUP NUMBER: 61007002

## **Batch Quality Control Frequency Summary**

Volatlles Analysis (Batch# 71524)

QC Туре	No. Samples
Batch Size	23

Page 14 MOE-2014-00237 Page 180
CHAIN OF CUSTODY RE	CORD Client Na	me:* I	JEMMEDA E				Postal Code* V67 2457	Page of
CANTEST 4606 Cana Bumaby, B	da Way Street Ac	dress (including s	suite-rumper): 72	O Burran O HORNEY	I SH STREET	City:	VANCOUVER	RESULTS REQUESTED BY:*
120334 Tet: Fax: Toll Free; www.cante	604.734.7276         Telephon           604.731.2386         Contact I           800.665.8566         Contact I           st.com         Deleter	e:* 604) 669-04 hame:* Stefany	124 Fax: 124 (60) 1 Anagli	4)669-0430 9	E-Mail Address Sq Lagli Sampler's Name S. Que	(Required for "Autor a Chemme s: zlia (Kac	inail Reports): 1000 . Com 1 Ravensbergen	14 10 05 Day Month Year (5 day TAT)
vanesagu	Morn	ing Star	·	6-17-001		Number:	P.O. Number 3	(Sürchargés May Apply)
Special Instructions: AutoFax AutoEr	nail Return Cooler 5 IAGS 0 VOCV Please cir	Ship Samp (please spr cle options as app	ling Containers and scify below)	A-Sold DROUT	/ (lotal / spec.) Bacteria Fecal/Total	SO, No, Jo,) · · · · · · · · · · · · · · · · · · ·	t PAH corrected) EPH (PAH corrected)	DO NOT ANALYZE
61007002	Sample Identification*	Date Sampled (M / D / Y)	Sample Type	Mulas PH Conduc	BOD COD	NIInte (I NIInte (I NIInte a PCP (I PCP (I	BETX VPH VOC PAH EPH(NC LEPH/H	HOLD - Number
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= 004 - Swi	02						VVVV	.3
005 SW	03						VV V V	3
006 Sw	57						VV V V	3
007 EFF	01	N.	*					3
Relinguished by:	Date/	Time	500 Recei	ved by:			🗙 = Required Field	al Number of Containers: 15
Method of Shipment Waybi	I No.:	<u></u> ] <u>- 182 -</u>	Received for La	ib by: PS	Date OCT. 6/1	5 <sup>11me</sup> 4:45	You will be paid directly by our	dient:
Shipped by: Shipm	ent Condition:	*******	Cooler opened	by:	Date	Time	Company Name:	· · · · · · · · · · · · · · · · · · ·
FOR LABORATORY USE ONLY				- 101	to Jul -		Address:	Postal Code:
Sample State at Receipt And Sent Co Temperature	d Frozen NA						Phone: MOE	Fax: 2014-00237

# CHROMATOGRAM COVER SHEET



The originals will follow with the report.

#### www.cantest.com

Head Office: 4606 Canada Way Burnaby, BC V5G 1K5 Tel: 604 734 7276

Victoria: 1102 – 4464 Markham St. Victoria, BC V8Z 7X8 Tel: 250 385 6112 Kelowna: 1328 Land Road Kelowna, BC V1P 1K9 Tel: 250 765 7501 Winnlpeg: Unit D - 675 Berry St. Winnipeg, MB R3H 1A7 Tel: 204 772 7276 Toronto: 18 Inkpen Lane Whitby, ON L1R 2HZ Tel: 905 665 5556

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2	Analysis Report		CANTEST LTD.
REPORT ON:	Analysis of Water Sample		Professional Analytical Services
REPORTED TO:	Hemmera Envirochem Inc. Suite 250 1380 Burrard Street Vancouver, B.C. V6Z 2H3 <u>Att'n: Stefan Quaglia</u>	RECEIVED OCT 3 12005	4606 Canada Wa Burnaby, B.C. V5G 1K5 Fax: 604 731 238 Tel: 604 734 7276
CHAIN OF CUSTODY: PROJECT NAME: PROJECT NUMBER: P.O. NUMBER:	120332 Morning Star 647-001.01 1893		1 800 665 8566
NUMBER OF SAMPLES	:5	REPORT DATE: October 19, 2005	

DATE SUBMITTED: October 11, 2005

REPORT DATE: October 19, 2005

**GROUP NUMBER: 61011026** 

SAMPLE TYPE: Water

**NOTE:** Results contained in this report refer only to the testing of samples as submitted. Other Information is available on request.

#### **TEST METHODS:**

Volatile Organic Compounds in Water and Soil - analysis was performed using procedures based on U.S. EPA Methods 624/8240/8260, involving sparging with a Purge and Trap apparatus and analysis using GC/MS.

Volatile Hydrocarbons (VH) and Volatile Petroleum Hydrocarbons (VPH) in Water - analysis was performed using B.C. MOELP CSR-Analytical Method 2 "Volatile Hydrocarbons in Water by GC/FID" and CSR-Analytical Method 5 "Calculation of Volatile Petroleum Hydrocarbons in Sollds or Water (VPH)" approved August 12, 1999. The method involves sparging/collection using a Purge & Trap apparatus with GC/MS analysis; VH components ranging from C6 to C10 are quantified against m-xylene and 1,2,4-trimethylbenzene. VPH is calculated by subtraction of specified MAH compounds from VH concentrations.

Extractable Petroleum Hydrocarbons and Light and Heavy Extractable Petroleum Hydrocarbons in Water analysis was performed using B.C. MOELP CSR-Analytical Method 4 "Extractable Petroleum Hydrocarbons in Water by GC/FID" and CSR-Analytical Method 6 "Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids or Water (LEPH & HEPH)". The method involves DCM extraction and GC/FID analysis. EPH components ranging from C10 to C19 and C19 to C32 are quantified against elcosane (n-C20). LEPH & HEPH are calculated by subtraction of specified PAH's.

Polynuclear Aromatic Hydrocarbons - analysis was performed using procedures based on U.S. EPA Methods 625/8270, Involving extraction, clean-up steps, and analysis using GC/MS.

TEST RESULTS:

(See following pages)

CANTEST LTD.

Zhenyong Gao, M.Sc. Coordinator, Trace Organics

Page 1 of 12

REPORTED TO:

Hemmera Envirochem Inc.

REPORT DATE: October 19, 2005



GROUP NUMBER: 61011026

# Polycyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE	SW 01	SW 02	SW 03	SW 07	
IDENTIFICATION:					
DATE SAMPLED:	Oct 7/05	Oct 7/05	Oct 7/05	Oct 7/05	
CANTEST ID:	510110100	510110101	510110102	510110103	DETECTION
ANALYSIS DATE:	Oct 13/05	Oct 13/05	Oct 13/05	Oct 13/05	LIMIT
Naphthaiene	<	<x< th=""><th>&lt;</th><th></th><th>0.3</th></x<>	<		0.3
Acenaphthylene	<	<	<	<	0.1
Quinoline	<	<	< 200		0.5
Acenaphthene	0.23	0.4	0.13	<	0.1
Fluorene	0.47	0.67	0.25		0.05
Phenanthrene	0.50	0.96	0.38	<	0.05
Anthracene	S .	<	1.5000000		0.01
Acridine	<	<	<	<	0.05
Total LMW-PAH's	1.2	2.03	0.76		
Fluoranthene	<	<	<	<	0.04
Pyrene	0.02	0.03	<	<	0.02
Benzo(a)anthracene	<	<	<	<	0.01
Chrysene	4	<	<		0.01
Benzo(b)fluoranthene	<	<	<	<	0.01
Benzo(k)fluoranthene	<	<	<	<	0.01
Benzo(a)pyrene	<	<	<	<	0.01
Indeno(1,2,3-cd)pyrene		- <	<ul> <li>&lt; 30 (0) (1)</li> </ul>		0.01
Dibenz(a,h)anthracene	<	<	<	<	0.01
Benzo(g,h,l)perylene		<b> </b>		<	0.01
Total HMW-PAH's	0.02	0.03			
Total PAH's	1.22	2.06	0.76	1 10 10 10 X 13	12

Results expressed as micrograms per liter ( $\mu$ g/L)

< = Less than detection limit

REPORTED TO: Hemr

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Hemmera Envirochem Inc.

**REPORT DATE:** October 19, 2005

GROUP NUMBER: 61011026

#### Polycyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	Eff01	
DATE SAMPLED:	Oct 7/05	
CANTEST ID:	510110104	DETECTION
ANALYSIS DATE:	Oct 13/05	
Naphthalene Acenaphthylene Quinoline Acenaphthene Fluorene Phenanthrene Anthracene Acridine Total LMW-PAH's Fluoranthene	< < 0.29 0.63 1.3 < 2.22 < 0.05	0.6 0.2 1 0.2 0.1 0.1 0.02 0.1 0.02 0.1
Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene Total HMW-PAH's Total PAH's	<<<<<<<0.062.28	0.04 0.02 0.02 0.02 0.02 0.02 0.02 0.02

Results expressed as micrograms per liter ( $\mu$ g/L) < = Less than detection limit

Sample# 510110104 - Detection limits adjusted: Limited sample volume

**REPORTED TO:** 

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Hemmera Envirochem Inc.

**REPORT DATE:** October 19, 2005 CAN**TEST**®

GROUP NUMBER: 61011026

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# Monocyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SW 01	SW 02	SW 03	SW 07	
DATE SAMPLED:	Oct 7/05	Oct 7/05	Oct 7/05	Oct 7/05	
CANTEST ID:	510110100	510110101	510110102	510110103	
ANALYSIS DATE:	Oct 13/05	Oct 13/05	Oct 13/05	Oct 13/05	LIMIT
Benzene Ethylbenzene Toluene Xylenes	< < 0.3	< < < 0.5	< < 0.4	<	0.1 0.1 0.1 0.1
Volat‼e Hydrocarbons VHw6-10 VPHw Styrene	< < <	< < <	< < <	< < <	100 100 0.1
Surrogate Recovery Toluene-d8	104	99	99	98	
Bromofluorobenzene	99	98	100	98	-

Results expressed as micrograms per liter ( $\mu$ g/L) Surrogate recoveries expressed as percent (%) < = Less than detection limit

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GROUP NUMBER: 61011026

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# Monocyclic Aromatic Hydrocarbons In Water

CLIENT SAMPLE IDENTIFICATION:	Eff01	
DATE SAMPLED:	Oct 7/05	
CANTEST ID:	510110104	
ANALYSIS DATE:	Oct 13/05	LIMIT
Benzene Ethylbenzene Toluene Xylenes Volatile Hydrocarbons VHw6-10 VPHw Styrene	< < 0.3 < ×	0.1 0.1 0.1 100 100 0.1
Surrogate Recovery Toluene-d8 Bromoflyorobenzene	99	-

Results expressed as micrograms per liter ( $\mu$ g/L) Surrogate recoveries expressed as percent (%) < = Less than detection limit

#### Page 5

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**REPORT DATE:** October 19, 2005



GROUP NUMBER: 61011026

# Extractable Petroleum Hydrocarbons (EPH) in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	EPHw10-19	EPHw19-32
SW 01 SW 02 SW 03 SW 07 Eff01	Oct 7/05 Oct 7/05 Oct 7/05 Oct 7/05 Oct 7/05	510110100 510110101 510110102 510110103 610110104	< < < 450	< < < 250
DETECTION LIMIT			250 μg/L	250 μg/L

 $\mu$ g/L = micrograms per liter < = Less than detection limit

#### Page 6

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GROUP NUMBER: 61011026

# Extractable Petroleum Hydrocarbons - PAH Corrected in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	LEPHw (corrected for PAH's)	HEPHw (corrected for PAH's)
SW 01 SW 02 SW 03 SW 07 Eff01	Oct 7/05 Oct 7/05 Oct 7/05 Oct 7/05 Oct 7/05	510110100 510110101 510110102 510110103 510110103 510110104	< < < 450	< < < 250
DETECTION LIMIT			250 μg/L	250 µg/L

 $\mu$ g/L = micrograms per liter < = Less than detection limit



REPORT DATE: October 19, 2005

GROUP NUMBER: 61011026

### Batch Quality Control for Monocyclic Aromatic Hydrocarbons in Water (QC# 71622)

Parameter	Duplicate (R.P.D.) 510110104	Duplicate Limits
Benzene	NC	20
Ethylbenzene	NC	20
Toluene	NC	20
Xylenes	0	20
Volatile Hydrocarbons VHw6-10	NC	20

ug/L = micrograms per liter

R.P.D. = Relative Percent Difference

NC = Not Calculated. Duplicate sample results were less than the detection limit. Relative Percent Difference calculation is not defined for analyte levels of less than detection limit.

**REPORTED TO:** 

Hemmera Envirochem Inc.



REPORT DATE: October 19, 2005

GROUP NUMBER: 61011026

# Batch Quality Control for Extractable Petroleum Hydrocarbons (EPH) in Water (QC# 71507)

Parameter	Blank (ug/L)	Blank Limits
EPHw10-19 EPHw19-32	< 250 < 250	250 250

ug/L = micrograms per liter

**REPORT DATE:** October 19, 2005



GROUP NUMBER: 61011026

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# Batch Quality Control for Polycyclic Aromatic Hydrocarbons in Water (QC# 71566)

Parameter	Blank (ug/L)	Blank Limits	Spike (% Recovery)	Spike Limits
Naphthalene	< 0.3	0.3	110	43 - 125
Acenaphthylene	< 0.1	0.1	104	64 - 116
Acenaphthene	< 0.1	0.1	108	62 • 116
Fluorene	< 0.05	0.05	108	70 - 108
Phenanthrene	< 0.05	0.05	106	74 - 118
Anthracene	< 0.01	0.05	96	73 - 117
Acridine	< 0.05	0.05	108	63 - 120
Fluoranthene	< 0.04	0.05	102	75 - 121
Pyréne	< 0.02	0.02	104	78 - 120
Benzo(a)anthracene	< 0.01	0.01	102	76 - 118
Chrysene	< 0.01	0.01	102	/1 • 127
Benzo(b)fluorantnene	< 0.01	0.01	98	59 - 138
Benzo(k) Ruorantnene	< 0.01	0.01	104	72 - 114
	< 0.01		30	60 - 120
Dibenz(a b)aptbracono		0.01	94	D. 106
Benzola h lipenilene		0.01	94	6/ 116
penco/9mmpersene				UT I I U

ug/L = micrograms per liter

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**REPORTED TO:** 

Hemmera Envirochem Inc.



REPORT DATE: October 19, 2005

GROUP NUMBER: 61011026

# Batch Quality Control Frequency Summary

#### TEH/EPH Water Preparation (Batch# 71507)

QC Туре	No. Samples
Blank	1
Method Performance Check Spike	1

#### PAH's in Water Sample Prep (Batch# 71566)

QC Туре	No. Samples
Blank	1
Spike	1

#### Volatlles Analysis (Batch# 71622)

QC Туре	No. Samples
Blank	1
Duplicate Volatiles Water Spike	1

#### TEH/EPH Water Preparation (Batch# 71507)

QC Туре	No. Samples
Batch Size	19

# PAH's in Water Sample Prep (Batch# 71566)

QC Туре	No. Samples
Batch Size.	17

### (Continued on next page)



REPORT DATE: October 19, 2005

GROUP NUMBER: 61011026

# Batch Quality Control Frequency Summary

Volatlles Analysis (Batch# 71622)

QC Туре	No. Samples
Batch Size	26

CHAIN OF CUSTO	DY RECORD	Client Name:* Postal Code*							Page of																		
CAN <b>TEST</b>	4606 Canada Way Bumaby, B.C. V5G 1K5	Street Add	et Address (including suite purger)* 1380 Burrard. SUITE 350 - 1390 HORNEY STREET VANCOUVER								RESULTS REQUESTED BY:*																
120332	Tel: 604,734.7276 Fax: 604,731.2386 Toll Free: 800.665.8566 www.cantest.com	Contact Na	504) 669-04 ame:*572 Fl Fl	124 in Qu	<u>(604</u>	4) 66 7   1 'q	9-04	<u>430</u>	Sar Ku	794 mpler	qgl 's Nar Rai	1 <u>q (</u> ne: 12 1 1	) h ber	em Gen	mer	~9, Toh	<u>_ (0</u> , 7 D	m e l	<[	2~		- 2	<u>17</u> <u>10</u> <u>05</u> Day Month Year Sday TAT			<u> ク                                   </u>	
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Special Instructions: AutoFax	AutoEmail Return $S \times   AutoEmail   O \times   AutoEmail O + O + O + O + O + O + O + O + O + O $	n Cooler	Ship Samp (please spo	ling Contair acify below)	VICE OF DESERT	Solution	A		(lotal / spec.)		acteria Fecal/Total	50, No,	/ I Nitrite	se (Totat / HC)	Tetra and Penta)				AH corrected)	H (PAH corrected)						O NOT ANALYZE	Containers
C. C. M. Munber	Sample Identification*		Date Sampled (M / D / Y)	Sample Type	-Welais AV	Malals A	Conductivi	155	Akalinity	BOD	CUD Colifarm B	F CI	Nitrate end	Oil & Grea	PCP (Tri, PCP (Mor	BETX	HdV	PAH PAH	EPH (not F	LEPH/HEP	a) 2					HOLD - D(	Number or
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		Ser Class		VELLOW												Pho	one: =				MO	Fax E-2014 Je 197	4-002	237			_

# CHROMATOGRAM COVER SHEET

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CONTACT	COMPANY NAME	
Stephan Quaglia	Hennera	Envirorhem.
FAX NUMBER	DATE	PGS INCL. COVER
604 669 0430	05004 18	2
FROM	RETURN FAX	TELEPHONE
CANTEST LTD	604 731 2386	604 734 7276
SUBJECT		
Chromatogram(s)		
Please find the attached chromatograms assoc	lated with:	
CANTEST Group # 6101026		
Your Project Name Morning Star		
Your Project Number 647-001.01		
Sample Matrix Water.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	

The originals will follow with the report.

www.cantest.com

Head Office: 4606 Canada Way Burnaby, BC V5G 1K5 Tel: 604 734 7276 Victoria: 1102 – 4464 Markham St. Victoria, BC V8Z 7X8 Tel: 250 385 6112

Kelowna: 1328 Land Road Kelowna, BC V1P 1K9 Tel: 250 765 7501

Winnipeg: Unit D - 675 Berry St. Winnipeg, MB R3H 1A7 Tel: 204 772 7276

Toronto: 18 Inkpen Lane Whitby, ON L1R 2HZ Tel: 905 665 5556 MOE-2014-00237 Page 198



(15:44) Pg 1 or y





CanTest Ltd.

Professional Analytical Services

4606 Canada Way Burnaby, BC V5G 1K5

Fax: 604 731 2386

Tei: 604 734 7276

1 800 665 8566

Date:	November 7, 2005	
To:	Memmera Envirochem	Inc.
Att'n:	Stefan Quaglia	-
From:	Amandeep Nagra	
Subject:	Analytical Results	

**MESSAGE:** 



# The Best Pick-Up Line in the Industry.

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REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

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Polycyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SW 01	SW 02	SW 03	SW 07	
DATE SAMPLED:	Oct 14/05	Oct 14/05	Oct 14/05	Oct 14/05	
CANTEST ID:	510180144	510180145	510180146	510180147	
ANALYSIS DATE:	Oct 22/05	Oct 22/05	Oct 22/05	Oct 22/05	LIMIT
Naphthalene		<	<	<	0,3
Acenaphthylene	<	<	<	<	0.1
Quinoline	<	<	<	<	0.5
Acenaphthene	<	<	<	<	0.1
Fluorene	<	<	<	<	0.05
Phenanthrene	<	<	<	<	0.05
Anthracene	<	<	<	<	0.01
Acridine Total LMW-PAH's	<	<	<	<	0.05
Fluoranthene	<	<	<	<	0.04
Pvrene	<	<	<	<	0.02
Benzo(a)anthracene	<	<	<	<	0.01
Chrysene	<	<	<	<	0.01
Benzo(b)fluoranthene	<	<	<	<	0.01
Benzo(k)fluoranthene	<	<	<	<	0.01
Benzo(a)pyrene	<	<	<	<	0.01
Indeno(1,2,3-cd)pyrene	<	<	<	<	0.01
Dibenz(a,h)anthracene	<	<	<	<	0.01
Benzo(g,h,i)perylene Total HMW-PAH's Total PAH's	<	<	<	<	0.01

Results expressed as micrograms per liter ( $\mu$ g/L) < = Less than detection limit



REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

Polycyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SW 08	Eff 01	
DATE SAMPLED:	Oct 14/05	Oct 14/05	
CANTEST ID:	510180149	510180150	DETECTION
ANALYSIS DATE:	Oct 22/05	Oct 22/05	LIMIT
Naphthalene	<	<	0,3
Acenaphthylene	<	<	0.1
Quinolíne	<	<	0.5
Acenaphthene	<	<	0.1
Fluorene	<	_ <	0.05
Phenanthrene	<	<	0.05
Anthracene	<	<	0.01
Acridine	<	<	0.05
Total LMW-PAH's			
Fluoranthene	<	<	0.04
Pyrene	<	<	0.02
Benzo(a)anthracene	<	<	0.01
Chrysene	<	<	0.01
Benzo(b)fluoranthene	<	<	0.01
Benzo(k)fluoranthene	< .	<	0.01
Benzo(a)pyrene	<	<	0.01
Indeno(1,2,3-cd)pyrene	<	<	0.01
Dibenz(a,h)anthracene	<	<	0.01
Benzo(g,h,i)perylene Total HMW-PAH's Total PAH's	<	<	0.01

Results expressed as micrograms per liter ( $\mu$ g/L) < = Less than detection limit



REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

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Monocyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SW 01	SW 02	SW 03	SW 07	
DATE SAMPLED:	Oct 14/05	Oct 14/05	Oct 14/05	Oct 14/05	
CANTEST ID:	510180144	510180145	510180146	510180147-	DETECTION
ANALYSIS DATE:	Oct 19/05	Oct 19/05	Oct 19/05	Oct 19/05	LIMIT
Велгеле	<		1 <	<	0.1
Ethylbenzene	<	<	<	<	0.1
Toluene	<	<	<	<	0.1
Xylenes	<	<	<	<	0,1
Volatile Hydrocarbons VHw6-10	<	<	150	<	100
VPHw	<	<	150	<	100
Styrene	<	<	<	<	0.1
Surrogate Recovery					, <u>"</u>
Toluene-d8	97	100	101	101	· .
Bramofluorobenzene	90	94	103	91	-

Results expressed as micrograms per liter (µg/L)

Surrogate recoveries expressed as percent (%)

< = Less than detection limit

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REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

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Monocyclic Aromatic Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SW 08	Eff 01	
DATE SAMPLED:	Oct 14/05	Oct 14/05	
CANTEST ID:	510180149	510180150	DETECTION
ANALYSIS DATE:	Oct 19/05	Oct 19/05	LIMIT
Benzene	<	<	0.1
Ethylbenzene	<	<	0.1
Toluene	<	<	0.1
Xylenes	<	<	0,1
Volatile Hydrocarbons VHw6-10	<	<	100
VPHw	<	<	100
Styrene	<	<u>&lt;</u>	0.1
Surrogate Recovery			-
Toluene-d8	99	101	
Bromofluorobenzene	93	97	•

Results expressed as micrograms per liter (µg/L) Surrogate recoveries expressed as percent (%) < = Less than detection limit

(15:48) Pg 6 of 9

REPORTED TO: Hemmera Envirochem Inc.



REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

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Extractable Petroleum Hydrocarbons (EPH) in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	EPHw10-19	EPHw19-32
SW 01	Oct 14/05	510180144	< 100	< 100
SW 02	Oct 14/05	510180145	< 100	< 100
SW 03	Oct 14/05	510180146	< 100	< 100
SW 07	Oct 14/05	510180147	< 100	< 100
SW 08	Oct 14/05	510180149	< 100	< 100
Eff 01	Oct 14/05	510180150	< 100	< 100
DETECTION LIMIT	100 μg/L	100 μg/L		

 $\mu$ g/L = micrograms per liter

< = Less than detection limit



REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

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Extractable Petroleum Hydrocarbons - PAH Corrected in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	LEPHw (corrected for PAH's)	HEPHw (corrected for PAH's)
SW 01	Oct 14/05	510180144	< 100	< 100
SW 02	Oct 14/05	510180145	< 100	< 100
SW 03	Oct 14/05	510180146	< 100	< 100
SW 07	Oct 14/05	510180147	< 100	< 100
SW 08	Oct 14/05	510180149	< 100	< 100
Eff 01	Oct 14/05	510180150	< 100	< 100
DETECTION LIMIT			100	100
UNITS			µg/L	μg/L

 $\mu$ g/L = micrograms per liter

< = Less than detection limit

(15:49) Pg 8 of 9



NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

**TEST METHODS:** 

Volatile Organic Compounds in Water and Soil - analysis was performed using procedures based on U.S. EPA Methods 624/8240/8260, involving sparging with a Purge and Trap apparatus and analysis using GC/MS.

Volatile Hydrocarbons (VH) and Volatile Petroleum Hydrocarbons (VPH) in Water - analysis was performed using B.C. MOELP CSR-Analytical Method 2 "Volatile Hydrocarbons in Water by GC/FID" and CSR-Analytical Method "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water (VPH)" approved August 12, 1999. The method involves sparging/collection using a Purge & Trap apparatus with GC/MS analysis; VH components ranging from C6 to C10 are quantified against m-xylene and 1,2,4-trimethylbenzene. VPH is calculated by subtraction of specified MAH compounds from VH concentrations.

Extractable Petroleum Hydrocarbons and Light and Heavy Extractable Petroleum Hydrocarbons in Water analysis was performed using B.C. MOELP CSR-Analytical Method 4 "Extractable Petroleum Hydrocarbons in Water GC/FID" and CSR-Analytical Method 6 "Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids, r Water (LEPH & HEPH)". The method involves DCM extraction and GC/FID analysis. EPH components ranging from C10 ' C19 and C19 to C32 are quantified against elcosane (n-C20). LEPH & HEPH are calculated by subtraction of specified PAH's.

Polynuclear Aromatic Hydrocarbons - analysis was performed using procedures based on U.S. EPA Methods 625/8270, involving extraction, clean-up steps, and analysis using GC/MS.

(Continued)

CANTEST LTD.

Zhenyong Gao, M.Sc. Coordinator, Trace Organics A Member of the CANAM Group www.tesling-labs.com

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Nov 7, 15:39 PST by: Amandeep Nagra

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CANTEST

REPORTED TO: Hemmera Envirochem Inc.

REPORT DATE: October 25, 2005

GROUP NUMBER: 61018023

COMMENTS:

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Samples received were at 11.6 degrees Celsius.

TEST RESULTS:

(See following pages)

	'O[RE(RD	<sup>U</sup> Client Nome:* □	IEMMMERA En	www.		Ĺ	Postal Code*	Page of
CAN <b>TEST</b>	4606 Canada Way Burnaby, B.C. V5G 1K5	Street Address (including s	uiteQuSter):13 50 E_350 - 1490	Barra HORNEN	STREET	City:	VANCOUVER	RESULTS REQUESTED BY:*
120330	Tel: 604.734.7276 Fax: 604.731.2386 Toll Free: 800.665.8566 www.cantest.com cantest@cantest.com	[604] 669-04 Contact Name:* Stlfan Project Name:	24 (604 Quagliq	) 669-0430 Project Number	Sampler's Name B.en /4420	ig@hemn /Kan Number:	Ravensbergen P.O. Number	21 10 05 Day Month Year Sday TAT (Surcharges May Apply)
Special Instructions: AutoFa	x AutoEmail Retu	m Cooler Ship Samp (please spe 2 X VUCV Please circle options as app	ling Containers ecify below)	647-00	lty (total / spec.)	S.O., No, (No <sub>2</sub> ) and Nitrite srease (Total / HC) Trl, Teira and Penta) Mono and Di)	Int PAH corrected)	- DO NOT ANALVER
Laboratory Number	Identification*	Sampled (M / D / Y)	Type	PH TISS	Alkalin Colifor	PCP ( PCP ( PCP (	BETX VPH VOC PAH EEPHIN PCB	
51018-0149	2W01 SW07	10/ 64/05	waren					3
- 146	5403						<i>J J Y J</i>	3
147	5~07						v v v v	3
179	54 08						v v v v	3
150	Eff 01	<b>V</b>	· ·					3
Relinquished by: Kenl Ra	ivensbergen	Date Ort 17 Time	Receive	ed by:			* = Required Field	al Number of Containers; 18
Method of Shipment:	Waybill No.: 2588	480 50 20	Received for Lat	- Suz	Date 10/17	Time <b>/ 300</b>	You will be paid directly by our	client:
shipped by: Plarolutor	Shipment Condition:	<b>_</b>	Cooler opened b	v: PT	Date OCT 18	8.50	Company Name:	
HOR LABORATORY USE ONLY Sample State at Receipt	nbient Cold Frozen	NA® <u>Comments</u>	<u> </u>				Contact:	Postal Code:
Tempo	erature	bel					Phone: MOR	Fax: E-2014-00237

# CHROMATOGRAM COVER SHEET

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CONTACT	***************************************	COMPANY NAME	
STE FAN	QUAGUA	HEMMERA	
FAX NUMBER		DATE	PGS INCL. COVER
604-669	- 0430	OCT 21,2005	3
FROM		RETURN FAX	TELEPHONE
CANTEST LTD		604 731 2386	604 734 7276
SUBJECT			
Chromatogram(s)			

#### Please find the attached chromatograms associated with:

CANTEST Group # 61018 023	
Your Project Name MORNING STAR	
Your Project Number $647 - 001 - 01$	
Sample Matrix WATER	•

The originals will follow with the report.

#### www.cantest.com

Head Office: 4606 Canada Way Burnaby, BC V5G 1K5 Tel: 604 734 7276 Victoria: 1102 – 4464 Markham St. Victoria, BC V8Z 7X8 Tel: 250 385 6112 Kelowna: 1328 Land Road Kelowna, BC V1P 1K9 Tel: 250 765 7501 Winnipeg: Unit D - 675 Berry St. Winnipeg, MB R3H 1A7 Tel: 204 772 7276 Toronto: 18 Inkpen Lane Whitby, ON L1R 2HZ Tel: 905 665 5556

MOE-2014-00237 Page 210 Data File C:\HPCHEM\1\DATA\051019B\044F6801.D Sample Name: 5101801[^ Seq. Line : Injection Date : 10/21/2005 11:06:50 AM 68 61018023 Sample Name ; 510180150 Location : Vial 44 Acq. Operator : pcn Inj : 1 Inj Volume : 2 µ1 Hemiol Acq. Method : C:\HPCHEM\1\METHODS\EPH.M Last changed : 10/21/2005 6:33:50 AM by pcn Due 04.24 Analysis Method : C:\HPCHEM\1\METHODS\EPHAP.M : 10/21/2005 1:48:13 PM by pcn Last changed (modified after loading)

Total Extractable Hydrocarbons. Soils and Waters are extracted using methylene chloride and then analyzed using an HPGC-FID. Calculations are based on an internal standard and reported in ug/L for waters and ug/g for soils.





