

DATE: April 12 2002

Gov't of Nunavut PW & S
P O Bag #002
Rankin Inlet Nunavut X0C 0C0

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ENVIRO-TEST ANALYSIS REPORT

Lab Work Order #: W020100622 Submitted By: Lindsay Amil

Project Reference:

Project P.O. #: Date Received: 02/ 1/ 9

Comments:

APPROVED BY:

Paul Nicolas

Project Manager
For chemistry interpretation call (204)945-2583
For microbiology interpretation call (204)945-2314

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ACCREDITATIONS: STANDARD COUNCIL OF CANADA (SCC), IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL
LABORATORIES (CAEAL): FOR SPECIFIC TESTS AS LISTED IN THE SCC SCOPE OF ACCREDITATION
(EDMONTON, CALGARY, WINNIPEG, SASKATOON, THUNDER BAY, WATERLOO, & GRAND PRAIRIE)
SCC, IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA): FOR SPECIFIC FOOD RELATED TESTS AS
LISTED IN THE SCC SCOPE OF ACCREDITATION (WINNIPEG)
SCC, FOR SPECIFIC HEALTH RELATED TESTS AS LISTED IN THE SCC SCOPE OF ACCREDITATION (WINNIPEG)
AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA): FOR INDUSTRIAL HYGIENE ANALYSIS (EDMONTON, WINNIPEG) AND
FUNGI ANALYSIS (WINNIPEG)
AGRICULTURE CANADA: UNDER THE CANADIAN FERTILIZER QUALITY ASSURANCE PROGRAM (SASKATOON)

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ENVIRO-TEST ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	Result	M.D.L.	UNITS	METHOD	ANALYST	ANALYST
02-A1717		Williamson Lake Pumpout Rankin Inlet Sample Type: Water - Municipal Treated Collected: 02/ 1/ 8						
		Microbiology						
		Coliform Total MP	< 1	1.	CFU/100 mL	A179.01	02/ 1/ 8	IKF
		Escherichia Coli MP	< 1	1.	CFU/100 mL	A179.01	02/ 1/ 8	IKF
		Heterotrophic Plate Count	< 12	1.	CFU/mL	A165.04	02/ 1/ 8	IKF
		Inorganics						
		Alkalinity as Bicarbonate	74.	19.	mg/L	A048.00	02/ 1/10	COG
		Alkalinity as CaCO3	42.	16.	mg/L	A048.00	02/ 1/10	COG
		Alkalinity as Carbonate	< 70	20.	mg/L	A048.00	02/ 1/10	COG
		Alkalinity as Hydroxide	< 10	10.	mg/L	A048.00	02/ 1/10	COG
		Aluminum - Extractable	< 0.01	0.01	mg/L	A510.06	02/ 1/10	DAG
		Antimony - Extractable	< 0.001	0.001	mg/L	A510.06	02/ 1/10	DAG
		Arsenic - Extractable	0.0014	0.0008	mg/L	A510.06	02/ 1/10	DAG
		Barium - Extractable	0.0008	0.0003	mg/L	A510.06	02/ 1/10	DAG
		Beryllium - Extractable	< 0.001	0.001	mg/L	A510.06	02/ 1/10	DAG
		Bismuth - Extractable	< 0.0001	0.0001	mg/L	A510.06	02/ 1/10	DAG
		Boron - Extractable	0.008	0.003	mg/L	A510.06	02/ 1/10	DAG
		Cadmium - Extractable	< 0.0002	0.0002	mg/L	A510.06	02/ 1/10	DAG
		Calcium - Extractable	23.7	0.08	mg/L	A510.06	02/ 1/10	DAG
		Carbon - Organic	5.	1.	mg/L	A609.06	02/ 1/10	TSP
		Cesium - Extractable	< 0.0001	0.0001	mg/L	A510.06	02/ 1/10	DAG
		Chloride - Soluble	44.	10.	mg/L	A144.04	02/ 1/10	ALW
		Chromium - Extractable	< 0.001	0.001	mg/L	A510.06	02/ 1/10	DAG
		Cobalt - Extractable	< 0.0002	0.0002	mg/L	A510.06	02/ 1/10	DAG
		Colour - True	< 5	1.	COLOUR/UNIT	A001.04	02/ 1/ 8	CLN
		Conductivity	219.	20.	uMHO/cm	A048.00	02/ 1/10	COG
		Copper - Extractable	0.0140	0.0004	mg/L	A510.06	02/ 1/10	DAG
		Fluoride - Soluble	0.9	0.1	mg/L	A268.04	02/ 1/10	ALW
		Hardness as CaCO3	81.7	0.07	mg/L	A034.01		calculated
		Iron - Extractable	0.02	0.01	mg/L	A510.06	02/ 1/10	DAG
		Lead - Extractable	0.0023	0.0001	mg/L	A510.06	02/ 1/10	DAG
		Lithium - Extractable	< 0.001	0.001	mg/L	A510.06	02/ 1/10	DAG
		Magnesium - Extractable	5.47	0.01	mg/L	A510.06	02/ 1/10	DAG
		Manganese - Extractable	0.0100	0.0002	mg/L	A510.06	02/ 1/10	DAG
		Molybdenum - Extractable	0.0004	0.0001	mg/L	A510.06	02/ 1/10	DAG
		Nickel - Extractable	< 0.0002	0.0002	mg/L	A510.06	02/ 1/10	DAG
		Nitrate-Nitrite-N Soluble	0.02	0.01	mg/L N	A269.04	02/ 1/10	ALW
		pH	7.08	0.01	pH UNITS	A048.00	02/ 1/10	COG
		Phosphorus - Extractable	< 0.02	0.02	mg/L	A510.06	02/ 1/10	DAG
		Potassium - Extractable	3.18	0.05	mg/L	A510.06	02/ 1/10	DAG
		Rubidium - Extractable	0.0021	0.0002	mg/L	A510.06	02/ 1/10	DAG
		Saturation Index/Langlier	-2.	-14.	SI 4.4C	A038.01		calculated
		Saturation Index/Langlier	-1.	-14.	SI 40C	A038.01		calculated
		Selenium - Extractable	< 0.002	0.002	mg/L	A510.06	02/ 1/10	DAG
		Silicon - Extractable	0.2	0.2	mg/L	A510.06	02/ 1/10	DAG
		Silver - Extractable	< 0.0002	0.0002	mg/L	A510.06	02/ 1/10	DAG
		Sodium - Extractable	30.1	0.005	mg/L	A510.06	02/ 1/10	DAG
		Sulfate - Dissolved	180	5.	mg/L	A009.05		calculated
		Strontium - Extractable	0.104	0.0001	mg/L	A510.06	02/ 1/10	DAG
		Sulphate - Soluble	18.	10.	mg/L 204	A268.04	02/ 1/10	ALW
		Tellurium - Extractable	< 0.0001	0.0001	mg/L	A510.06	02/ 1/10	DAG

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ENVIRO-TEST ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	M.D.D.	UNITS	METHOD #	ANALYST	ANALYST
		Thallium - Extractable	< 0.0001	0.0001	ng/L	A510.04	02/ 1/10	DAG
		Tin - Extractable	< 0.0002	0.0002	ng/L	A510.04	02/ 1/10	DAG
		Titanium - Extractable	< 0.0005	0.0005	ng/L	A510.04	02/ 1/10	DAG
		Tungsten - Extractable	< 0.0002	0.0002	ng/L	A510.04	02/ 1/10	DAG
		Vanadium - Extractable	0.0001	0.0001	ng/L	A510.04	02/ 1/10	DAG
		Vanadium - Extractable	< 0.001	0.001	ng/L	A510.04	02/ 1/10	DAG
		Zinc - Extractable	0.023	0.005	ng/L	A510.04	02/ 1/10	DAG
		Zirconium - Extractable	< 0.0007	0.0002	ng/L	A510.04	02/ 1/10	DAG
		Trace Organics						
		Bromodichloromethane-Unpres	24.	0.2	ug/L	A718.03	02/ 1/21	TJJ
		Bromoform-Unpres	4.3	0.1	ug/L	A718.03	02/ 1/21	TJJ
		Chlorodibromomethane-Unpres	22.	0.2	ug/L	A718.03	02/ 1/21	TJJ
		Chloroform - Unpres	21.	0.1	ug/L	A718.03	02/ 1/21	TJJ
		THM - Total Unpreserved	62.	1.	ug/L	A718.03	02/ 1/21	TJJ
		Total Anions in Milliequivalents:	2.02					
		Total Cations in Milliequivalents:	3.04					
		Percent Error:	7.69					

COMMENTS FOR LAB NUMBER 02-A1717

LAB COMMENT

The portion of the sample for metals was preserved by the client prior to submission.

UNPRESERVED THM'S

This form of analysis allows trihalomethanes to continue to form between the time of sampling and the time of analysis. This gives a conservatively high estimate of the trihalomethane concentration.

ENVIRO-TEST LABORATORIES TEST METHODOLOGIES

Work Order W020100622

Conductivity, pH, Alkalinity in Water

ETL Method Number: A047.02

References: APHA 4500B, 1810B, 2320B, 1779

Principle of Method:

Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.

pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO_3^- and H_2CO_3 endpoints indicated electrometrically.

Total Coliforms and/or E. coli in Water by Membrane Filtration using m-ColiBlue21

ETL Method Number: A175.01

Reference: Mach # 10029 & APHA 9121B

Principle of Method:

This procedure is applicable to E. coli analysis for water samples. It is also used for Total Coliform analysis when only one 100 mL sample is submitted for both Total Coliforms and E. coli. If two sample bottles are submitted for these analyses, E. coli analysis as performed by this procedure, and Total Coliform analysis is performed by A151.

A suitable sample volume is poured through a membrane filter and placed in a petri dish prepared with m-Coli Blue 24 broth. The inverted plates are incubated at 35°C (100 for 24hrs). Coliforms that are not E. coli turn red because they reduce TTC (2,3,5 triphenyltetrazolium chloride) in the medium. E. coli turn blue due to the reaction between the enzyme beta glucuronidase and AcFo (5-bromo-4-chloro-3-indolyl-beta-D-glucuronide) in the medium.

Heterotrophic Plate Counts

ETL Method Number: A155.05

References: APHA 9115B, 1778

Principle of Methods

This is a procedure for estimating the number of live heterotrophic bacteria in water and measuring changes during water treatment and distribution or in swimming pools. In the pour plate method, samples are diluted and plated on to media. After incubation, the colonies are counted and reported as CFU/mL.

Colour, True and Apparent, in Water

ETL Method Number: A091.04

References: APHA, APWA, WPCF, Standard Methods for the Examination of Water and Wastewater, 19th Edition, Washington D.C., 1995. Methods 2130 Series

Principle of Method:

Colour is measured by visual comparison against a routinely calibrated color disk. Apparent color includes color due to substances in solution as well as suspended matter. True color is the color of water from which turbidity has been removed by centrifugation.

Chloride, Fluoride, Nitrate-Nitrite, Sulphate, Ammonia in Water

ETL Method Number: A144.05

References: Lachat QuikChem Methods

Principle of Method:

Chloride - Colourimetric using Mercuric thiocyanate
Fluoride - Ion selective electrode
Nitrate/Nitrite - Colourimetric. Cadmium with copper sulphate reduction
Sulphate - Turbidimetric
Ammonia - Colourimetric using Salicylate-nitroprusside and hypochlorite, in an alkaline phosphate buffer.

Solids in Water, Wastewater and Food Products

ETL Method Number: A001.01

Reference: APHA 254C, 1738, EPA 160.1, 1971, CFI# FL8192-010

Principle of Method:

Total Solids (TS)

The sum of the homogeneous suspended and dissolved material in the sample dried at 103 degrees C in a prepared casserole.

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Total Dissolved Solids (TDS)

The residue remaining in a prepared casserole after passing the sample through a 1.2 um Whatman GF/C glass microfibre filter and drying at 180 degrees C. Samples may be dried at 100 degrees C if the client specifically requests this drying temperature.

Note that TDS may also be calculated as follows: $TS - TSS = TDS$. The calculated TDS result will be reported under a unique analyte number for traceability.

Total Suspended Solids (TSS)

The residue retained by a prepared 1.2 um Whatman 734-AM glass microfibre filter dried at 100 degrees C.

Note that there is a low range Total suspended solids analysis available. A method detection limit of 2 mg/L can be achieved when 500 mL of sample is used. This low range analysis will be performed upon client request.

Volatile Total Solids (VTS)

The portion of the Total Solids driven off by ignition for one hour at 550 degrees C.

Volatile suspended Solids (VSS)

The portion of the Total suspended Solids driven off by ignition for one hour at 550 degrees C.

Volatile Dissolved Solids (VDS)

The portion of the Total dissolved Solids driven off by ignition for one hour at 550 degrees C.

OPERATING PROCEDURES

6.1 NORMAL OPERATIONS

6.1.1 System Overview

In general, all components of the Waste Water Treatment Plant work to:

- Collect and treat all sewage from the community including the Nuvuk Subdivision
- Discharge that sewage to the Prairie Bay ocean discharge through the outfall line.

The WWTP is equipped with three ports for accommodation of screening equipment. Initially, the first port is equipped with the lead mechanical screening plant accommodating all flows. The second port has been left vacant for future expansion. The third port is equipped with a static bar screen to accept overflows.

6.1.2 Screening Plant Flows and Operating Methodology

The WWTP is designed to accommodate flows from the following sources:

- Johnston Cove Lift Station at 40 L/s peak flow
- Nuvuk Subdivision Lift Station at 25 L/s peak flow
- Internal plant flows - negligible contribution

The upstream Johnston Cove and Nuvuk lift stations are designed to handle 100% of the peak flows utilizing a single pump and not allow overflows, that is all flows entering the station are to be pumped downstream and not overflow to surface. This means that should flows increase over peak values, the lift stations could possibly utilize 2 pumps thereby increasing their flows to approximately 125% of peak.

The WWTP is designed to reasonably handle all incoming flows and not discharge untreated effluent. The range of flows to the WWTP is from a low of 25 L/s with only Nuvuk peak flows entering the system, to 85 L/s with 65 L/s being the design peak flow. The 85 L/s would result from both lift stations experiencing above peak flows simultaneously (that is, 2 pumps at each lift station operating). The likelihood of both lift stations discharging above peak flows simultaneously (the travel time to the plant is different for each lift station) is minimal as the lead pump in each lift station is designed to handle peak flows. To design the plant to handle 2 pumps each from each lift station would require the screens to be largely oversized and unnecessary.