6.0 ENVIRONMENTAL

On October 25th and 26th, FSC Architects and Engineers, conducted an environmental sampling process on a selected group of houses identified by the environmental soils report. Based on this report, four (4) houses(approximately 10% of the total number of units) were used for the environmental sampling process. The previous report indicated high concentrations of zinc, lead and cadmium throughout the Nanisivik town site.

Using sampling procedures determined by the FSC Environmental Department, eleven (11) samples were obtained from each of the four houses, each consisting of a sample size of approx 10cm x 10cm and are as follows

- 6 dust samples taken from various parts of the house (return and supply duct work, window sills in the living room and a bedroom, closet located next to the bathroom and a sample obtained from the kitchen – either on top of the refrigerator or upper millwork). These samples were taken to determine the levels of zinc, lead and cadmium
- 2 paint chip samples taken from the front vestibule of each of the houses and from the lower millwork of the kitchen or wall of one of the bedrooms. These samples were taken to determine the levels for lead and PCB's in the paint.
- A ceiling tile sample was taken from one of the bedrooms to be analyzed for asbestos.
- A floor tile sample was taken from the mechanical room to be analyzed for asbestos.
- A piece of insulation from the hot water tank was taken as a sample to be tested for asbestos.
- Mercury tipping switches (as found in a thermostat) were noted as being present in each of the homes. This information was passed onto the FSC Environmental Dept.
- A search in each of the homes was conducted for fluorescent lighting, which may or may not contain PCB's in the transformers for each of the lights. None were found. This information was passed onto the FSC Environmental Dept.

6.1 Results

Three possible sources of contamination from 4 different houses were sampled for the Nanisivik Feasibility Study. Once the materials were sampled they were sent to Enviro-Test Laboratories in Edmonton for analyses. Enviro-Test Laboratories are accredited by the Standard Council of Canada / Canadian Association for Environmental Analytical Laboratories (SCC/CAEAL), American Industrial Hygiene Association (AIHA), and SCC/Health Canada, and certified by the National Environmental Laboratory Accreditation Program (NELAP).

The sources of contamination under consideration were:

- Asbestos
- Lead/PCB Paint
- Cadmium/Lead/Zinc Dust

Asbestos

In Canada, regulations state that the maximum acceptable concentration of asbestos is 1%. As shown in Table 1, none of the samples that had been taken contained detectable levels of asbestos and thus there is no asbestos contamination.

Table 1 Asbestos Results

Sample ID	Sample Date	Location	Asbestos Type	% Asbestos
H604-7.	26-Oct-02	Hot water tank insulation - Mechanical room	N.D	<1
H604-7	26-Oct-02	Hot water tank insulation - Mechanical room	N.D.	<1
H604-8	26-Oct-02	Ceiling Tile - Bedroom #2	N.D.	<1
H604-9	26-Oct-02	Floor tile - Mechanical room	N.D.	<1
H700-7	26-Oct-02	Floor tile - Mechanical room	N.D.	<1
H700-8	26-Oct-02	Ceiling Tile - Bedroom #1	N.D.	<1
H700-11	26-Oct-02	Hot water tank insulation - Mechanical room	N.D.	<1
H801-7	25-Oct-02	Ceiling Tile - Bedroom #1	N.D.	<1
H801-8	25-Oct-02	Floor tile - Mechanical room	N.D.	<1
H801-11	25-Oct-02	Hot water tank insulation - Mechanical room	N.D.	<1
H905-7	25-Oct-02	Ceiling Tile - Bedroom #1	N.D.	<1
H905-8	25-Oct-02	Floor tile - Mechanical room	N.D.	<1
H905-11	25-Oct-02	Hot water tank insulation - Mechanical room	N.D.	<1

N.D. None detected, Detection Limit: 1%

Paint

The next set of analyses performed was for lead and/or PCBs in paint. PCBs were undetectable in the paint, but there was some lead. Canadian Guidelines consider lead paint to be a toxin, but do not have a concentration values on the amount of lead that may be considered a hazard. We have used the U.S. Poison Protection Act (42 U.S.C. 4822 (c)) as our guidelines when dealing with lead concentrations. The following table shows the results.

Table 2 Paint Results

				Lead Poison Prevention Act (42 U.S.C. 4822(C))
				50,000 mg/kg
Sample ID	**Sample Date**	**Location**	**PCBs**	**Lead (mg/kg)**
			All Aroclors (mg/kg)	
H604-10	26-Oct-02	Vestibule #2	<0.3	190
H604-11	26-Oct-02	Bedroom #1	<0.3	10
H700-9	26-Oct-02	Bedroom #3	<0.3	520
H700-10	26-Oct-02	Vestibule #2	<0.3	30
H801-9	25-Oct-02	Vestibule #2	<0.6	30
H801-10	25-Oct-02	Lower Millwork - Kitchen	<0.3	40
H905-9	25-Oct-02	Vestibule #2	<0.3	210
H905-10	25-Oct-02	Bedroom #3	<0.3	<10

As shown in the above table the concentration of lead did not surpass the guideline limit, neither does the paint contain PCB's.

Dust

The dust in the house was tested for cadmium, lead and zinc. Table 3 shows the laboratory results of the samples. A control sample of the cloth used to collect the samples was analysed for background levels of the above noted parameters. The results listed as "actual" on this table are the result of subtracting the control values from the laboratory results.

There are no Canadian Guideline concentrations for any of these parameters. In the U.S., there are only concentration guidelines for lead dust. These have been used and are displayed in the following table.

Table 4 Lead Dust Contaminants

U.S. Protection Agency Lead Standards (40 CFR Part 745) January 5, 2001			**Floors - 40ug/ft2 Window Sills - 250ug/ft2**
Sample ID	**Location**	**Lead (ug/100cm2)**	**Conversion - ug/ft2**
H604-1	Window sill - Living room	76.8	713.5
H604-2	Window sill - Bedroom #4	20.1	186.7
H604-3	Supply Duct - Bedroom #3	34.6	321.4
H604-4	Closet next to bathroom	14.3	132.9
H604-5	Top of fridge - Kitchen	9.4	87.3
H604-6	Return air duct - Dining room	24.5	227.6
H700-1	Window sill - Living room	2.2	20.4
H700-2	Window sill - Bedroom #3	1443.7	13412.4
H700-3	Return air duct - Dining room	42.6	395.8
H700-4	Supply Air Duct - Bedroom #1	10.2	94.8
H700-5	Closet next to bathroom	<0.2	N/A
H700-6	Upper Millwork - Kitchen	<0.2	N/A
H801-1	Window sill - Living room	349.7	3248.8
H801-2	Window sill - Bedroom #4	819.7	7615.3
H801-3	Return air duct - Dining room	138.7	1288.6
H801-4	Supply Duct - Bedroom #3	33.5	311.2
H801-5	Upper Millwork - Kitchen	2.6	24.2
H801-6	Closet next to bathroom	<0.2	N/A
H905-1	Window sill - Living room	618.7	5747.9
H905-2	Window sill - Bedroom #3	22.1	205.3
H905-3	Supply Air Duct - Bedroom #1	5.1	47.4
H905-4	Closet next to bathroom	<0.2	N/A
H905-5	Top of fridge - Kitchen	<0.2	N/A
H905-6	Return air duct - Dining room	37.6	349.3

We have considered every item that is not a floor to fall under the windowsill parameter. As seen in this table, there is extensive lead dust contamination in these houses. Because we do not have results for flooring, and because of these elevated levels, we must assume that there has been dust ground into the floors that would most likely be well above the guideline limits.

6.2 Recommendations

In order to deal with the problem of dust contamination, the houses must be thoroughly cleaned.

1. All items in the house must be washed down from floor to ceiling, into all crevices.

2. Ductwork should be vacuumed using HEPA-filter type equipment.

3. If there are wood floors in the house, they should be sanded down in high traffic areas to remove the top layer of ground-in dust, then resealed.

4. During the cleaning of the houses, personal protective equipment (PPE) should be worn. PPE required would be a dust mask, gloves, and coveralls. Ensure that proper personal washing takes place after PPE is removed.

5. All surfaces in houses should be re-sampled following cleaning. We believe that to wash an entire house down to these specifications would take a four-person crew a full day to complete.