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March 20, 2000

Mr. Doug Sibold
Community Government Transportation
Bag 800
Government of Nunavut
Iqaluit, NU

RE: Qikiqtarjuaq Tannery Pilot Project

Dear Mr. Sibold:

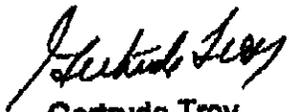
I wrote your office on March 07, concerning the pilot project of the Mirninguq Tannery at Qikiqtarjuaq to see if a tannery can be feasible and, if so, under what conditions. I have to have a draft report and a funding proposal prepared by March 27, 2000.

As I stated in my letter of March 07, the effluent from this pilot project will be held in containers until such time as a study will show what would be the best method of disposal. Attached is a letter from Mr. Stephen Shivas concerning the chemicals and effluents from this tannery.

I would like a reply in writing no later than Friday, March 24, concerning any regulation or comments that may be required from your office.

Thank you.

Sincerely,



Gertrude Troy
Project Coordinator

SHIVAS CONSULTING SERVICES*Tannery & Environment Specialist*

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188 Anne Street, N.
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March 14, 2000

Gertrude Troy
 Municipality of Qikiqtarjipaq
 NUNAVUT
 X0A 0B0

FAX (867) 927-8120

Dear Gertrude

I finally received your FAX at 5:08 PM on March 9th. You certainly have a massive assignment to accomplish by March 27th. I'll be glad to assist you in any way I can.

You asked me how much I charge for my services. Normally I get \$400. per day plus expenses. Since my contribution may help my fellow Canadian there I will work for \$200. per day plus all expenses. My new secretarial services charges \$22. per hour to type and \$1. per page to receive a FAX. Their phone and FAX numbers is (705) 728-6882.

I am also sending a separate letter to Don Pickle. It is being mailed because it is massive and not specifically applicable to your needs. It is more for interest sake and the Sewing Group. No doubt you can get a copy from Don Pickle of this separate letter.

This report to you covers the following subjects:

- I. ~~Comments on Sewage effluent specifications~~
- II. Business notes
- III. Priorities

Subject I Sewage

Since the tannery sewage will be picked up and trucked to the Municipal Sewage System my comments will deal with Schedule I. The tannery effluent will be mixed with the Broughton Island town sewage in the lagoon. We must be concerned about the tannery effects on the lagoon overflow of supernatant to the ocean and the sludge and solid waste going to landfill on Schedules III and IV.

Here are my comments on each Schedule I parameter that apply:

1. Aluminum at 50 mg/L. Formerly the tannery used Alum as a source of acid in the pickle. I propose using Nitre Cake instead. It is a solid salt which is easily transported. I do not expect any Aluminum to be present in future tannery effluent tests.
2. BOD₅ at 500 mg/L. Here I lack any realistic analytical data from this tannery. To the best of my knowledge the tannery effluent has never been precisely sampled to give a composite for testing which represents exactly what the tannery would create in sewage.

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Frankly if sewage does not meet Government Specifications there is little this tannery could do to correct a BOD-problem that is economically feasible. I doubt if the tannery sewage would affect the town's lagoon BOD test significantly in any case.

3. Chlorides at 1500 mg/L. The lagoon's supernatant will eventually flow into the ocean which is salt water. So why is anyone concerned about chlorides?

4. Chromium at 5mg/L. To meet this specification might be a tannery problem but it should not be. The specification does not state the state of the chrome. If the chrome salt was hexavalent this spec would be justified because Cr6 is a toxic, water soluble carcinogen. But the tannery will have or produce no Cr6 but only trivalent chrome with properties very different from Cr6. At pH's over about 4 Cr3 is insoluble and would settle in the sludge. As in tanning Cr3 readily reacts with protein to produce a leather which is insoluble. I am sure the town's sewage lagoon will contain ample protein to insolubilize all Cr3 the tannery produces.

If the Government Sewage Police disagree with my experience the tannery can try a number of corrective measures.

(a) The recent formula decreases the Cr added from 8% to 6% for economic and technical reasons. A normal tannery an 8% addition of chrome tanning salt is based on a purified hide substance which has had the hair, fat etc. removed. I believe we can produce a good tannage with only 6% Chrome salt because it is based on the hair on sealskin. The hair doesn't tan so less chrome is needed.

(b) Large tanneries now sometimes collect these exhaust tanning floats and recycle them to save chemicals. To do so at the Broughton Island tannery would require balling out the liquid from the drum, purifying it to screen out scrap pieces, skim off surface fats and acidify to use as a pickle. I doubt if the saving in water and chemicals would justify the labour costs. But if we had to in order to meet government specs it can be done.

5. Oil and grease at 1250 mg/L. Any fat sewered by the tannery would be seal fat - a natural product in that area. The tannery purposely scours fat from the sealskins and it ends up in the sewage. Scouring is essential to the process. I do not know if the emulsifier + fat produces an unstable enough emulsion that the fat would float to the surface where theoretically it could be skimmed off. Even if this occurred it would be a very labour intensive procedure.

6. PH 6.5 to 10.5. I suspect the tannery's mixed effluent would be close to 6.5. If lower, soda ash could be added to correct this at an added cost.

7. Sulfates at 1500 mg/L. Like chlorides the tannery's salt content is likely okay. But because local water is an expensive diffusion would be expensive. But what is the problem with a small amount of such salts going into the salty ocean?

8. Suspended solids at 600 mg/L. Like BOD the tannery is not equipped to treat their effluent to lower BOD or suspended solids. I do not know what this tannery's test would be. But in any case tannery suspended solids would produce no problem in the town's lagoon. These solids would be little pieces of leather or skin tear offs.

None of the other parameters in Schedule I will be tannery factors or even be present in micro amounts. None of the parameters in schedule III will be present in the tannery waste leachate. In Schedule IV the only parameter which would come from this tannery source is chrome. Since the tannery chrome in sewage would be in an insoluble state none would be in the leachate.

Subject II Business Notes

I gather from your FAX that the Sewing Group and the tannery will be operating as separate industries. This will demand some business acumen. The tannery management must learn to run the tannery as a profit seeking business and do the following:

1. Buy skins as cheaply as possible. It has been traditional to merchandise sealskins which were flushed, stretched and dried. Cheaper skins might be purchased before drying. This would save the tanner the first step of re-hydration and it would produce a bigger useable area without the peripheral stretch holes. More area means better price. There is a labour saving to the skin supplier so lower price is justified. The tannery would have to learn to process such skins immediately before they rot.

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2. The tannery would have to sell at the highest price possible even to the Sewing Group. It would likely require extra customers to get that price up by competition for the tanned skins.
3. I doubt if such labour production incentives as piece work rates for workers is possible in this plant. But productivity must be increased and labour cost decreased. A company profit bonus plan might inspire worker dedication and efforts.

In a compact, isolated, small community like Broughton Island a manager that demands cheaper skins, harder work, better quality, lower pay etc. could become very unpopular. A local selling job is needed with a slogan "if you want this tannery to operate here, it must pay its way with efficiency and produce a top quality product. We must work to earn a successful industry."

Many of the answers to these terms of reference can be found in Judy McGrain's own book. It will require a few months of a pilot run to work out the kinks, up quality and train help etc.

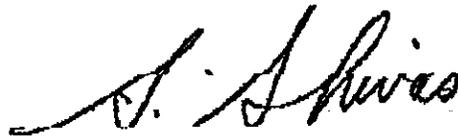
Subject III Priorities

It is very important to establish priorities:

1. There must be pilot runs to make a first rate product which will sell to satisfy the customers.
2. Then improve efficiencies, lower cost etc.
3. Once the above are okay then make a carefully monitored sewage sampling representative of the total tannery's normal production sewage. Have this sewage sample analyzed. Don't fool around with sewage grab samples then change the process to improve leather quality. The process must be established first. Early sewage tests are a waste of time.

If you wish I am available to go there and help run the pilot tests.

Yours truly



Stephen Shivas

Schedule II: Standards for Non-point Sources Discharges

Concentrations not to be exceeded

PARAMETER	EFFLUENT OBJECTIVE (mg/L)
Aluminum	1
Ammonia	10
Arsenic	1
Barium	1
Cadmium	0.1
Biochemical Oxygen Demand	15
Chlorine	1
Chromium	0.1
Copper	1
Cyanide	0.1
Fluoride	2
Grease, Fat, Oil	15
Iron	1
Lead	0.05
Mercury	0.0006
Nickel	1
pH Range	6 - 10.5
Phenolic Compounds	0.02
Phosphorous	1
Silver	0.1
Suspended Solids	15
Tin	1
Zinc	0.5

Schedule III: Standards for Solid Waste / Process Residuals Suitable for Landfill

Leachate test results not to exceed 100 mg/L	
PARAMETER	PARAMETER
Ammonia sulphide	Maleic anhydride
Benzidine	Methylamine
Benzyl chloride	Potassium permanganate
Diethylamine	Quinoline
Ethylamine	Strychnine
Ethylenediamine	Tetrachloroethanes

Schedule IV: Standards for Solid Waste / Process Residuals Suitable for Landfill
(based on Leachate quality test results)

PARAMETER	CONCENTRATION (mg/L)
Arsenic	2.5
Barium	100
Cadmium	0.5
Carbon Tetrachloride	0.5
Chromium	0.5
Cyanide (free)	20
DDT	3
Endrin	0.02
Heptachlor + Heptachlor epoxide	0.3
Lead	5
Lindane	0.4
Mercury	0.1
Methoxychlor	10
Methyl ethyl ketone	200
Metolachlor	5
PCBs	50*
Selenium	1
Silver	5

Tetrachloroethylene	3.0
Toxaphene	0.5
Trihalomethanes	10
2, 4, 5-TP (Silvex)	1
Zinc	500

* Based on Concentration by Mass

7.0 Bibliography

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