1614P JAD February 19, 1986

PROPOSED WILLOWBANK WINERY PARAMETERS

- initially annual production will run to 15,000 gallons; the ultimate capacity, several years hence, may range to 60,000 gallons

- for the proposed winery, a building size of 46 feet by 80 feet is appropriate, together with approximately one-half acre of land

SITE SELECTION:

- unit o, Niagara on-the-Lake Business Park, Niagara Stone Road, Virgil, Ontario. See Schedule A

- traffic routes: receiving grapes, supplies for control of fermentation and amelioration of musts and wines and other raw materials

  : receiving, bottling and casing supplies; and shipment of wines

- parking : visitors

  : employees

GENERAL PRODUCTION FACILITIES

The main facilities required for the production of table wines are:

1. a grape-receiving area (including eventually a platform scale and testing facilities);

2. crushing facilities including unloading area; can provide access to outside with De-stemmer Crusher inside and garage door to permit access; bin to catch refuse, and garbage bin to catch stems in volume of approximately 8% of weight;

3. a tank room for receiving and fermenting red grape must and for receiving white grape must, separating free-run juice and pumping this into closed

fermentors; where fermentation is completed, wines are racked, filtered, fined, aged and stabilized;

4. the bottling, bottle-storage, and casing room;

5. the shipping department.

Facilities should be provided also for a laboratory for quality control of grapes, fermentation, new wines and finished wines, and for other necessary research and development.

Separate facilities should be provided for boiler and refrigerator compressor, and areas for repair and maintenance operations.

All working areas generating off-odors or subject to possible contamination should be well separated from the wine storage area.

Adequate washroom and eating areas for employees must be provided.

PLATFORM SCALE

- Provision should be made in the Site Plan for a platform scale to be located at the side of the winery, so farmers can pull in loaded, weigh in, go to the back and unload, and weigh out upon exit; this will be constructed at a later date; initially other scale facilities will be utilized

- The Toledo Scale Model 7530 is appropriate. The Model 7530 foundation generally requires excavation for only the load bearing piers. The piers are tied together in a monolithic design preventing shifting and subsequent weighing inaccuracies due to environmental or use-related stresses

- The platform size is 40' x 10'. The scale requires a separate source of 110 volt (+/-10%), 60 Hz power, and installation of surge voltage protection kit

MAIN BUILDING

- sufficient insulation to help maintain the required temperature

- a source of heat should be provided for laboratory, offices, tasting room and other employee areas

- ready ingress of must and other supplies into the winery and commercial shipment of wine via truck

- single storey, straight line production

- lighting and ventilation requirements vary with operations; high ceilings and adequate windows or vent space are needed in the tank room to remove gaseous fermentation products and for cooling; the winery should have four to six skylights with ventilating fans to permit diffusion of carbon dioxide, etc., emitted from the fermentation process; the bottling room should be well lighted and ventilated and easily cleaned and sanitized

- the window and door areas should be properly designed for adequate lighting and convenience of entrance and exit

- to avoid heating during the day and to prevent contamination with fruit flies, lighting should not be excessive

- the floor should be properly reinforced concrete covered with a smooth water proof cement finish resistent to wine; the final cement coat on floors and over drain surfaces should be covered with an adherent, inert, flexible coating; the floors should be strong enough to bear the compression and vibration load required; throughout the winery, particularly in the tank room, they should be well sloped for drainage so they can be easily washed and kept clean; there should be no low areas where water or wine may accumulate; drains should have smooth well rounded bottoms to prevent accumulation of materials, should be covered with a removable iron grating, and should be numerous, large enough, and with sufficient slope for maximum drainage flow; there should be no corners where refuse and pomace can accumulate; no areas which cannot be reached by a stream of water

- fermenting and aging and storage tanks should be set on fairly high concrete pads to facilitate cleaning and inspection and repair of bottom surfaces; the concrete pads should be notched below the discharge valves of the tanks to permit attachment of hoses; the concrete pads can be constructed by the tank supplier

- racks for storage of barrels for aging smaller lots should be accessible for handling by fork-lift trucks, and facilities for bottle storage in suitable racks should be provided

UTILITIES AND SERVICES

- a high pressure cold water supply, with many readily accessible outlets throughout the winery,is essential; water is used in washing and rinsing tanks and floors; water usage will come in washing out the tanks containing materials such as juice lees, bentonite, wine lees and precipitated potassium bitartrate; additional water will be consumed in the washing out of the processing equipment such as presses and filters and will contain material such as juice/wine lees, bentonite and diatomaceous earth; the amounts of these latter two materials will be kept at a minimum and should be able to be disposed of directly into refuse bins for subsequent removal by garbage trucks; further water utilization will come from the washing and sanitizing of the bottling equipment; see Schedule B for anticipated water requirements

- adequate lighting, particularly in the bottling area and the laboratory, is necessary. Diffuse daylight is preferable in the laboratory, but suitable artificial lighting in the bottling area and other working areas will suffice. Numerous protected electric outlets for current of various power loads are a great convenience in winery operations; non-sparking waterproof connections should be made available where alcohol vapors may be present or where water might splash onto and into a motor or connection; in general electrical plugs are required for every two tanks on the tank pads - voltages will vary - 110, 440, 550 volts, depending on pump requirements; in addition 4 or 5 electrical plugs should be installed on roof - 110 volts, so power is available at tops of tanks

CRUSHING OPERATION

- the unloading, crushing and stemming operations are usually separate from the rest of the winery to facilitate delivery of grapes and disposal of stems, for ease of cleaning and to avoid introducing fruit flies into the winery; this is best done by incorporating the De-stemmer Crusher in an enclosed outside area with a garage door

- farmers transport grapes to winery in trucks or tractors with wagons; generally in one or two ton containers

- the trucks are weighed, usually on a platform scale, either at the winery or at another location

- upon arrival at the winery the grapes are sampled, inspected and unloaded

- the containers are unloaded by fork-lift and dumped directly into the hopper at the top of the De-stemmer Crusher (eight feet high); the grapes are then crushed by a motor driver rolls allowing the pomace to drop into a button-holed screen drum with a paddle conveyor to remove the stems; this complete outfit must be set over some sort of container to catch the pomace

- must have a source of hot and cold water for clean up

- drainage must be effective: sloped floor; central drains with floors sloping inwards towards them

- garbage bin to catch stems and leaves

- a piston-type pump and closed pipe lines carry the must from the must sump to the pressing operation; crushed white grapes are pumped to the Dejuicer and then to the press where the skins are pressed, and the pressed juice, combined with the free run, is pumped into a tank for chilling and subsequent fermentation; crushed red grapes are pumped to an uninsulated tank for fermentation - after three to four days on the skins, the juice is drained off to either an uninsulated or an insulated tank and the skins are pumped to the Dejuicer and then to the press for pressing and the juice obtained is added back to the free run

PRESSING OPERATION

- the Dejuicer complements and tremendously increases the capacity of the grape presses by removing the free juice before the pomace is compressed; the pomace is pumped or dropped into the stainless hopper where it is gently augered up through a perforated stainless tube;

- adjacent to the De-stemmer Crusher but separated from it by a wall; this operation involves a Dejuicer machine and a continuous press

- the Dejuicer is indispensable for the vinification of white grapes and for separating the virgin must from the dregs of grapes; in the vinification line, the Dejuicer is used before the press in order to take the greatest advantages from its specifications

- continuous pressing is used for the vinification or pressing of white grapes and for the fermented dregs of grapes, with considerable reduction of manual labour

- a reservoir (i.e., a hole in the floor holding 300 gallons) should be installed in front of the press to catch and retain the press juice prior to its being pumped back into the free run to complete fermentation

- must have good drainage and water sources

TANK-PROCESSING AREA

- this area includes:

    . fermentors
    . pumps for wine
    . pomace pumps
    . cooling equipment
    . filters

- the processing area should be located in a centralized area

- should have good drainage, as well as water source for clean up

TANKS

- initially 15,000 gallons total capacity, plus room for expansion up to 60,000 gallons
- all valves to be ball valves 2" or 1 - 1/2"
- tank room height is 22.5 feet high

Tanks:

(A) Primary: 5 - 2,000 gallons) 15,000
5 - 1,000 gallons) gallons

- all should be insulated tanks, except for two 2,000 gallon tanks which will be jacketed, but not insulated
- man-way
- sloped bottom tanks (slope away from walls)
- a one-foot clearance for walking between tanks is required - need room to walk between tanks with a hose
- tanks (other than hot press tanks) are insulated, but not jacketed, so tank size is increased by one inch for insulation; hot press tanks are not insulated, but are jacketed
- corridors in tank room must be wide enough to allow access to fork-lifts; fork-lifts must be able to turn around at corners
- fluorescent lights should be installed over tanks
- tanks vent at top, so some ventilation is required
- tanks are constructed in place; each tank is built on a 18 inch concrete pad; all tanks will be constructed to a uniform tank height of 16 feet; 5,000 gallon tanks are approximately 8' wide; 3,000 gallon tanks are 6'3" in diameter; 2,000 gallon tanks are 5'2" in diameter; 1,000 gallon tanks are 3'8" in diameter; all widths are to the knuckle

(B) Secondary:

- 3 - 100 gallon tanks + 2 - 200 gallon tanks (site wherever there is room)

  4 legs

- jacketed and insulated

  (See picture in Schedule C)

- slots in legs big enough to accommodate the forks of a fork-lift

- man-way large enough to allow person to get shoulders in or to crawl in

- top totally covered by a lid hinged in the middle

- two valves

- sloped bottoms

(C) Tertiary:

- 3 or 4 100 l s.s. tanks (start with one or two)

- tanks should be jacketed and insulated for use in production of very small lots of wine such as Eiswein.

CATWALKS

- it is necessary to have catwalks around the top of the tanks to enable access to tank tops; chimney top should be waist high from the catwalk

- catwalks should be 30 inches wide

EQUIPMENT AND HOSES

- all materials with which the musts and wines come into contact should be resistant to corrosion; should add no undesirable flavours, odors or metalic ions to the musts or wine; and should be easily cleaned and sterilized

- several types of filters are used in wineries; these vary from the plate-and-frame or vacuum filters used for rough filtration to fine or polish filtration for bottling

- equipment valves should be ball valves, 2" or 1-1/2"; 1-1/2" lines are used for pumping wines in the winery; 2" lines are used for pumping wines with skins, etc.

- rubber hoses are used for much of the transfer of wines; only the best-quality, smooth-lined hoses should be used; these should be thoroughly conditioned before use by running dilute citric acid through them; after use they should be disinfected and kept dry

- it is not expected that permanently installed pipes will be required

- pumps are used in wineries for transferring musts, lees and wine; the wine may be pumped rapidly, as in moving from one tank to another; at a moderate rate, as in filtering or cooling; or slowly, as in bottling; they must have the required capacity and pressure at the maximum suction head and at the maximum delivery head; they must be capable of handling fluids of varying viscosity and density and should give the required suction head; if the suction inlet is above the liquid level the pumps ought to be self-priming, or at least easily modified to make pump quick and easy; different types of pumps are thus required in different winery operations

- see Schedule "D" for the equipment list

CHILLING OF WINE

- all chilling of juices and wines will be done using a chilling unit to cool the juice and wine; occasionally during the fermentation period a re-chilling of the fermenting must will have to be carried out. This is done by pumping the juice or wine from the bottom of the tank into the chiller, and then from the chiller into the top of the tank. We do not propose to utilize water flowing over the tanks (trickle-cooling) for cooling

- on the un-insulated tanks we propose to have jackets allowing us to run a chilling solution through them in order to cool down any skin-contact fermentation

HOT ROOM

- contains a boiler to make hot water for washing tanks; the hot room is o ' x o '

COLD ROOM

- an area of 17 feet by 20 feet approximately
- for small quantities of wine
- cool to -5 degrees centigrade
- permit access for fork-lift to move tanks
- holds smaller tanks and pumps
- contains a cooler and a pre-fab cooling box.

LABORATORY

- an area of 16 feet by 20 feet approximately
- contemplate two desks, two filing cabinets, two sinks
- should have ventilation to outside
- 2 separate sink areas
- space for refrigerator
- 3-4 sources of
  (i) gas
  (ii) air
  (iii) vacuum

RECEIVING AND SHIPPING

- shipping and receiving is by transport trailor truck
- a truck holds 22 to 24 shipping pallets at one level high

WAREHOUSING

- approximately 1320 square feet is required for warehousing
- warehousing is required for three days bottling at 1,000 gallons or 500 cases per day; consequently warehousing should be provided for 3000 cases - 1,500 incoming and 1,500 outgoing
- 18 incoming pallets convert into 36 shipping pallets
- for pallet sizes see Schedule "E" attached hereto
- miscellaneous storage is required for storage of supplies, chemicals, sugar, 100 shipping pallets
- check mezannine space availability over processing area and bottling area

BOTTLING ROOM

- separate room, properly arranged and with adequate ventilation, heat and light, and for adequate storage space for empty and filled bottles
- one pallet in and one pallet out as a minimum
- for the first year white wines will be bottled in June or July, for immediate release; in subsequent years, white wines will be bottled in May and blended white wines as required; red wines are barrelled in January for up to a year, and bottled as required
- bottling room is approximately o feet square, ceilings must be at least 12 feet high
- bottling room should have outflow air system to keep bugs out
- door should be 8 feet high to permit access of pallets

BARREL AREA

- barrels can be stored haphazardly around the winery, or more preferably in a separate area

- barrels are used to store small quantities of red and white premium wines requiring long term storage
- ultimate capacity should contemplate storage for initially 15, ultimately 60 barrels
- barrels are stored in racks, generally in a staggered arrangement to permit cleaning underneath the barrels

TASTING ROOM AND RETAIL FACILITY

- a counter to pour wine samples
- walls to permit displays
- some storage of sampling wines and wines for sale
- area to be small
- must have a sink and small fridge as well as chairs (4-5)

AMENITIES FOR EMPLOYEES

- can be an informal area
- likely 2 to 6 employees
- during the year, only two, at vintage six
- a small area with table, chair, etc.

OFFICE

- small office area with a couple of desks, telephone, etc.

MUNICIPAL SEWERS

- the applicable by-law for the Regional Municipality of Niagara is the sewer use by-law No. 3308-83

- to apply for a municipal sewer hook-up it is necessary to complete an application entitled "Details Relating to Sewer Discharge"

- see Schedules "F" and "G"

GARBAGE

- a six-yard bin should be adequate

- for small bins, use small bulk bins

SCHEDULES

A - Site for Winery
B - Water Usage Chart
C - Picture of Secondary Tanks
D - Equipment List
E - Skid and Area Calculations
F - Waste Generation and Disposal
G - Niagara Sew By-law ~~x~~ Sewer

Schedule "B"

Harvest & transport to winery in ~~1/2~~ 1 or 2 ton bins (5 gals ~~1/2 of~~ 2 H_2O per bin)

CRUSHING/DE-STEMMING OF GRAPES

↓

Pumping of the crushed grapes down a stainless steel pipe to either tanks for skin contact or to presses for immediate pressing of the skins

(skin contact)

juice is given skin contact/wine fermented on skins

↓

wine/juice drained to another tank, skins removed and pressed and tank cleaned (200)

↓

pressed skins are disposed of and press is washed (200)

↓

(fermentation progresses)

↓

at completion of alcoholic fermentation wine is racked to clean tank; lees are D.E. (40 KG) filtered for disposal and tank is washed (200)

↓

MLF progresses

↓

at end of MLF wine is racked to clean tank; lees are D.E. (40 KG) filtered for disposal and tank washed (200)

↓

wine in new tank is treated with sulphur dioxide and bentonite (0.2% w/v) and left for cold stabilization

↓

wine is D.E. filtered off of tartrates and bentonite; bentonite is removed for disposal; tank is washed (200)

(no skin contact)

skins are pressed and juice combined with free run and pumped to tank; press washed (200)

↓

juice is chilled and D.E. (40 KG) filtered prior to fermentation; tank cleaned (200)

↓

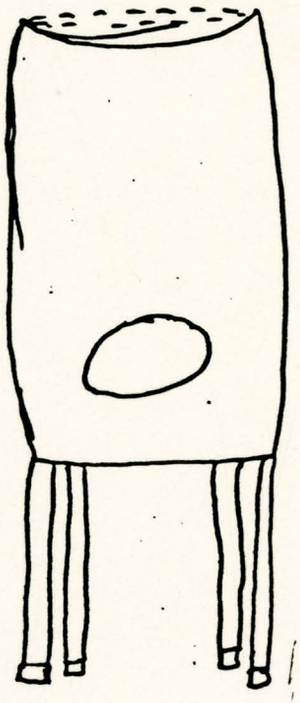
at completion of alcoholic fermentation juice is racked to a clean tank; tank is washed (200) and lees filtered for disposal (40 KG)

Note:

1. 40 KG refers to 40 KG D.E. per 1,000 gallons
2. (200) refers to 200 gallons water

(1) and (2) above will not be constant throughout

SCHEDULE "C"



SCHEDULE " D "

EQUIPMENT LIST

1. *De-stemmer Crusher. DVP/35 Mearelli (capacity 3.5 tons per hour)

2. Presses

   *(a) Screw press and pump - Enopress 350

   *(b) De-juicer-model SV/250.

   (c) Vaislin 3 H.L. Horizontal Press

3. Pumps

   *(a) 2 - self-priming centrifugal pumps - model PAS-A.

   *(b) 2 stainless steel piston MEC smeraldo 85-1-piston - quick release fittings

4. Filters

   *(a) Lees Filters (to come)

   *(b) Diatomeceous Earth (D.E.) filter with closing unit - model Emme 1/ECO 20 HL/H

   (c) Plate and Frame filter - possibly, model omess spadoni 40x40 cm model 12-20.

   (d) Pall Filters

5. *Hoses - 1-1/2" - 2" hose - quick release fittings (Price approximately $7)

6. *Hot Room

   . For hot water production for tank cleaning, bottling room cleaning, etc. - to be supplied by E.S. Fox - size of an ordinary house furnace.

7. *Chiller (Two Stage)

   . a stationary chiller for tanks (15 H.P.)

8. Bottling Room Equipment

   . bottle cleaner

   . line to filler S.S.

   . filler

   . line to corker (conveyor tracks)

   . corker

   . line to labeller

   . labeller

   . line through heat shrinker to packaging area

9. Bottles (2.54 per case); Corks (o.06951 cork); Act Carbon; o.0004/grms

10. Eventually we should consider purchasing a small R.O. unit

11. *Miscellaneous barrels, mixer, pails, brushes, brooms

12. *Lab scale schenk

13. *Fork-lift (Propane)

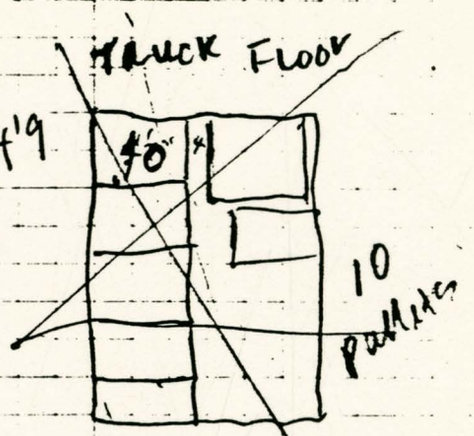
14. Toledo Scale - Model 7530
    Concrete Deck Low Profile
    Motor Truck Scale (ref. form TC 6005)
    Platform Size - 40' x 10'
    Capacity - 60,000 lbs.

15. *Barrels

    - initially 15, up to 60 barrels

SCHEDULE "E"

Skids



Incoming

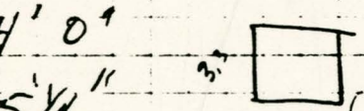
1) Width 4'9"
2) Length 3'7" } SKID
3) Height 5½"

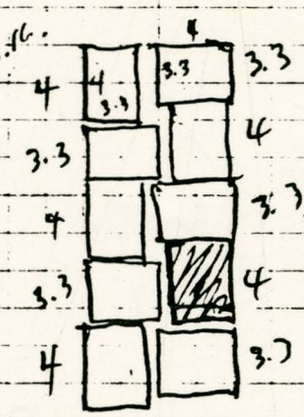
4) Height of 375 ml. bottles (including skid height)
6' 8½" (8 cases high)

Outgoing

1) 3'4¼"
2) 4'0"
3) 5'¼"
4) 4'4" (5 cases high)

3.3 x 4. x 4.3 = 56.76 cu ft
x 6.2 gal/cu ft = 354/112 = 3.16 gal/cu ft





One Litre Bottles

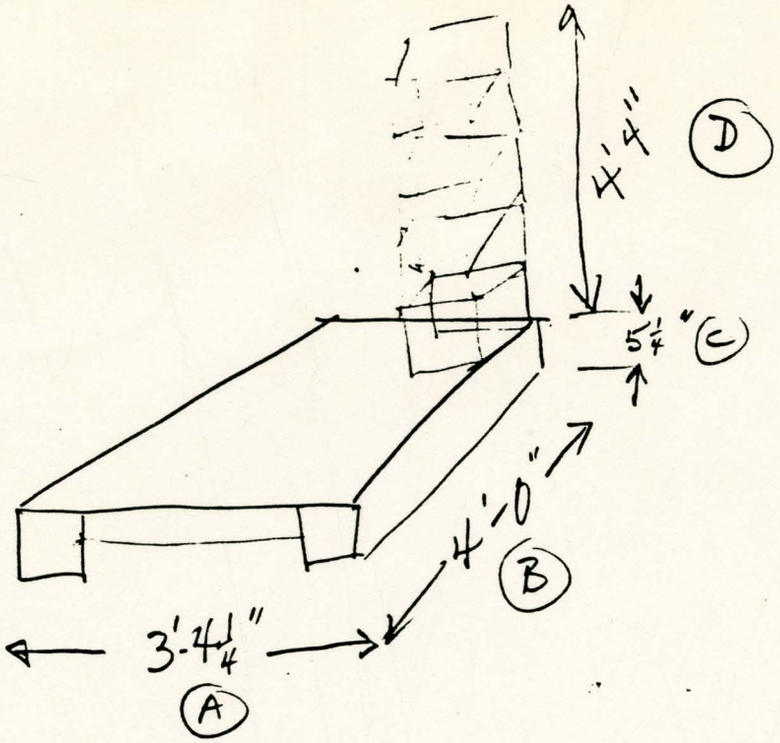
Height of 6 cases + skid 6" 11½" ⇒ 1 INCOMING

1 case height: 1'1"

750 ml. Bottles

Height of 4 cases + skid 4" 4½" ⇒ 1 INCOMING

1 case height: 1'¼"



Vol required

1 skid of 750ml bottles × 12 b/case × 56 cases

occupies A × B × (C+D)

3.3' × 4' × 4.8' = 69.7 cu ft

(× 6.24 gal/cu ft.) = 434.93 gal

∴ 1 skid of 112 gal of wine actually takes up 434.93 gal of air space or 3.88 gal of warehouse space per gal of wine minimum!

+ at least 2 foot clearance.

Assuming we go 3 skids high.

∴ 3 skids × 112 = 336 gal of actual bottled wine takes up 13.2 sq feet of floor space.

SCHEDULE "F"

WASTE GENERATION AND DISPOSAL

FORMS:

(1) Stems

For 15,000 gallons of wine, the approximate volume of stems generated would be 8 tons. The quantity of stems would be proportionately larger for increased volumes.

(2) Grape Skins (/Seeds)

Sufficiently strong pressing of these skins, either after fermentation on the skins or immediately upon receipt, can generate a very dry, and fairly odourless end-product. These skins can then either be removed immediately for land-fill incorporation or they can be removed and stored in closed containers for removal at a later date when sufficient volumes have accumulated.

Volumes generated would be (approximately):

(i) for initial 25,000 gallon capacity - 22.5 tons

(ii) for final 60,000 gallon capacity - 60.0 tons.

(3) Juice Bottoms

Material settling out of the juice during refrigeration prior to fermenation will not be disposed of but will filtered through the use of a Diatomeceous Earth (D.E.) filter for subsequent fermentation.

Hence no waste will be generated from this source.

(4) Fermentation Lees

This material, consisting of yeast cells and sedimented juice materials, will represent a volume of 500 gallons for the initial 25,000 gallon capacity and 1,200 gallons for the final 60,000 gallon capacity.

This material can be disposed of in a number of manners:

(i) pumping the material up to septic tank;

(ii) filtration of the material with the use of a D.E. filter. This would generate a clear, and substantially reduced in odour, effluent which can be either treated as in (i) above; removed immediately for disposal in soil irrigation; or accumulated in an internal system for removal when sufficient volumes have accumulated,

(iii) immediate removal by a pumping truck.

(5) Bentonite and Tartrates

Bentonite usage is in the area of 0.1% (weight/volume (w/v)) and hence for our initial capacity of 25,000 gallons will be approximately 6 kilograms (13 pounds) and for the final capacity of 60,000 gallons will be approximately 13.5 kilograms (29.5 pounds).

Allowing the bentonite to be compacted by tartrate decomposition will produce a material which, while being moist, will not be wet, and hence can easily be removed from the tanks and stored in a "refuse room" prior to disposal.

SCHEDULE "F"

– Mike Glynn
Region

Details Relating to Sewage Discharge Instructions

The wastes to be in compliance with Sewer Use By-law #1579-1530-76.

Note: - All flows that are to be directed to a water course must be approved by the Ministry of the Environment.

- All connections to a municipal storm or sanitary sewer must be approved by that municipality.

The information form shall include the completed questionnaire together with any plans, reports etc. to satisfy the following items "A" to "E" where applicable.

(A) Process Description, Water Supply & Waste Disposal

A written description including a flow diagram of industrial process(es) sufficient detail to indicate:

(i) Quantity of water used in specific process(es) and/or industrial operations (Item 6).

(ii) Quantity and Quality of wastes arising from water use or other liquids (Items 7 & 8).

Where the quantity and/or quality of wastes varies according to industrial operating procedure, the variation in rates of flow (normal, maximum and minimum) and the maximum and average concentrations of waste components shall be given.

B) Physical Lay-Out

A layout sketch of property (to scale or approximate) to co-ordinate buildings, treatment or disposal works, property boundaries, effluent lines sampling manholes, and proposed sanitary sewer or storm sewer connections.

C) Design of Treatment Works

Engineering reports on the proposed works shall indicate:

(i) Expected flow and concentrations of liquid industrial wastes, and means of measuring, from all processes contributing to the treatment plant influent (Items 7 & 8). A flow diagram is suggested.

(ii) Functions, capacity and operation of the individual components comprising the pre-treatment facilities, and the system as a whole. Performance data should be given where possible.

(iii) Quantities of treatment chemicals.

...2