2.3.1.5 De-liming and Bating

At this point in the process, the hides are hair-free, swollen, and moderately clean. The alkaline chemicals used in the unhairing process are still present in the hides, however, and in relatively large amounts. The hides will be washed again with water and de-limed in large mixers to eliminate the alkaline chemicals and prevent interface with subsequent tanning chemistry. To speed up de-liming, Ammonium salts will be added to neutralize (i.e., lower the pH to ~8) or convert the residual alkali into soluble components, which will leach from the hides into the wastewater. The hide de-swells as the alkalinity is reduced and water is released, producing liquid waste and trace quantities of ammonia gas (cf. Sections 2.4 and 4.2).

On occasion, or as necessary, proteolytic enzymes (referred to in the industry as "bate") are also added to clean up the grain surface and further destroy any remaining hair roots and pigments. This process makes the grain surface softer and cleaner. The de-liming salts adjust the pH of the hide to the appropriate range for enzyme use. Typically, the bate is required for further removal of any undesirable constituents of the hide, but the pH must be managed so that the enzymes will not be denatured when added to the drum. When the enzymatic unhairing is completed, the hides are washed thoroughly.

2.3.1.6 Pickling

One final step remains to prepare the hides for tanning. Since chrome-tanning agents are not soluble under the alkaline conditions used in the dehairing step, a pickling process is necessary to alter the hide chemistry and create an acidic environment required for tanning.

In this step, salt, followed by sulphuric acid, will be added to the hides immediately after bating (if bating is required). Salt is initially added prior to the addition of sulphuric acid because adding acid alone would cause the hides to swell. Following the addition of the salt and acid, the hides will be in a preserved state.

2.3.1.7 Tanning

Tanning is the process that stabilizes the collagen fibres of the hide so that they are no longer susceptible to bacterial or fungal putrefaction or rotting.

Modern tanning is based on the use of either trivalent chromium (Cr^{+3}) or vegetable tannins. The chrome method of tanning will be used at the proposed Colony tannery. This method of tanning is accomplished in a relatively short period of time, and produces leather that has the best combination of chemical and physical properties required for leather manufacturing.

Chromium binds to the proteins in hide collagen and renders them stable (i.e., resistant) against bacterial action. Careful preparation of the hide is needed to ensure complete binding of the chromium provided in the solution. Chromium that is not bound by the leather is precipitated in downstream processes as unreactive chromium oxide (Cr_2O_3; cf. Section 2.3). Chrome tanning formulations and processes vary from one type of leather to the next, and vary among tanneries.

Once adequate penetration of the chromium has occurred, the pH of the system is slowly raised to increase the fixation of chrome with the skin protein, by adding mild alkali. The leather is fully tanned when it is resistant to heat and won't denature (or shrink) at 100°C. The extent of tanning can be controlled by the management of liquor pH, temperature, and processing time. This completes the tanning stage.

2.3.1.8 Wringing

Wringing is the process whereby excess moisture is squeezed out of the hides by passing them through large rollers, under pressure. This step follows tanning.

2.3.1.9 Shaving

During this process, the hide is run through a shaving machine to mechanically shave the hides to a desired thickness. The shaving process also removes any unwanted material from the flesh side, creating some solid wastes (cf. Section 2.4.2.2).

2.3.1.10 Colouring and Fat Liquoring

Following chrome tanning, all hides have a characteristic blue colour caused by the chrome tanning solution. "Colouring" is the process in which the wet blue colour is neutralized by removing the free acids from the hides. This step determines many of the properties of the leather when processing is completed. Following the removal of the blue colour, vegetable extracts and syntans are added to give the leather its desired feel and character. Dyestuffs are then added to colour the leather to a desired shade.

Colouring will be conducted by placing the shaved hides into large cylindrical drums filled with dyestuff-containing colouring liquor. The colours used will be dissolved in hot water and added through a hollow axle of the rotating drum. The dye combines with the hide fibres to form an insoluble compound that becomes part of the hide. The Colony is currently contemplating initially colouring the hides to 3 different colours, though it may increase or decrease the number of colours in the future, based on market demand.

Fat liquoring is the last of the wet-chemical operations to which the leather is subjected. It is the process by which the fibres are lubricated. By varying the type and amount of fat liquor, the tanner can produce leather with a range of softness and suppleness characteristics. The basic ingredients in fat liquoring are oils and related fatty substances produced from various animal, vegetable, and minerals sources. They are combined with emulsifiers to make them water miscible.

Fat liquoring occurs after the hides are coloured and washed to eliminate residual dye. The fat liquor is dispersed in hot water and added to the rotating colouring drum for about one hour. The fat liquors (oils) are added to coat the fibres in the hide structure so that the leather will remain flexible and soft after drying.

2.3.1.11 Setting Out

Following colouring and fat liquoring, the hides are flattened, through a process known as setting out. This process increases the size of the hides and smoothes out any surface imperfections.

2.3.1.12 Drying and Conditioning

Following the setting out stage, the hides will be hung and air-dried to reduce moisture. The final moisture content of the hides will be between 12% and 18%. After the hides are dried, they become stiff and less flexible. To soften the hides, they will be placed in milling drums and tumbled to make them more supple. The hides will then be mechanically treated in a staking machine to further soften and flatten them. Staking is accomplished on machines with a very large number of rapidly oscillating, overlapping pins.

2.4 WASTE STREAMS

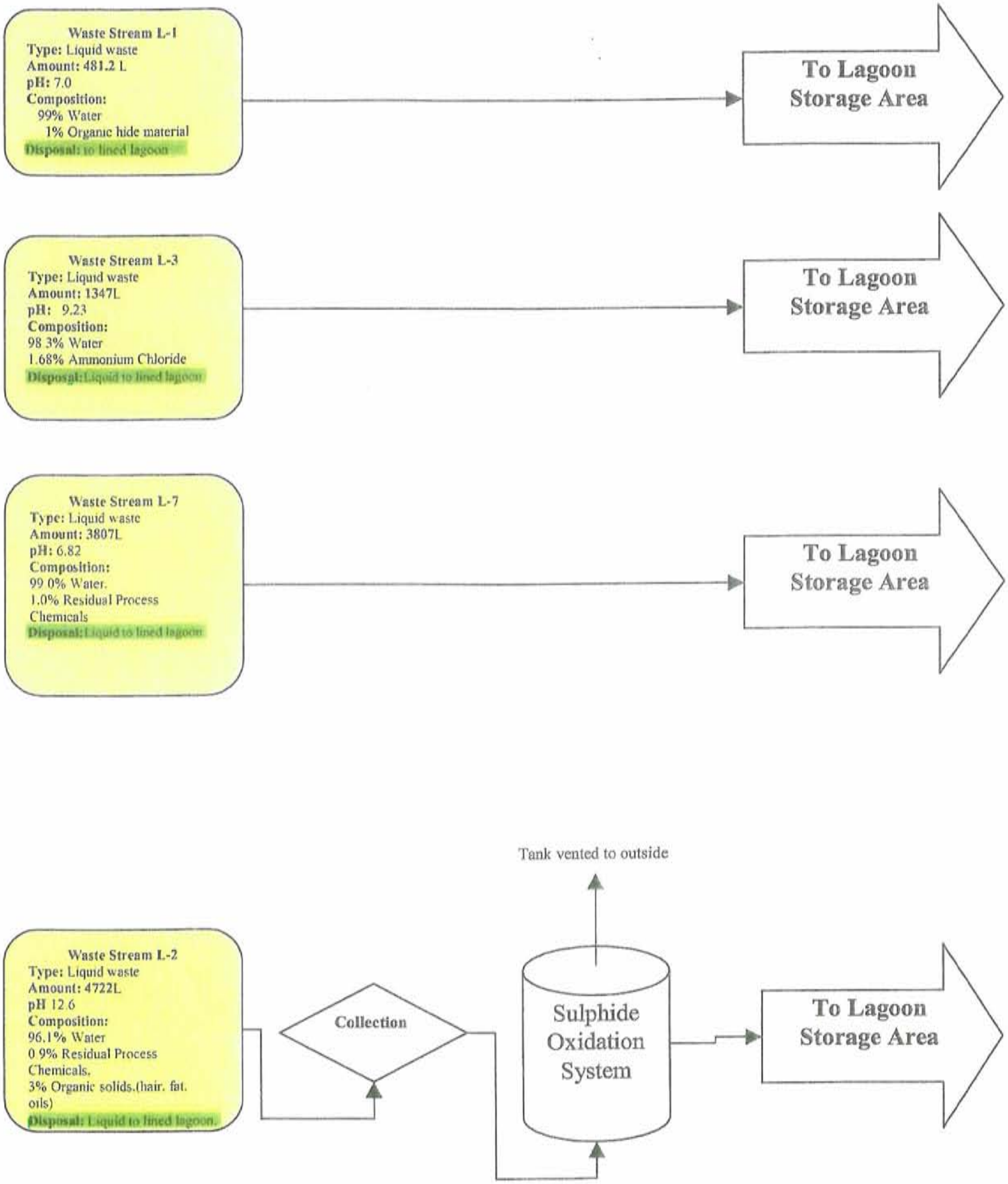
2.4.1 Waste-Stream Identification

The conceptual design for the deer-hide tannery, created by Tannery Run Sales of Winnipeg, Manitoba, includes a waste-management plan for the waste streams identified in the conceptual process-flow chart (cf. Figure 2-1). In addition, the waste streams are further delineated in the process-flow diagram as shown in Figure 2-6.

2.4.2 Waste-Management Plan

Waste streams outlined in the process-flow diagram (cf. Figure 2-6), have been categorized by their respective chemical phases (i.e., Liquid ["L1-L7"]; Solid ["S1-S2"]; and Gaseous ["G1-G2"]). Each stream is composed of a distinct chemical "mix" and must be treated separately. As the conceptual design is based on a batch process, the waste streams will be generated in sequence. This process eliminates the risk of mixing the waste streams and also allows adequate time for process treatment. Each of the waste streams is further described in the following subsections.

As indicated in Section 2.2, "bench-scale" testing of a sample 60-hide load was conducted at the Colony by Tannery Run Sales between March 8 and 13, 2006, to validate the conceptual



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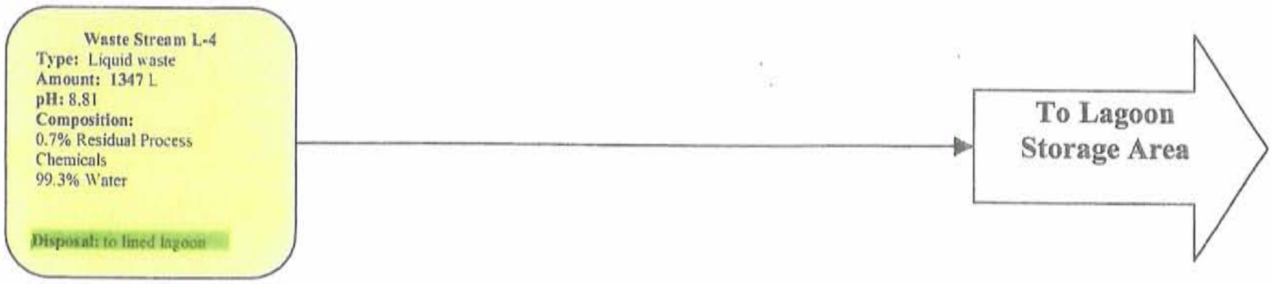
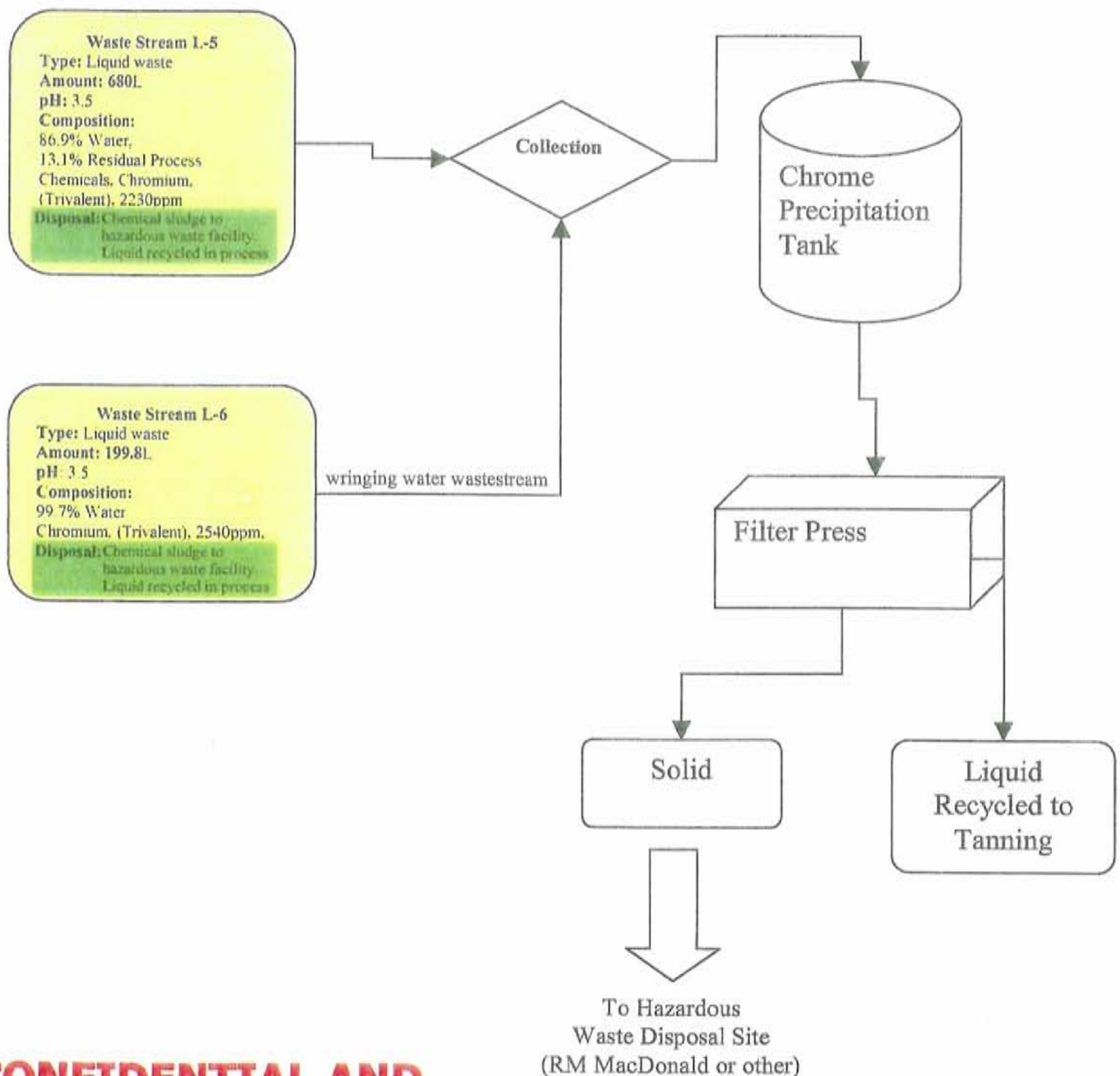
Process Flow Diagram for Wastewater & Effluent Waste Streams

Figure 2-6

Fig2_4
s\01\0760

Source: Tannery Run Sales





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Process Flow Diagram for Wastewater & Effluent Waste Streams

Figure 2-6 cont'd

Fig2_4
s\01\0760

Source: Tannery Run Sales

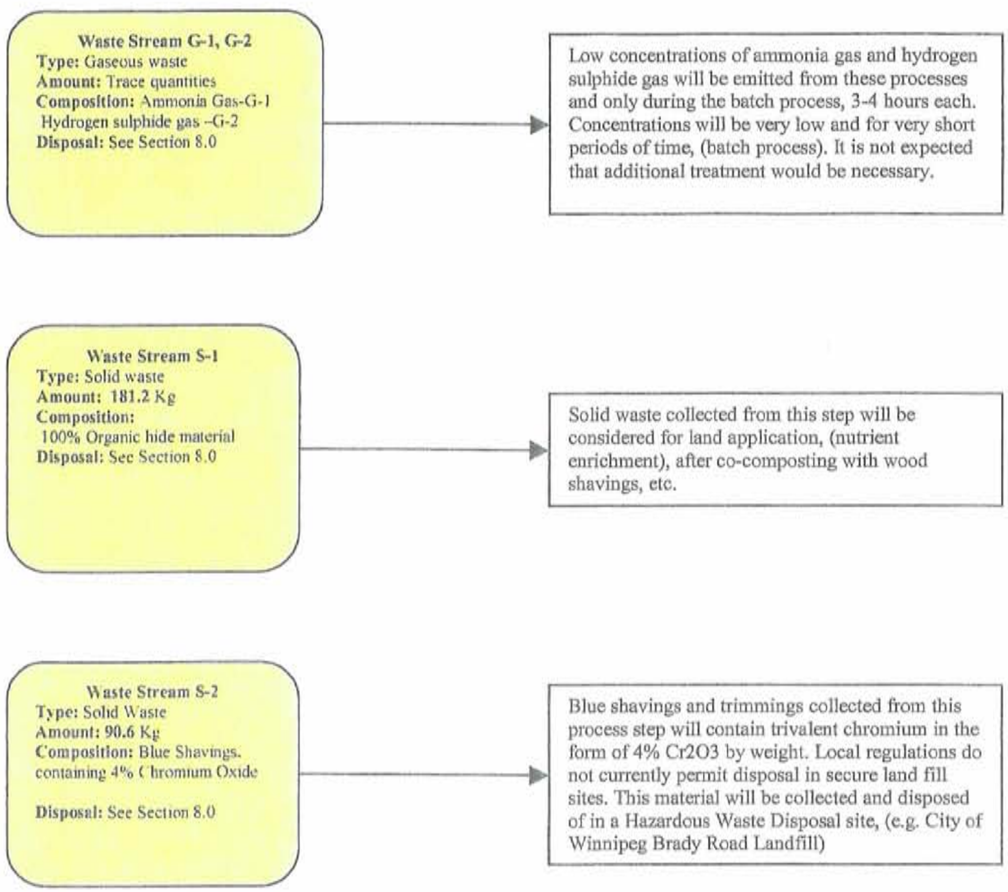

Fig2_4
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Source: Tannery Run Sales

Process Flow Diagram for Wastewater & Effluent Waste Streams

Figure 2-6 cont'd

design parameters and the predicted waste streams (cf. Sections 2.4.2.1 and 2.4.2.3). This testing was possible because the equipment required for the proposed tannery (cf. Section 2.2.1) had already largely been purchased by the Colony. For the testing, a bench-scale working apparatus of both the sulphide-oxidation and chrome-precipitation process was also constructed. No filter press, however, was available during the testing process, as this equipment has not yet been purchased by the Colony. After each stage of the tanning process (cf. Section 2.3), samples were taken by Tannery Run Sales and submitted to Norwest Labs (now Bodycote) in Winnipeg, Manitoba. The test results are described further in each of the following subsections and a copy of the laboratory analytical results is provided as Appendix B.

2.4.2.1 Liquid Wastes

L-1, L-3, L-4 and L-7 (Chrome- & Sulphide Free)

Liquid-waste stream L-1 is derived from the soaking process (cf. Section 2.3.1.2). It is estimated, based on the conceptual design and process description for the proposed tannery (cf. Sections 2.1 and 2.2), that approximately 480 L of liquid (per batch of 200 hides) will be generated from combined washings. This liquid waste is characterized as follows:

- ~99% water
- ~1% dissolved organic hide material

Liquid-waste stream L-3 is a mixture of ammonium chloride (1.68%) and water (98.3%) derived from the de-liming process (cf. Section 2.3.1.10). It is estimated that 1,350 L of liquid (per batch of 200 hides) will be generated.

Liquid-waste stream L-4 is derived at the "Bating" stage. It is estimated, based on the conceptual design and process description for the proposed tannery (cf. Sections 2.2 and 2.3), that approximately 1,350 L of liquid (per batch of 200 hides) will be generated. This liquid waste is characterized as follows:

- ~99.3% water
- ~0.7% residual process chemicals, mainly ammonium chloride and surfactant (degreaser)

Liquid-waste stream L-7 is derived from the colouring process (cf. Section 2.3.1.10). It is estimated, based on the conceptual design and process description for the proposed tannery (cf. Sections 2.2 and 2.3), that approximately 3,810 L of liquid (per batch of 200 hides) will be generated. The liquid waste is characterized as follows:

- ~99% water
- ~1% dye-stuff/fat liquors

The disposal plan for all of these liquid wastes (i.e., L-1, L-3, L-4 and L-7), which total ~7,000 L per batch of 200 hides, is direct discharge into the lined lagoon (cf. Section 2.2.5).

L-2 (Sulphide-Containing)

Liquid-waste stream L-2 (from the unhairing waste stream; cf. Figure 2-2) will contain sulphide in the range of ~300 to 400 mg/L based on the conceptual design, the process description for the proposed tannery (cf. Sections 2.2 and 2.3) and the bench-scale testing conducted in March 2006 (cf. samples "A" and "B" in Appendix B). Due to this high sulphide content, this waste stream must be collected and processed through a sulphide oxidation pre-treatment system. During sulphide oxidation, sulphide-bearing liquors can be separated from effluent using catalytic air oxidation. This operation controls the release of hydrogen sulphide. Catalytic oxidation is a simple, low-cost technology that uses aeration in the presence of a manganese catalyst (i.e., 400 mg/L of manganese). Approximately 60 m^3 of air is needed for each m^3 of effluent processed. Sulphide will be oxidized/transformed into thiosulphate, sulphite and sulphate, all of which are more inert than sulphide.

Upon completion of the sulphide-oxidation process during the bench-scale testing in March 2006, the resulting liquid had a sulphide concentration of just over 5.0 ppms[1,2], thus permitting its disposal in the lined lagoon (cf. Section 2.2.5). The total volume of liquid recruiting to the lagoon from this waste stream is ~4,700 L.

Accordingly, with L-1, L-2, L-3, L-4 and L-7 outputs from the process, the lagoon will receive ~11,700 L per batch of 200 hides.

During tannery commissioning (i.e., full 200-hide load production), testing will be undertaken to optimize the sulphide-oxidation process, to achieve concentrations consistently lower than 5 ppm.

L-5 and L-6 (Trivalent Chromium-Containing)

Liquid-waste streams L-5 and L-6 will contain trivalent chromium (Cr^{+3}), based on the conceptual design and process description for the proposed tannery (cf. Sections 2.2 and 2.3). These waste streams must be pre-treated prior to recycling. Pre-treatment will consist of chrome precipitation and collection of the resulting precipitate in a filter press. Chromium is soluble in acidic solution but precipitates out when the pH is increased (i.e., to over 7). The most suitable chemicals for chromium treatment are:

- lime (CaO)

[1] For reference, note that the allowable discharge concentration to City of Winnipeg sewer system is <10 ppm (city of Winnipeg Bylaw No. 7070/97).
[2] See Appendix B (sample "A" – prior to sulphide oxidation versus sample "B" – after sulphide oxidation).

- sodium carbonate (Na_2CO_3)
- caustic soda (NaOH)

Caustic soda (sodium hydroxide) was used for treating the chromium during the bench-scale testing conducted in March 2006. The chromium-removal efficiency achieved was 99.99% (cf. Appendix B; #5Cr [start of oxidation] = 2,230 ppm Cr versus #5BCr [end of oxidation] = 8.22 ppm).

Similar to the discharge limits for sulphide, the City of Winnipeg's discharge limits for chromium are 5 ppm. While the Colony is not discharging to a sewer system, it desires to reduce the chromium to this guideline. Accordingly, during tannery commissioning (i.e., full batch processing of 200 hides), to achieve rapid sedimentation of the precipitated chromium-hydroxide sludge (adding lime solution until a minimum pH of 8.5 is achieved), an anionic polyelectrolyte will also be added. The optimum concentration of the sedimentation agent will be determined at this time. Further monitoring during tannery commissioning and operations will also be conducted to confirm and quantify the consistency of the achieved chromium-removal efficiency.

The settled chromium-hydroxide sludge will then be dewatered by means of a filter press. The dried, chrome-containing sludge cake will be properly packaged and delivered to a hazardous waste treatment facility. The remaining supernatant liquid obtained from the filter press will then be adjusted for pH and returned to the "Pickling" stage for reuse (because of the salt content). After multiple recycles, this salt (NaCl)-containing mixture (880 L [680 L from L-5 and 200 L from L-6]) will be sealed in drums and sent to a hazardous waste-treatment facility for disposal.

2.4.2.2 Solid Wastes

S-1 (Chrome-Free)

Solid-waste stream S-1 is a by-product of the fleshing operation (cf. Section 2.3.1.3). Solids deriving from this process stage will consist mainly of hide fats and proteins. This material is high in organic content and therefore appropriate for use as a composting material for later soil amendment. It is estimated, based on the conceptual design and process description for the proposed tannery (cf. Sections 2.2 and 2.3), that ~180 kg of solid waste will be generated for every 200 deer-hides processed. This will be co-composted on site by the Colony, in an existing on-site composting operation, using animal-husbandry solid wastes and wood shavings (cf. Section 2.5).

S-2 (Trivalent Chromium-Containing)

Solid-waste stream S-2 is a by-product of the shaving operation (cf. Section 2.3.1.9). Blue shavings and trimmings collected from this processing step will contain trivalent chromium in the form of about 2-3% Cr_2O_3 (by weight). Local regulations do not currently permit disposal of this waste in secure landfill sites. Accordingly, this material will be collected on-site and disposed of in a Hazardous Waste Disposal site (e.g., Miller Environmental Corporation). It is estimated, based on the conceptual design and process description for the proposed tannery (cf. Sections 2.2 and 2.3), that about 91 kg of solid waste will be generated for every 200 deer-hides processed.

2.4.2.3 Gaseous Wastes

G-1 and G-2

Low concentrations (less than 5 ppm) of ammonia gas and hydrogen sulphide gas (i.e., nuisance odours) are expected to be emitted approximately 6 to 8 hours/week from the de-liming and unhairing processes (cf. Figure 2-2). Tannery Run Sales, however, noted that no nuisance odours were detected during the bench-scale testing (60-hide load) conducted between March 8 and 13, 2006. Periodic testing, using a hand-held H2S monitor, during full tannery commissioning (i.e., processing of 200 hides), will monitor facility emissions to ensure lack of nuisance (cf. Section 2.8).

2.5 LAND APPLICATION OF WASTES

The chrome-free, 100% organic hide material solid waste (cf. S-1 waste stream, Section 2.4.2.2) will be co-composted on site by the Colony with animal husbandry solid wastes and wood shavings (an existing composting operation) and spread on Colony lands. Accumulated sludge (biosolids) in the manure storage basin (lagoon), from hog, dairy and tannery operations (cf. liquid waste streams L-1, L-2, L-3, L-4 and L-7, Section 2.4.2.1) may also be spread on Colony lands. Currently, the Colony owns 4,400 acres of agriculture lands (cf. Figure 2-4) within the vicinity of Miami, Manitoba. The spreading of waste on Colony lands would be in accordance with Manitoba Conservation's "Environmental Requirements for Treatment and Disposal of Biosolids in Manitoba" and the Colony's Manure-Management Plan (annually updated and submitted to Manitoba Conservation).

Appropriate testing of the sludge slurry for trivalent chromium and salts, and soils for salinity, nutrients, and heavy metals (e.g., trivalent chromium), will dictate the amount of waste applied to the Colony's agricultural fields. In the spring or early fall, prior to land application of wastes, samples will be taken from the surfaces of each cell of the lagoon from which sludge will be removed. Composite samples from each field onto which waste will be applied will be taken prior to the application of this sludge (cf. Section 2.5.1). With respect to trivalent chromium, application of wastes will not exceed Environmental Quality Guidelines established by the Canadian Council of Ministers for the Environment (CCME; 64 mg/kg; CCME 1999; Appendix C). Similarly, electrical conductivity [EC] and sodium adsorption ratio [SAR] of wastes will not exceed limits described by the Manitoba Surface Water Quality Objectives (1500 µS/cm and 6.0 SAR respectively; Manitoba Conservation 1988).

A total of 3.35 kg of Cr^{+3} wastes are predicted to be produced during one season of tannery operations. In the event that the total amount of liquid tannery waste produced in one year of operation is applied across all Colony owned agricultural lands (4,400 acres), total loadings of Cr^{+3} to soils will be an estimated 0.8 g/acre (0.002 kg/ha). However, given the low solubility of Cr^{+3} in soils and its strong retention on soil surfaces, the bioavailability and mobility of Cr^{+3} in soils and waters is limited (ANRCP 1998). If the Colony's agricultural lands typically support soils with soil bulk density of 1,200 kg/m^3, and the Cr^{+3} within the tannery waste remained within the 15 cm (0.15 m) of the soil horizon (A horizon), then the total amount of Cr^{+3} in soils will be approximately 1×10^{-6} mg/kg of soil.

Trivalent chromium, a heavy metal used in the tanning process, is non-toxic to plants due to its poor permeability and noncorrosivity in plant tissue. Plant uptake of Cr^{+3} is passive, unlike for hexavalent chromium (Cr^{+6}), which is actively transported through plant roots. Although not produced or used during the tanning process, Cr^{+6} is a different form of chromium that is highly toxic to some plants, animals and humans (ANRCP 1998). Typically an environment with oxidizing agents (e.g., chromic acid) present or an environment that is extremely acidic (with a pH of 3) could Cr^{+3} potentially convert to the toxic hexavalent form. Neither oxidizing agents or extremely acidic conditions are present during the tanning process, nor are they encountered within the manure storage facility (lagoon) or the soil complex.

At the rate of application of residual Cr^{+3} found in tannery waste, coupled with the low solubility of Cr^{+3} in soils, its strong retention on soil surfaces and its passive uptake in plants, it would require an estimated 900 years of annual tannery waste application to reach the CCME maximum limits for acceptable Cr^{+3} levels in Colony-owned soils (64 mg/kg; using a background concentration of soil Cr < 63 mg/kg and loading rate of Cr^{+3} = 0.001 mg/kg/year). Annual testing of Colony soils for Cr^{+3} prior to land application will provide exact measures of existing background chromium levels.

Total loading of salts to Colony lands through the application of tannery waste is estimated to be low (0.61 kg/ha) compared to typical loadings of sodium from hog manure (70 kg of N/ha yields 15.6 of Na kg/ha; ARDI 2001). Generally, the addition of 70 kg available N/ha of liquid hog manure can yield a loading between 5-67 kg of Na/ha (Manitoba Conservation 2006). In most cases, the addition of large amounts of carbon (organic matter) through manure applications will offset the effect of adding a relatively small amount of salts to the soil (Manitoba Conservation 2006a).

The CCME has no established guidelines/criteria for salt (i.e., sodium or chloride) in agricultural soil. According to the University of Manitoba, Department of Soil Science (Nicolas *pers. comm.* 2000), chloride concentrations in typical Manitoba soils ranges between 2 and 200 mg/kg.

Benchmark testing of the Colony's agricultural soils prior to any land application of tannery wastes will be conducted annually to determine initial sodium and chloride levels (cf. Section 2.4.2). Additionally, soil pH, electrical conductivity and SAR will be tested for comparison with the CCME and Manitoba Surface Water Quality Objectives guidelines for these parameters in agricultural soils (i.e., 6 to 8, 2 dS/m, 1500 µS/cm and 6.0 SAR respectively; CCME 1999; Manitoba Conservation 1988; cf. Section 2.5.2).

Agricultural lands onto which waste (lagoon sludge slurry) is spread will be regularly tested by the Environmental Inspector (cf. Section 2.8.1) to ensure no contaminants are accumulating above recommended limits for soils, affecting crop production or the surrounding environment.

2.5.1 Satisfaction of Manure Management Regulation

Spreading livestock manure on cultivated fields is a common practise within the farming communities of Manitoba. When monitored, this practise provides a safe and effective method of recycling livestock manure waste and returning important macronutrients (e.g., potassium, nitrogen, potash) and micronutrients (e.g., copper, zinc, boron) to cultivated soils. Adding manure to soils is beneficial to crops as the organic matter within manure waste binds nutrients present within livestock waste and within soils, to the soil, thus permitting their slow release during the growing season. Although tannery waste will contain very low concentrations of salt and trivalent chromium, the effect of adding salt and chromium to soils will be offset by the abundance of organic matter found within the livestock manure. Trivalent chromium is an element not easily leached into groundwater due to its tenacity to bind well with cation exchange sites present within organic matter. Research suggests that while trivalent chromium is generally held within the surface layers of the soil profile, it is not readily transported into plant tissue. Mixing of manure with tannery effluent would likely benefit the adsorption of salts and chromium within the soil complex.

Both livestock (e.g., bovine and swine) and tannery effluent will be transported from the Colony site to the earthen manure storage facility, a three-cell lined 'lagoon,' located at minimum 100 m from any ditches, sinkholes, springs or wells and 1 km from the Colony's agricultural operation. In the spring and/or fall, when lagoon sludge accumulates to levels requiring its removal, sludge from the lagoon will be tested for nutrients, heavy metals and salts prior to being pumped and transported for dispersal upon the Colony's agricultural lands (4,400 acres). In compliance with the Manure Management Regulation, spring application of sludge will not occur on soils supporting a crop for that current growing season.

Benchmark soil sampling, conducted within each field owned by the Colony, will provide baseline information on the content of various elements present in the soil. Soil samples will be taken at various depths (within first 15 cm of surface and below 0.6m) in a GPS-referenced 30x30 area located within the dominant soil type or representative area of each field (Manitoba Conservation 2006b). If fields contain variable soil types and/or landscape features, more than one benchmark site may be sampled. Benchmark sites are often selected during the early growth stages of a crop, when differences in soil fertility are most evident. Past grower experience, yield maps, soil surveys and remotely sensed images can also be used in benchmark site selection (Manitoba Conservation 2006b).

In compliance with the Livestock Manure and Mortalities Management Regulation 42/98, Clause 14(5), soil samples will be taken at depths below 0.6 m (2 ft). Information collected from benchmark sampling (samples taken at 0.6 m and within first 0.15 m) will guide the application of wastes and thus nutrient, heavy metal and salt loadings to crops such that loadings are well within the limits described in the Livestock Manure and Mortalities Management Regulation 42/98, Clause 14(1.4), CCME guidelines and Manitoba Water Quality Standards (CCME 1999; Manitoba Conservation 1988). Application of wastes will adhere to a manure-management plan submitted annually by the Colony and approved by the director.

Follow-up monitoring of soil for nutrients (N, P and K), salts, Cr^{+3} along with soil pH, EC, and SAR will occur annually, for fields in which the application of the nutrient-laden waste is appropriate.

2.6 CONSTRUCTION AND SYSTEM COMMISSIONING

2.6.1 Tannery and Lagoon Construction

The Colony has a large (~15,000-ft^2) building, located on a new concrete pad that is available for housing the proposed tannery operations. At this time, this building is unused, but would be set up with the tannery equipment immediately following the granting of the *Environment Act* licence.

With respect to the construction of the lagoon, the Colony estimates that it will take approximately one week to construct. Permits and authorizations necessary under the various statutes (cf. Section 1.1) will be applied for and obtained by the Colony. The appointed Environmental Inspector for the proposed development (cf. Section 2.8.1) will assist the Project Manager and/or Site Supervisor to ensure compliance with permit/authorization conditions at all times.

The Colony is committed to Best Construction Practices (e.g., Environmental Code of Good Practice for General Construction, Environmental Protection Service 1980). During excavation and construction of the lined lagoon, the Colony will require that the following general practices be followed:

- Construction activities will, to the extent possible, be confined to previously disturbed areas.
- Controls will be put in place to minimize erosion.
- No construction solid or liquid waste will be deposited into excavation areas.

- Indiscriminate burning, dumping, littering or abandonment of solid or liquid wastes will be prohibited and garbage (including construction wastes) will be removed on a regular basis to an appropriate disposal site.
- Spilled hazardous and non-hazardous products will be cleaned up immediately and properly disposed of.
- Surface soils in excavated areas will be stripped from the site and stockpiled for use in final site resurfacing and revegetation.
- Revegetation of disturbed areas will be initiated after construction activities have been completed.

2.6.2 Additional Benchmark Testing

Prior to tannery commissioning, benchmark water-quality testing of the groundwater and nearby water bodies (e.g., creek) will be conducted (cf. Section 3.2). Benchmark testing of the Colony's agricultural soils will also be conducted to determine initial sodium and chloride levels and the soil pH and conductivity (cf. Section 2.8.1) These data will be kept and used for later comparison during tannery operations (cf. Sections 2.4.2.1 and 2.8).

2.6.3 Hazardous Materials Handling

All materials that are classified as hazardous under Workplace Hazardous Materials Information System (WHMIS) regulations to be used at the proposed facility (cf. Section 2.2.2) will be handled in accordance with the information on the supplier's Material Safety Data Sheets (MSDSs) provided prior to receipt of the material. Similarly, all materials that are classified as hazardous according to the Dangerous Goods Handling and Transportation Act (DGHTA) and its regulations will be handled accordingly. Bulk acidic or caustic materials stored on-site for use in tannery processes will be equipped with secondary containment, with 110% spill-protection capacity. Consistent with Manitoba statutory requirements, all employees at the facility will be regularly trained in WHMIS and the DGHTA and preventative maintenance (i.e., inspections and repairs) of the chemical storage areas (including tanks and secondary containment) will be conducted. Copies of all employee-training and maintenance-inspection records will be kept on-site.

2.6.4 Emergency Response Plan

An Emergency Response Plan (ERP) for the proposed facility will be developed and submitted to Manitoba Conservation for approval within 90 days of the start-up of the facility. The ERP will be kept on-site for easy reference by employees. Consistent with Manitoba statutory requirements, employees at the facility will receive ERP training (with periodic training updates). All on-site employees will further be assigned specific emergency-response duties as outlined in the facility ERP.