Section 4.0
Process Description

SECTION 4.0
PROCESS DESCRIPTION

4.1 GENERAL PROCESS DESCRIPTION

The proposed OlyWest pork processing facility will be located on a 19 ha (48 acres) section on the west side of the 46 ha (114 acre) parcel of land with a total floor area of approximately 35,415 m^2 (381,200 ft^2). The proposed OlyWest facility will process approximately 45,000 hogs per week and 600 hogs per hour under full production. Pork products will be cut and packaged on-site for shipment and/or processing at other plants. The proposed OlyWest facility will pre-treat its process-generated effluent prior to discharge to the City of Winnipeg sanitary sewer system. The sanitary and pre-treated wastewater will be transported to the City of Winnipeg NEWPCC via an interceptor sewer for final treatment. Pre-treatment will consist of screening and a DAF system to remove and recover particles of meat, fat, bone chips, and other extraneous solids prior to discharge to the City of Winnipeg system. Hogs that die en-route to the proposed OlyWest facility, blood, bone, trimmings, and pre-treatment sludge will all be sent to an on-site protein recycling facility for processing into tallow, blood meal and meat and bone meal on a continuous basis. The protein recycling facility will be an integrated continuous plant process and will operate at approximately the same time as the processing plant. The protein recycling facility will be enclosed in the plant and will include particulate cyclones, venturi/packed-media scrubbers and room air packed-media scrubbers for odour control. A detailed description of the materials and water use is included in Section 5.3.5 and 5.3.6. The building layout plan is included as Figure 4.1.

The plant will operate on a five day work week (Monday to Friday), for 250 days per year. The worker shift times are listed in Table 4.1.

Table 4.1: Worker Shift Schedules

Shift	Start	Finish
Ist Shift Pork Cut	6:00 a.m.	2:30 p.m.
Ist Shift Pork Kill	7:00 a.m.	3:30 p.m.
2nd Shift Pork Cut	3:00 p.m.	11:30 p.m.
2nd Shift Pork Kill	4:00 p.m.	12:30 a.m.
Cleanup (non-production)	12:30 a.m.	6:00 a.m.

The workers will arrive and leave the plant approximately 45 minutes before and after their shifts. The full scale production of the plant will include two worker shifts split into two start

times plus a sanitation shift. The plant is expected to ramp up to full production over a three to five year period.

4.2 DETAILED PROCESS DESCRIPTION

A plant process schematic is shown in Figure 4.2 which indicates the major steps in the processing.

4.2.1 Raw Materials: Receiving and Storage

At the processing plant, the primary raw materials used will be hogs. Under full operation, approximately 45,000 hogs per week will be delivered at the plant site in approximately 210 trucks for processing. For truck unloading, there are three unloading docks. One dock is dedicated for Hytek Ltd. trucks, the second dock is dedicated for Big Sky Farms Inc. trucks and the third dock is for all other independent producer's trucks. Upon arrival, the hogs will be held in the holding facility for at least three hours, as described in the following section.

Water and natural gas, supplied by pipelines, CO_2, citrate, salt, wastewater treatment chemicals, cleaning and maintenance chemicals, cardboard, and other packaging (which will arrive by truck) are the only other raw materials that form inputs to the processing. No storage will be provided for natural gas or incoming water. There will be two CO_2 tanks on-site capable of storing 100,000 kg of CO_2. The citrate product is sold in 20 kg bags and will be mixed with water to add to the blood to enable further processing. Approximately 10 bags of citrate will be required per day and it is estimated that 250 bags of citrate will be on-site at any given time.

4.2.2 Holding Facility

The holding pens have been designed to cover an area of approximately 3,069 m^2 (33,035 ft^2). This will provide temporary storage space for a maximum of 2,780 hogs. The holding facility design was reviewed by noted Animal Welfare expert Dr. Temple Grandin and changes were made to ensure that animal welfare considerations were incorporated into the proposed OlyWest facility.

The holding facility consists of unloading docks, large receiving pens and smaller holding pens. Hogs are first unloaded from the trucks into the larger receiving pens which can hold 240 hogs, the equivalent of one truck load. Once emptied of hogs, the trucks are scraped clean of bedding material and manure in a dry cleaning process. The bedding material and manure is stored in a receiving container inside the holding facility.

From the receiving holding pens, the hogs are divided into groups of 80 and moved into the main holding pens where they will be held for a minimum of three hours, prior to proceeding to the asphyxiation area. During the three hours, the hogs are not fed and are allowed to rest. The hogs are misted with a fine spray of water for approximately ½ hour upon their arrival to calm and cool them. The hogs are then misted again before they are sent to the CO_2 asphyxiation area. Within the holding pens, hogs are each allocated 0.56 m^2 (6 ft^2) of space.

Any hogs that appear sick are separated out and sent to a quarantine stall for diagnosis by a veterinarian. Dead on arrival hogs are stored in a room in the holding facility where they await transfer on a regular basis, to the protein recycling area for processing.

Every time the holding pens are emptied, they are cleaned with wash water containing a deodourizing agent (SFA) to reduce odour. The wash water flows from the holding pens through a trench drain to a rotary screen. The rotary screen removes the solids from the effluent which are placed in the enclosed receiving container with the bedding material from the trucks. The screened water gets sent to the on-site wastewater pre-treatment facility for treatment.

4.2.3 Truck Wash

Once the trucks are scraped clean of bedding material and manure, they will be cleaned using water and a foam cleaner (biosolve) in an on-site truck wash. The wastewater from the truck wash will pass through a rotary screen and an oil and sand interceptor prior to being discharged to the City of Winnipeg sanitary sewer. The connection to the City of Winnipeg sewer will be in compliance with the City of Winnipeg Wastewater System and Land Drainage Works By-Law 7070/97.

4.2.4 Asphyxiation Area

Before entering the asphyxiation area, groups of eight hogs are formed and positioned into push wagons. The push wagons are operated by means of an electric motor drive, mounted on the top of the overhead guiding frame. Once within the push wagons, the groups of hogs are then moved along through an arrangement of push boards and movable gates. The push force is adjustable, with a maximum force of 99.8 kg (220 lb). If the maximum force is reached at any point, the push wagon will retract and then proceed to start pushing again, up to a maximum of three times, followed by an emergency signal.

From the push wagons, the groups of eight hogs are then brought to the runway. The groups accumulate behind each other in the waiting sections; leading into the asphyxiation supply chamber. Once into the asphyxiation supply chamber, each group of eight hogs is moved into an electric powered gondola, which is subsequently lowered into a CO_2 gas chamber by a means of transport chains. The dividing gate for the gondola is constructed of a heavy steel plate with open vertical slots. After receiving a signal that the dividing gate is closed, the loading system waits until a new gondola is available at its loading position before repeating the procedure. The gondolas provide a floor space of approximately 0.47 m^2 (5 ft^2) per hog, for a total floor space of approximately 3.62 m^2 (39 ft^2). Dwell time of the hogs in the gas is estimated at approximately 60 seconds. This time may vary if an emergency stop is activated.

The gondolas with asphyxiated hogs are then lifted out of the pit and tilted backwards by extending the roller table. This causes gas surrounding the asphyxiated hogs to flow back into the pit through the openings of the roller table. The gondolas are then emptied and the hogs are guided onto a shackling table. There will be a total of six gondolas in operation to satisfy

the capacity of 600 hogs/hr. The system is designed such that the unloading of the gondolas is performed within the machine itself.

The asphyxiation pit will be washed down once per day. There will be a pump at the bottom of the pit to send this water to the on-site wastewater pre-treatment facility.

4.2.5 Dirty Kill Area

After the hogs are asphyxiated with CO_2, the hogs are hung by their rear feet, stuck and bled. The carcasses are hung upside down so that the blood can flow from the carcass by gravity. The blood flows from the carcass into a drip pan and an anticoagulant (citrate) is added to the collected blood. A pump recovers the blood from the drip pan and sends the blood to a stainless steel reservoir. The blood is processed as described in Section 4.2.12 Blood Processing. It is estimated that 38,700 kg of blood will be collected daily.

Once bled, the carcass is marked for tracking purposes, then pre-washed to remove loose hair and dirt. After pre-wash, the carcass is pulled through a scalding tank by the shackles to open the hair follicles, which eases hair removal. The shackles are then removed and the carcass enters a dehairing machine. The carcass tumbles inside a dehairing machine where "rubber fingers" pull the hair off the carcasses without causing damage to the carcass itself. The removed hairs are sent to the protein recycling facility by air cannon for processing. Approximately 10,035 kg of hair will be sent to protein recycling on a daily basis. After dehairing, the carcass is re-shackled, pre-dried and singed to remove any remaining fine hairs. Once the hairs are removed, the carcass is polished, manually checked for remaining hairs, and scraped by hand if necessary. The last step of the dirty kill process is placing the carcass for a final blast in an oven to disinfect the exterior of the carcass. The oven-blasted carcass is then considered clean, and enters the clean kill area. The kill floor is approximately 1,625 m^2 (17,494 ft^2) in size. The kill floor will have floor drains for collection of clean-up and other waters. The first rinse of water in the sanitation shift will be sent to the protein recycling facility for processing while during the second stage of washing all water will be sent to the on-site wastewater treatment facilities. During processing, the blood collection drains that lead to wastewater treatment are closed to facilitate blood collection for further processing.

4.2.6 Clean Kill Area

Upon entering the clean kill area, the carcass belly is opened using an ergonomic robotic system. Organs and edible offal are removed. The removed items and carcass travel further down the line together for inspection by veterinarians. Upon passing the inspection, the items are separated. The stomach and rectum are washed and are classified as edible offal and sent for packaging. The small intestine is squeezed of its contents and washed. The contents of the small intestine (partially digested food) and wastewater from this process are sent to the wastewater pre-treatment facility. Heparin is separated from the small intestine and is sent for packaging. The small intestine (casing) is salted and also sent for packaging. The large intestine and remaining viscera are sent to protein recycling facility for processing. The heart, liver, skirt, kidneys, tongue, snout, ears, and cheek meat are sent for packaging. Kidneys,

hearts and livers that are considered unfit for human consumption are sent to either the pet food area or to the protein recycling area depending on market prices. Also sent to the pet food area or protein recycling area are lungs, spleen and inedible skirts. The protein recycling facility will also process leaf lard, blood clots, gullets, and head bones.

Once all of the organs have been removed, the carcass is split. Prior to being sent to the snap chill area, the carcass undergoes another inspection by a veterinarian to ensure no diseased tissues are present.

4.2.7 Snap Chill/Carcass Cooler Area

After passing the second inspection, the split, de-headed carcasses are moved into the snap chill area. The carcass spends approximately 70 minutes in the snap chill area before being sent to the cooler. The snap chill area is cooled with -34.4°C (-30°F) high velocity air to create extreme windchill conditions. Following the snap chill, the carcass is moved into the cooler where it will typically remain for 16 hr at 0°C (32°F) prior to being sent for cutting. Time in the cooler may be extended depending on the time of day, as the carcass may have to wait until the next morning to be sent to the cutting area.

A holding area within the carcass cooler is available to store any carcass that failed inspection. This confines the carcasses until further testing is possible. The snap chill area is approximately 949 m^2 (10,220 ft^2) and the carcass cooler is approximately 2,595 m^2 (27,936 ft^2) with a storage capacity of 8,640 hogs.

4.2.8 Cutting Area

Once the carcasses are removed from the cooler area, they enter the cutting area. Typical equipment includes stainless steel tables and cutting areas, with band saws and other cutting equipment. During this stage the carcass is disassembled into primary and secondary cuts. Primary cuts include hams, bellies, loins, picnics, butts, and spareribs. Secondary cuts include tails, hind feet, trimmings, belly skin, back skin, back fat, jowls, riblets, hocks, front feet, and neck bones. These cuts are then separated into like parts which are then conveyed to separate zones of the packaging area. The cut room is approximately 5,256 m^2 (56,583 ft^2).

4.2.9 Packaging

When the separated parts arrive in the cooled packaging area, they are packaged to client specifications. Fresh or frozen products will then be shipped in bulk quantities to clients in Canada, the United States and Japan for distribution or further processing. The proposed OlyWest facility will conform to European Union packaging regulations for export. The packaging area will be approximately 1,030 m^2 (11,090 ft^2).

4.2.10 Cool and Cold Storage

As described earlier in this section, there are four freezer/cooler areas in the facility; snap chill, carcass cooler, packaging area, and one in the shipping area. The snap chill will have

about 2,919 kilowatts (830 tons) of refrigeration and be approximately 949 m^2 (10,220 ft^2). The carcass cooler will have about 3,028 kilowatts (861 tons) of refrigeration and be approximately 2,595 m^2 (27,936 ft^2). The packaging area will have about 176 kilowatts (50 tons) of refrigeration and be approximately 1,030 m^2 (11,090 ft^2). The shipping area will have about 211 kilowatts (60 tons) of refrigeration and be approximately 2,053 m^2 (22,102 ft^2). The snap chill and carcass cooler areas have overhead rails for easy movement of the hanging carcasses. On the cut floor, the carcass enters by the overhead rail, but exits the packaging room as boxes of product.

4.2.11 Protein Recycling

The protein recycling equipment will be provided by The Dupps Company. During the selection process of finished meat products at the proposed OlyWest facility, there are various steps that separate the meat product from the inedible by-products. The proposed OlyWest facility will process these inedible by-products on-site using an integrated protein recycling system. The protein recycling system will be enclosed in an area of approximately 1,347 m^2 (14,500 ft^2) and it will process blood, bones, hair, trimmings, wastewater sludge, and DOA hogs. Blood processing will also be conducted separately in the system and is described in the next section. A process schematic of the protein recycling system is included in Figure 4.3.

The protein recycling system operates at approximately the same time as the processing plant and will start approximately 30 minutes after the first kill shift start time and will operate until approximately 60 minutes after the end of the second cut shift. This translates to an approximate daily running time of 17 hours between 7:30 a.m. and 12:30 p.m. All raw materials are sent to the protein recycling facility on a near continuous basis. The hog hair is hydrolyzed and then sent to a receiving bin where it is mixed with all other incoming materials. Once the system is running, the materials will be discharged across a step-face electromagnet into a grinder. The electromagnet removes any foreign metal particles as a check on quality. The materials will be crushed into pieces approximately 2.54 cm x 2.54 cm (1" x 1") to improve heat transfer and material handling. The crushed pieces will then be fed at a controlled rate from a metering bin into a cooker. The cooker heats the material to between 121 ^oC and 132 ^oC (250 ^oF and 270 ^oF), evaporating moisture and freeing the fat from the protein and bone. Water and other vapors exit the cooker through an entrainment trap. Entrained particles are separated from the vapors and returned to the cooker. The vapors are ducted to a vapor condenser, with the resulting liquid being sent to the wastewater pre-treatment system. A slurry of fat and solids is discharged from the cooker to a drainor where the liquid fat is separated from the solids. These solids are conveyed by an overpressor screw where they are combined with the solids from the sedimentor (discussed later). The solids, called cracklings, enter a pressor and then a continuous screw press to reduce the fat content to about ten percent. The pressed cracklings are then ground and passed over a shaker screen to separate out large particles which are re-ground. The smaller crackling pieces, called meat and bone meal, are sent to a silo, located outside of the protein recycling facility for storage with a storage capacity of approximately 235 m^3 (8,300 ft^3). The fat from the drainor falls into a sedimentor, where small pieces of solids and fines settle to the bottom. These solids are

discharged to a screw conveyor and mixed in the overpressor screw. The collected liquid fat goes to a centrifuge where very small impurities are removed. The clarified liquid fat, called tallow is then pumped into the inedible oil tanks located outside of the protein recycling facility for storage. The approximate storage capacity of the inedible oil storage tank is 94,635 L (25,000 US gallons). Odors from the pressor, centrifuge and drainor, as well as non-condensable vapors from the condenser are ducted to a venturi scrubber to remove particulate matter before further treatment as described in Section 4.3.1.

4.2.12 Blood Processing

Blood collected at the proposed OlyWest facility can either be sold in liquid form to a third party processing company or it can be sent to the on-site protein recycling facility to produce blood meal depending on market prices. For the liquid blood option, the blood can be pumped into one or two refrigerated storage reservoir(s) capable of storing at least 50,000 kg of blood each, located inside the proposed OlyWest facility between the holding facility and the dirty kill area. It is unknown at this time how many blood reservoirs there will be onsite, however two smaller reservoirs is preferred over one large reservoir. The liquid blood product must be sold fresh daily and as such will be hauled off-site in a tanker truck on a daily basis.

The liquid blood that is sent for processing within the protein recycling facility will be used to create blood meal. The blood is collected in a raw blood storage tank which is equipped with an agitator to ensure a homogeneous mixture. From the tank, the blood goes through a steam blood coagulator which clots the red blood cells. The clotted blood is then fed through a centrifuge which splits the serum water from the clotted blood. The serum water is sent to the on-site wastewater treatment facility. The blood clot is dried in a natural gas fired ring dryer, then ground and transported to a silo for storage. The storage silo will be located outside of the proposed OlyWest facility and will have a storage capacity of 89 m^3 (3,150 ft^3).

The vapours generated during the ring drying are sent to the air emission treatment system as described in Section 4.3.1.

4.2.13 Shipping

Products that will be shipped from the proposed OlyWest facility include meat products, blood meal, meat and bone meal, tallow, and edible offal for pet food. These products will be sold in Canada and the United States, and exported to overseas markets like Japan. The main mode of transportation from the proposed facility will be by truck. It is estimated that approximately 30 trucks will transport product from the site every day. In the future, there is the potential to implement rail shipping being located next to the CN Railway's Symington Yards.

4.3 POLLUTANT HANDLING AND PRE-TREATMENT FACILITIES

4.3.1 Air Borne Emissions

4.3.1.1 Holding Facility

To control odour within the holding facility, pens will be washed with wash water containing a deodourizing product, every time they are emptied. The deodourizing product, called SFA, is produced by Super F and releases a eucalyptus scent. Good ventilation of the area will be achieved and maintained with air exchanges. During the winter, six air changes per hour, and during the summer, 60 air changes per hour, will be maintained in the proposed facility as dictated by temperature in three zones in the holding pen area. Air intakes and exhausts will be located on the roof of the facility. Exhausted air will travel up a chimney and will be exhausted at approximately 9.6 m (31 ft) above the ground level to improve dispersion in the atmosphere. Good housekeeping in the holding area will be the primary method of controlling air borne emissions at the source. The misting of the hogs with water will contribute to good air quality although this is not its original intended purpose.

4.3.1.2 Wastewater Treatment Facility

Odorous emissions generated in the wastewater pre-treatment facility will be exhausted to the protein recycling facility air emission control system for treatment as described in the following section.

4.3.1.3 Protein Recycling Facility

A schematic of the air emission control system in the protein recycling system is shown in Figure 4.4. The protein recycling system will be in an enclosed building maintained under negative pressure. Good housekeeping in the facility will help control emissions at the source. As well, a multi-stage air scrubber system will be installed to reduce odours prior to their exhaust to the atmosphere. This scrubber system is designed by SCP Control, Inc. and implemented by The Dupps Company, and will consist of two cyclones, two venturi/packed-media gas scrubbers and two packed-media room air scrubbers. Process gases collected from the meal milling area will pass though a cyclone to separate out fine particles from the air stream. The gas from the cyclone and process gases from equipment within the protein recycling facility will then pass through a combination venturi/packed-media scrubber. The gas is then exhausted to two packed-media room air scrubbers that also treat the ambient air within the protein recycling facility. After passing through the multi-stage air scrubber system the gas is exhausted to the atmosphere. As a result, the high intensity odour gasses from the processing equipment are treated in at least three separate treatment systems prior to discharge to the atmosphere. The air emission control system will typically start operating upon the startup of the steam generators and will operate until the final step in the process is complete. Generally plant operators are required to continually operate at least one room air scrubber during the warmer months of the year to provide odour control for continuous non-protein recycling sources such as the wastewater treatment air and meal silos.

The cyclone within the milling area will receive particle-containing gas from the grinder, rotex screen and screw conveyors. The cyclone is sized to operate at 99 m^3/min (3,500 ft^3/min) and will remove particulate greater than 5 micron. The removed particulates will be returned as finished meal and the treated gas will be directed to the combination venturi/packed-media scrubber system. The blood meal grinder will also be equipped with a cyclone which will operate at 14 m^3/min (500 ft^3/min).

The process gas will be treated using two 340 m^3/min (12,000 ft^3/min) combination venturi/packed-media scrubber systems. One venturi/packed-media scrubber system will collect emissions from the basic rendering processes consisting of the non-condensable gas off the cooking process and emissions from the drainor, pressor, centrifuge, meal silos, grease tanks, grease work tanks, and the cyclone operated within the meat and bone meal grinding area. The second venturi/packed-media scrubber system will collect emissions from the blood coagulation and related blood drying process. Both venturi/packed-media scrubbers also process a small amount of ambient air from the protein recycling facility. The design and operation of the two venturi/packed-media scrubbers are the same. The venturi/packed-media scrubbers are designed to receive air from the cyclone particulate separator system as well as from other process equipment that is highly odorous and particulate laden. The venturi scrubber removes particulates and cools the hot gas with a combination of approximately 60% fresh water and 40% recycled water from the venturi sump. To achieve this water flow combination the venturi is equipped with a recycle pump. Following the venturi, the treated gas is directed to the packed-media scrubber. The process gas flows vertically upward through the media. Simultaneously, an oxidant solution consisting of sodium hypochlorite (NaOCl) and plant water at a controlled pH is continuously sprayed onto the top surface of the packed-media. The packed-media provides an extended surface area and a tortuous path to increase the contact time of liquid and gas. The solution flows downward through the packed-media and is collected in a sump. A metered flow of plant water is continually added to the sump and a portion of the sump liquid is continually overflowed to a drain. The sump water is recycled within the packed-media and the pH and oxidant concentration are maintained. From the packed-media, the gas passes through a mist eliminator which removes water droplets from the gas stream which are drained directly to the upper surface of the packed-media. The exhaust from the packed-media scrubber is discharged to the room air scrubber (see below) for additional chemical scrubbing. SCP Control, Inc. offers a system performance statement that claims,

> *"When the oxidant solution recycled to the system is maintained at a defined/controlled concentration of reactive chemical(s) (namely; sodium hypochlorite and a caustic/acidic chemical), SCP will cause the odor control system to perform to the following: The odor concentration of the gas discharged from the 12,000 cfm packed tower system will not exceed fifteen hundred (1500) odor units. A condition of this performance is any residual odor from the oxidant chemical supplied to the packed tower shall not be a factor in defining the odor unit value. Meaning the chemical concentration*

shall be reduced and maintained at a level wherein chemical vapor emissions are near or at the non-detectable level."

Once the air has been treated within the venturi/packed-media scrubber, the air is exhausted to a room air packed-media scrubber. There will be a room air scrubber for each venturi/packed-media scrubber. The room air scrubber that collects treated air from the blood processing and drying venturi/packed-media scrubber will also treat room air from the wastewater treatment area, room air from the blood drying and blood processing room and air from the continuous rendering facility. The second room air scrubber will collect air from the continuous rendering venturi/packed-media scrubber and air from the milling room and the general room air from the continuous rendering facility. Each room air scrubber is sized to treat 2,407 m^3/min (85,000 ft^3/min). The packed-media scrubber will use a solution of NaOCl and plant water at a controlled pH to oxidize the air stream contaminants. This oxidizing solution is sprayed onto the top surface of the packed bed by a header/nozzle assembly and operates as described previously for the venturi/packed-media scrubber. The oxidizing solution is collected in a liquid sump at the base of the scrubber. A metered flow of fresh plant water is continually added to the sump and a portion of the sump liquid is continually overflowed to a drain. Sump water is recycled within the packed bed and the pH and oxidant concentration are maintained. From the packed-media section, the treated gas flows to a vane-type mist eliminator located directly above the header/nozzle assembly. The mist eliminator allows water droplets entrained in the gas to condense on the eliminator and separates them from the gas stream. The treated air is then discharged to the atmosphere.

SCP Control, Inc. offers a standard performance warranty that indicates,

"When sodium hypochlorite at a controlled pH or an equal chemical defined by SCP is used as an oxidizing solution, SCP will cause the odor control system to perform to the following requirements: The odor concentration of the effluent gas from a 85,000 cfm packed tower system will not exceed one hundred fifty (150) odor units when the pretreated process gases and room air to the system do not exceed an odor concentration in excess of three thousand (3000) odor units. Odor units are those determined by or converted to represent ITTRI measurement methodology. This performance is based on the condition that the gas temperature within the packed bed scrubber does not exceed 110°F. In addition, the odor of the chemical supplied to the packed tower shall not be considered in the determination of an odor unit. (i.e., the addition of any odorous chemical for the control of contaminant odorous vapors shall be controlled at a sufficiently low level to prevent the release of a detectable amount to chemical odors with the discharge of gas from the system"

Air flow into the protein recycling facility will be through defined louvers and controlled access points. All other openings into the protein recycling facility will be kept closed during plant operations to maintain a greater control on emissions. The protein recycling facility will

operate under negative pressure to ensure that there are no fugitive emissions from the facility and that all exhaust air is passed through the multi-stage scrubbing system.

4.3.2 On-site Wastewater Pre-treatment

A schematic of the wastewater pre-treatment is shown in Figure 4.5. Wastewater created on-site will be diverted into one of two streams, sanitary wastewater and process wastewater. Sanitary wastewater will be collected from sinks, showers and toilets and sent directly into the City of Winnipeg sewers for treatment at the NEWPCC in Winnipeg. The anticipated daily maximum sanitary sewage discharge is 170 m^3/day, with a daily average over seven days of 121 m^3/day. This discharge is based on 1,134 employees each consuming 60% of the water a typical person uses in a day, while at the proposed facility. The wastewater from the truck wash will pass through a rotary screen and an oil and sand interceptor prior to being discharged to the City of Winnipeg sanitary sewer. It is estimated that the truck wash will consume approximately 315 m^3/day of water.

The process wastewater will consist of water produced during the different processes within the proposed facility as well as water from the sanitation shift. The process wastewater will be pre-treated on-site to reduce the organic load in terms of biological oxygen demand (BOD) and total suspended solids (TSS), while also reducing the nitrogen (N) and phosphorous (P) levels prior to entering an interceptor sewer system which will convey the pre-treated wastewater to the City of Winnipeg NEWPCC for final treatment.

For the pre-treatment of the process wastewater, all process wastewater will be collected in a 25 m^3 pumping pit. The wastewater will then be pumped with two "Flygt" submerged pumps, each with a pumping capacity of 102 m^3/hr, to a rotary screen with an estimated 0.76 mm opening and a 318 m^3/hr capacity. The solid materials collected will be sent by screw conveyor to the protein recycling system for processing. The screened wastewater will flow by gravity to an underground equalization basin located under the wastewater pre-treatment area. This underground basin will have a 734 m^3 capacity. The equalization basin will be a concrete structure that will have an additive in the concrete that eliminates cracking. The equalization basin will have a similar construction to a sewage holding tank. The basin will have two "Flygt" submerged mixers to equalize the loads and pH. A pH probe will be installed in the equalization tank to monitor the pH, allowing for sodium hydroxide, NaOH, a chemical caustic, to be injected with two dosing pumps, when required. This will create conditions to obtain the best flocculation pH. The sodium hydroxide will be contained in a 2,846 L caustic tank, with a secondary concrete containment wall installed around the primary tank to contain 110% of the caustic tank volume.

To move the chemically adjusted wastewater, a "Flygt" submerged pump with a 200 m^3/hr capacity will be installed in the equalization tank. The tank will also be equipped with a second submerged pump that will be used as a back-up pump in case of breakdown. The wastewater will be pumped from the equalization basin to a serpentine static mixer where ferric sulphate ($Fe_2(SO_4)_3$) will be injected using two dosing pumps connected to a pH

controller which will be linked to a pH probe located at the beginning of the static mixer. The mixing tank will have a 13 m^3 capacity, and will have a secondary concrete containment wall surrounding the tank to contain 110% of the coagulant tank volume. Depending on the wastewater characteristics, two dosing pumps will inject polymer from an automated unit either at the end of the static mixer or in the air dissolution dispenser of the DAF system. The wastewater will then enter a 200 m^3/hr DAF system with a micro bubble pump for treatment. The micro bubbles will cause the sludge to rise to the surface of the DAF. The sludge will then skimmed off the surface and be sent to a 20 m^3 storage tank prior to being pumped to the protein recycling facility with a positive displacement screw pump. There is enough space in the wastewater treatment facility to install a second sludge storage tank; however, the second storage tank will only be installed if it is required in the future. Water that is collected from the sludge storage tank will be sent to the underground equalization basin for re-treatment. The treated wastewater from the DAF will flow out the bottom of the DAF system and pass over a turbidity meter. If the turbidity is too high, the DAF treated wastewater is sent back to the underground equalization basin for further treatment. An automatic valve will be installed after the turbidity meter to allow automatic flow routing. If the wastewater meets the turbidity requirements, it will be monitored with a magnetic flow meter before being sent to the interceptor sewer line for further treatment at Winnipeg NEWPCC.

It is expected that the proposed facility will send wastewater into the sewer at a maximum rate of 3,240 m^3/day, and a seven day average of 2,520 m^3/day.

4.3.3 Solid Waste

After emptying the truck of hogs, the truck is emptied of soiled bedding material in the truck dry cleaning area. Approximately 3,000 tonnes per year (12,000 kg (26,455 lb) per day) of material will be scraped out of the trucks. The manure from the holding facility (estimated at 469 tonnes (1,033,968 lbs) per year) is also collected in a container, and disposed of in one of three ways.

The first option is to utilize the material as a crop nutrient source through land application. A partnership with a local farmer has been established, who will receive, field store and then land apply the material. From nutrient profiles, approximately 157.8 hectares (390 acres) of land will be required annually; with 789 ha (1950 acres) required over a five-year period. All collected material would be moved off-site daily and stored in compliance with regulations set by *Manitoba Livestock Manure and Mortalities Management Regulation (MLMMMR)*. Land application will also follow the *MLMMMR*.

The contingency plan for disposal includes regular removal of the materials from the disposal bin inside the plant to be disposed of in an environmentally sound manner to a licensed landfill facility located outside the City limits.

The third option involves OlyWest developing partnerships with soil amendment companies, or other similar industries. The materials would be utilized as a nutrient and/or carbon additive to current products from these companies or industries. The end product would then

be transferred to a third party using socially and environmentally acceptable transport methods.

Currently the first disposal option is the preferred option with option two available in case of problems and option three pursued as opportunities arise.

4.3.4 Domestic Solid Waste

It is expected that the facility will generate about 2,885 kg (6,360 lb) of domestic waste per week (150 tonnes/yr,), to be disposed of in an authorized landfill site.

Recyclable materials such as cardboard and office paper will be disposed of separately. Based on a similar facility, the expected amount of cardboard to be recycled is 2,885 kg/week (6,360 lb/week) (150 tonnes/year) and approximately 1.1 m^3 (38.85 ft^3) of office paper per week (156 m^3 /yr or 5,509.3 ft^3/yr). There will be three compactors at the proposed OlyWest facility.

4.4 FUTURE EXPANSION

The proposed OlyWest facility is expected to start processing hogs in 2009 running at a capacity of 18,000 hogs per week (3,600 hogs/day). The capacity is scheduled to increase over the next three to five years, until reaching a maximum of 45,000 hogs per week (9,000 hogs/day). The proposed facility building and property has been designed to accommodate the physical space requirements necessary for future expansion if deemed necessary and pending additional environmental reviews and approvals. This report is based on the full capacity of the plant (9,000 hogs/day), including the input and output mass balance in Section 5.3.5.