

**ENVIRONMENTAL ASSESSMENT REGISTRATION**  
**PHASE SEPARATION OF SPENT DRILLING MUD FLUIDS**

**SUBMITTED TO:**

**NEWFOUNDLAND AND LABRADOR MINISTER OF THE DEPARTMENT OF MUNICIPAL AFFAIRS AND ENVIRONMENT**

**PO BOX 8700**

**ST. JOHN'S, NL, A1B 4J6**

**ATTENTION: DIRECTOR OF ENVIRONMENTAL ASSESSMENT**

**PREPARED BY:**

**PARDY'S WASTE MANAGEMENT AND INDUSTRIAL SERVICES LIMITED**

**30 KYLE AVENUE**

**MOUNT PEARL, NL A1N 4R5**





**NAME OF UNDERTAKING:** Phase Separation of Spent Drilling Mud

**PROPONENT:**

- (i) Name of Corporate Body: Pardy's Waste Management and Industrial Services Limited
- (ii) Address: 30 Kyle Avenue, Mount Pearl, NL, A1N 4R5
- (iii) Chief Executive Officer:
  - a. Mr. Derek Pardy
  - b. President
  - c. 25 Stentafor Avenue, Pasadena, NL, A0L 1K0
  - d. (709) 686-2013, (709) 632-4672
  
- (iv) Principal Contact Person for purposes of environmental assessment:
  - a. Steve Moores
  - b. General Manager & Director
  - c. 30 Kyle Avenue, Mount Pearl, NL, A0L1K0
  - d. (709) 368-4350, (709) 632-1767

**THE UNDERTAKING:**

- (i) Name of the undertaking: Phase Separation of Spent Drilling Mud
- (ii) Purpose of the undertaking: For Pardy's Waste Management and Industrial Services Limited to use existing infrastructure, equipment and personnel to receive and phase separate spent drill muds into water, oil and solids from oil and gas producers and their service providers for the purpose of hydrocarbon recovery & reuse, and sustainable waste management of water and solids.



**DESCRIPTION OF THE UNDERTAKING:**

Pardy's Waste Management and Industrial Services Limited currently provides services including vacuum truck rentals, industrial services, bulk liquid transport, waste management, industrial water treatment, septic collection and treatment, used oil collection, treatment, and resale and project management services to customers in Newfoundland and Labrador. The current level of activity and anticipated increase in activity in the exploration and development of oil and gas resources in Newfoundland & Labrador requires service providers that can provide sustainable waste management solutions.

Prior to being approved for use offshore for exploration and production drill muds undergo assessment and review and have to be classified as low toxicity. Currently Halliburton (Baroid) and Schlumberger (MI SWACO) supply new, or reconditioned drill mud for use to the Newfoundland and Labrador offshore oil industry. During use, and reconditioning drill muds eventually weather and age to a point they are no-longer effective for their designed purpose and become waste. During recovery of spent drill mud rock fragments known as drill cuttings and excess water accumulate in the waste stream. The waste is contained and transported to shore via Offshore Supply Vessel (OSV) where it is unloaded and sent for disposal. The primary composition of spent drill muds is approximately 60% water, 15-25% oil with the remainder being solids. Due to the construction of the drilling mud, the mixture of oil, water and solids is visually similar to a homogenous viscous fluid that will not readily separate with conventional gravity tank treatment. Spent drill muds are shipped via OSV in a liquid state and meet the definition of liquid until primary treatment (phase separation) has been accomplished.

The stabilized emulsion of mud requires heat and/or physical force (g-force) to effectively separate into its aqueous, non-aqueous and solid phases.

Alternative waste management techniques that exist for spent drill muds include landfilling, and reinjection, and low temperature thermal desorption. Landfilling and reinjection techniques have been precluded by Pardy's as viable alternatives to the management of spent drill mud solids because landfilling of liquid waste is prohibited, and no disposal wells exist on-shore in the Province of Newfoundland and Labrador.



**EXISTING TECHNOLOGY REVIEW:**

Pardy's has consulted with many of their counterparts throughout the waste management industry in Canada while evaluating waste streams, and technologies available to effectively provide sustainable waste management services in Newfoundland and Labrador. The primary phase separation technology review below is based on readily available information, market demand, individual customer requirements and current regulatory regime in Newfoundland and Labrador. The review is subjective based on Pardy's assessment of the waste and knowledge of technology.

Low Temperature Thermal Desorption	
<p>Advantages:</p> <ul style="list-style-type: none"><li>• Effective at removing hydrocarbons from soil/solids;</li><li>• Effective at drying solids through evaporation.</li></ul>	<p>Disadvantages</p> <ul style="list-style-type: none"><li>• Not efficient for removing solids from liquids;</li><li>• Temperature of kiln drier high enough to potentially thermally degrade hydrocarbons, limiting reuse of recovered product;</li><li>• Throughput rate often very slow and not able to achieve net zero on annual basis, resulting in waste stockpiling year over year.</li><li>• Energy requirement to separate liquids from solids dramatically increases with liquid content;</li><li>• Energy requirement increase with colder ambient temperatures;</li><li>• Particle size of solids in mud slops small enough to volatilize with air emissions, and difficult to control through conventional baghouse. Scrubber often required to control micro fines during process;</li><li>• Technology and process has to be custom designed, operated based on waste stream and is not readily convertible to handle other wastes;</li><li>• Large footprint and expensive capital investment.</li></ul>



Heat Assisted Centrifugation	
<p>Advantages:</p> <ul style="list-style-type: none"><li>• Component based system, readily available equipment and parts;</li><li>• Technology and equipment adaptable to wide variety of liquid waste and sludge waste streams;</li><li>• Temperature required to effectively separate phases under force, not high enough to thermally degrade hydrocarbons;</li><li>• Process readily variable (tunable) to effect solids removal from liquid phase;</li><li>• Process readily variable to separate aqueous and non-aqueous phase liquids;</li><li>• Relatively low energy demand;</li><li>• Energy demand relatively consistent;</li><li>• High throughput rate achievable with proper equipment calibration and process design resulting in annual waste elimination;</li><li>• Centrifugation very effective at removing micro fines from liquid phases;</li><li>• Low capital cost;</li><li>• Highly effective for removing solids from liquid.</li></ul>	<p>Disadvantages:</p> <ul style="list-style-type: none"><li>• None.</li></ul>

**PREVIOUS EXPERIENCE:**

Pardy's Waste Management and Industrial Services Limited has recently undertaken a pilot project with NEWALTA Corporation successfully phase separating 7,562,566 litres of spent drilling mud (mud slops) at their facility located at 30 Kyle Avenue, Mount Pearl. Mud slops were transported from storage to Pardy's facility and separated into 1,743,025 litres of hydrocarbon (IFO), 2,337.35 tonnes of recovered solids that were transported to a licenced soil treatment (bio-remediation) facility and 4,284,600 litres of treatable waste water that was sent to a licensed water treatment facility. The pilot project was executed in an 8 week period, validating conventional phase separation as an effective primary treatment method for spent drill mud, known to the waste management industry as mud slops.

Phase separation of mud slops does not treat the segregated aqueous and non-aqueous liquids or solids. The intent of the undertaking is to provide a sustainable method to separate the phase components of the mud slops, which, when separated are manageable, reusable and treatable. It should also be noted that the undertaking does not include mud slops that are impacted or contaminated with normally occurring radio-active material (NORM). Pardy's is currently **not** permitted to transport, store, receive or treat NORM's.

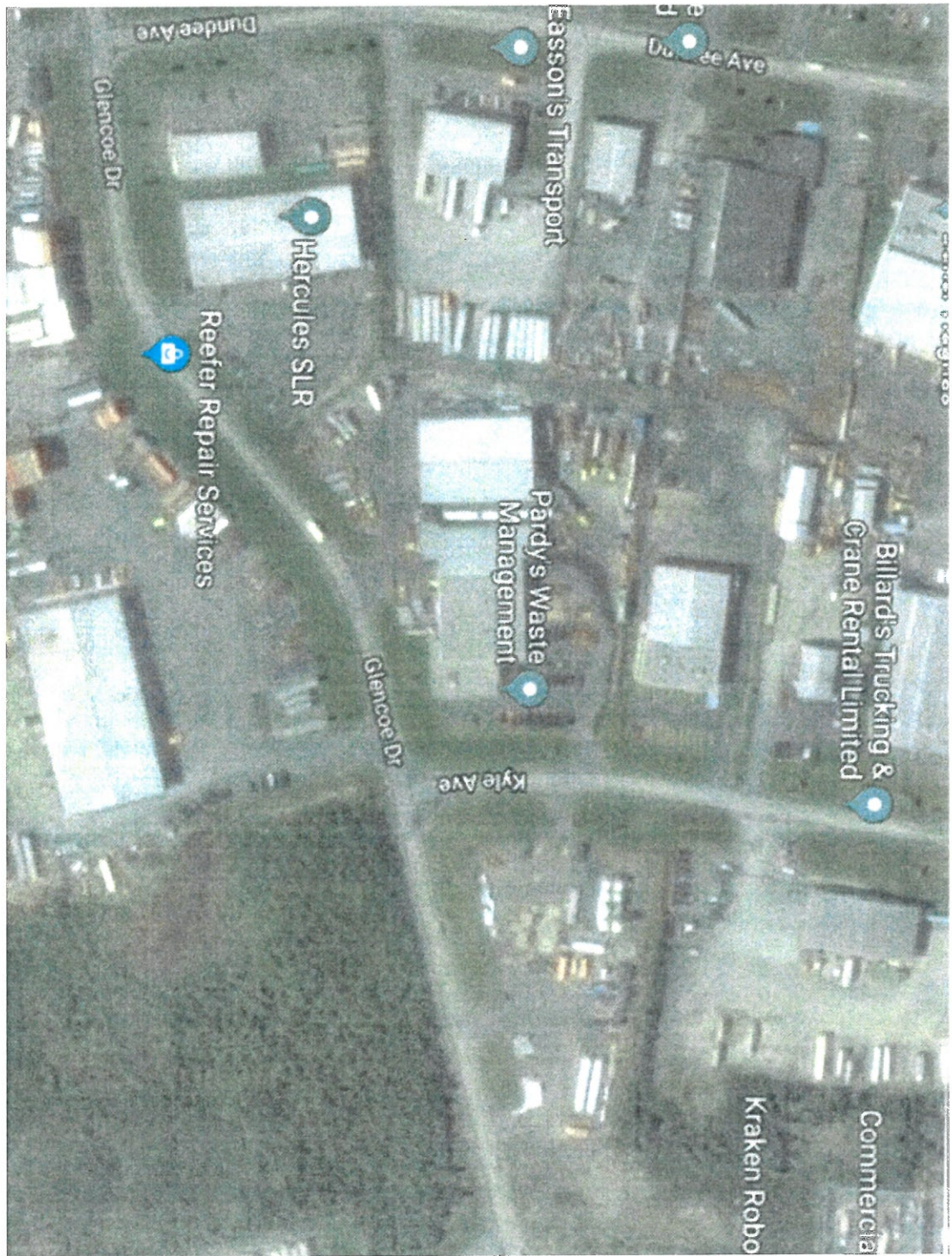


#### **PARDY'S APPROACH TO DEALING WITH SPENT DRILL MUDS (MUD SLOPS):**

Following a technology review, market assessment, and pilot project Pardy's is preparing to offer mud slop disposal services to the oil and gas exploration and development industry. Pardy's currently own and operate a fixed facility located in Mount Pearl, which is close to shore base OSV entrance points and strategically situated to provide quick and effective liquid waste management solutions. The fixed facility in Mount Pearl contains a large indoor heated tank farm, and the process kit required to effectively undertake the phase separation of mud slops by heat assisted centrifugation. The Mount Pearl facility also contains an industrial wastewater treatment system, and is within close proximity to a licenced drill mud solids disposal facility. Pardy's is proposing to receive the primary waste stream (mud slops) at 30 Kyle Avenue in Mount Pearl, for the purpose of phase separation into treatable water, treatable solids and re-useable hydrocarbon as Industrial Fuel Oil (IFO).

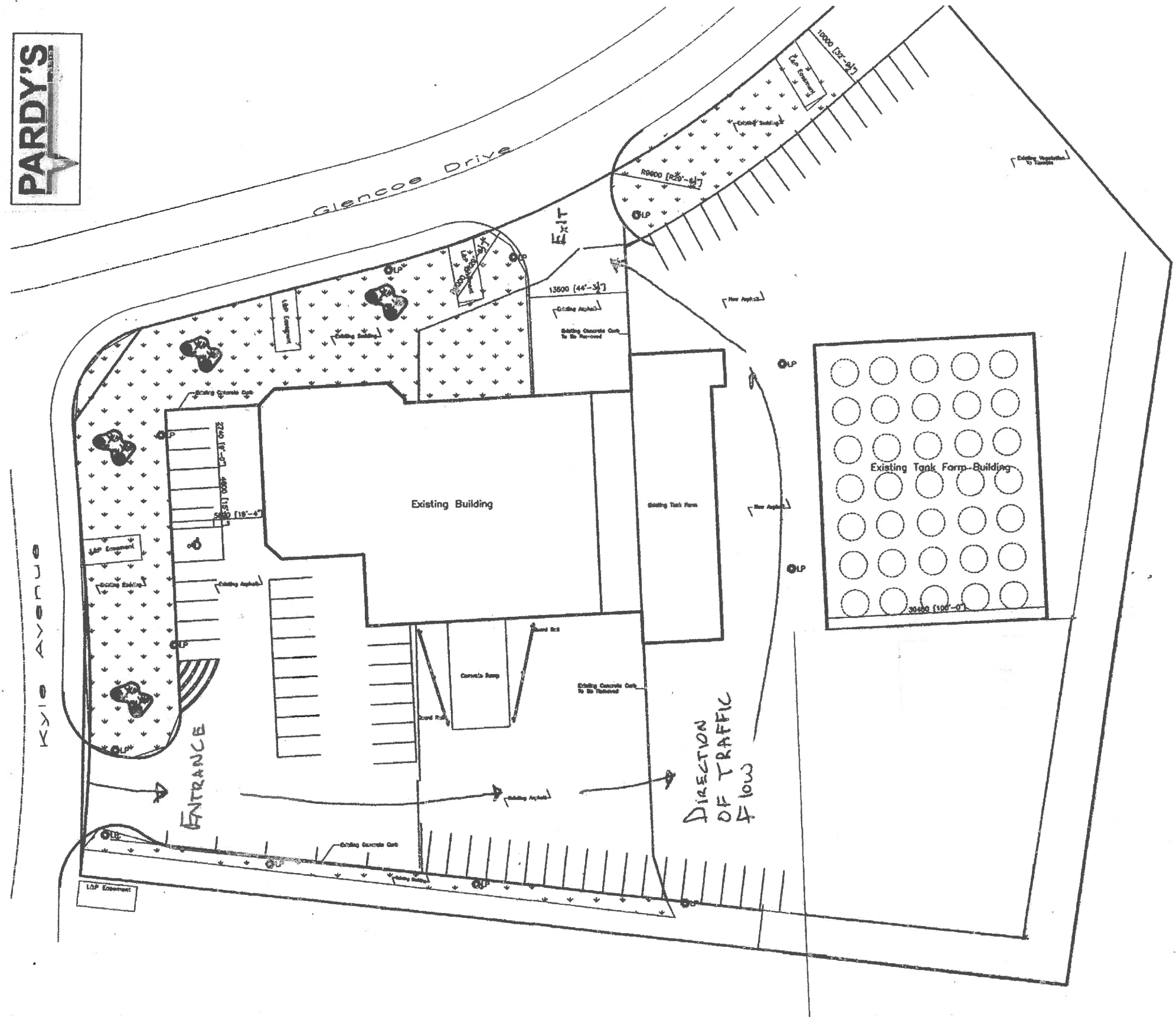
- (i) Geographic Location – The proposed site location and existing infrastructure can be found illustrated on the following pages. The phase separation process is located inside the “Existing Tank Farm Building” and is currently an integral part of day to day operations handling and segregating primary liquid waste streams (excluding mud slops). The site is in Donovan's Industrial Park, at 30 Kyle Avenue, which is zoned light industrial. The approximate property boundary is illustrated on the Site Location Plan. The Existing Tank Farm Building was designed and constructed as a contained dyke for the purpose of handling large volumes of liquid waste. The proposed access route to the facility is illustrated on the Site Plan. All proposed activity will take place inside the Existing Tank Farm Building.





PARDY'S WASTE MANAGEMENT AND INDUSTRIAL SERVICES

SITE LOCATION PLAN & APPROXIMATE PROPERTY BOUNDARIES







(ii) Physical Features – The undertaking requires storage, handling and processing of waste. All activity will be carried out inside the Existing Tank Farm Building. Equipment required for the undertaking includes:

- Storage Tanks;
- Heat exchangers;
- Boiler;
- Pumps;
- Centrifuge;
- Transportation network to receive / dispose of primary and treatable waste.

The area surrounding the Existing Tank Farm Building is finished with an asphalt surface and is accessible by vehicles used to transport waste to and from the facility. The traffic flow is illustrated on the attached Site Plan. The 30 Kyle Avenue facility has a fenced property boundary with controlled access to process areas through gates.

The subject site is relatively flat and is currently used as a liquid waste storage and processing facility, maintenance shop and dispatch branch for Pardy's industrial cleaning and vacuum truck services. A small portion (less than one acre) is currently leased to Halliburton (Bariod) as a Liquid Mud Plant (LMP) production facility.

The subject site does not contain any wildlife, fish, or bird habitat or vegetation that could be impacted by the undertaking.

There are two storm sewer catch-basins at boundaries of the site near the entrance and exit.

(iii) Construction – No construction is required for this undertaking



- (iv) Operation – Waste reception will be through coordinated collection with customers. Pardy's will only receive waste from known customers with characterized waste. Waste not meeting specific conditions of operating Certificates of Approval's will be rejected. Pardy's hours of operation are 7:30 am to 4:30 Monday to Friday, however, 24-hour operations are possible when required, as the facility is equipped with adequate area lighting and task lighting, and appropriate facilities to accommodate extended operation.

The Existing Tank Farm Building was constructed to warehouse large volumes of liquid waste. The facility is enclosed with a heated floor slab, to enable 4 season operation. Please refer to the Process Flow Diagram for additional information. The Existing Tank Farm Building is where the primary phase separation will occur.

Approximately nine (9) x 90,000 litre storage tanks will be used in the primary phase separation of mud slops. The tanks facilitate primary mixing, batch preparation, intermediate process transfer, recirculation for heating, and segregated waste storage.

The incoming waste will be blended and batched according to process design and circulated through a heat exchanger to preheat waste while blending. Once the waste has been blended and heated to adequate temperature it will be processed through a centrifuge where solids, aqueous and non-aqueous liquids will separate.

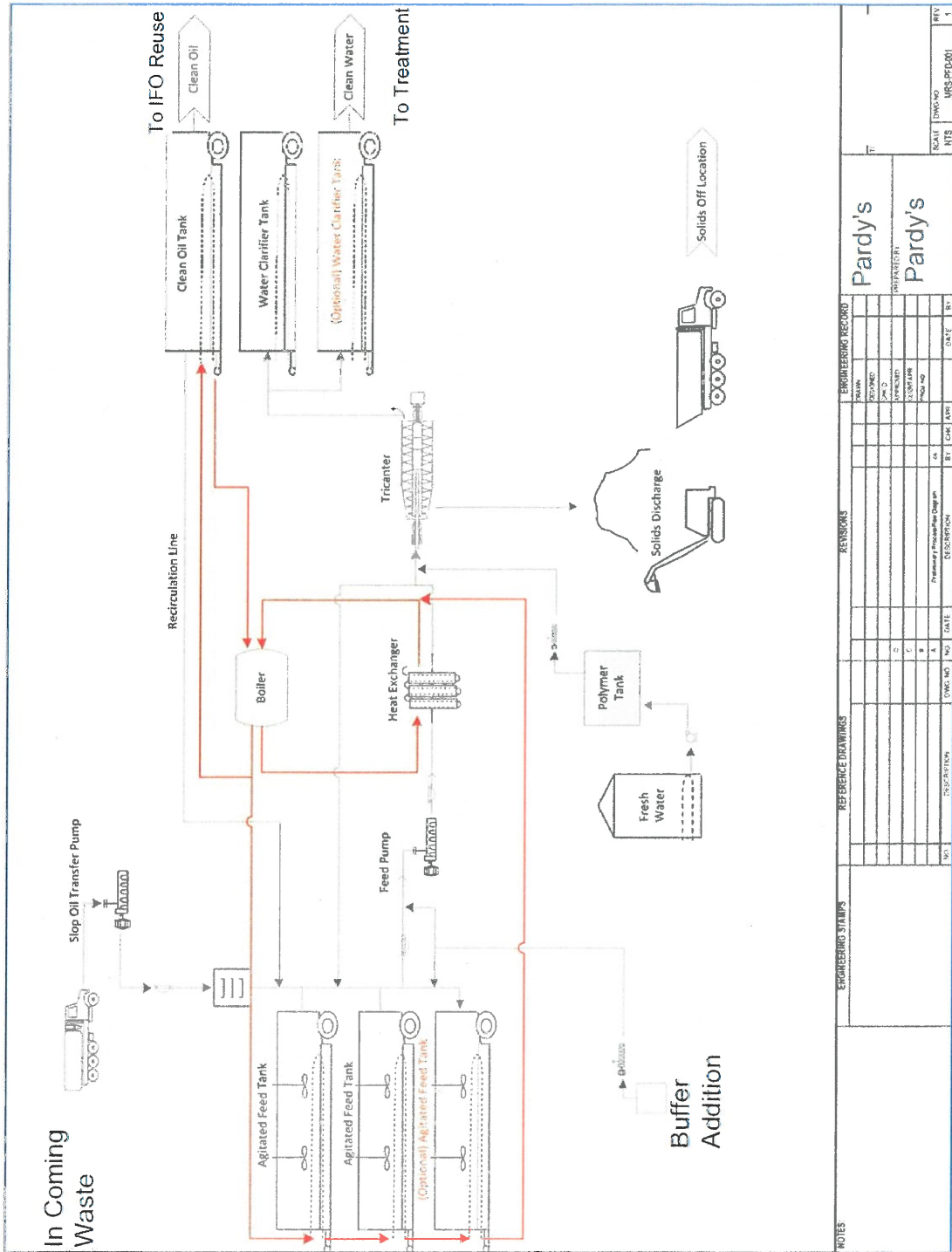
Solids will be transported off site to a licenced disposal facility. Water will be clarified and sent for treatment at a licenced disposal facility. Oil will be retained and blended with other incoming recovered hydrocarbon waste and resold as industrial fuel oil (IFO).

The proposed undertaking is a permanent addition to the Pardy's facility.

Potential sources of pollution include untreated water and untreated solids. No airborne emissions are anticipated.

As the proposed undertaking is being operated within an existing facility using existing equipment and involves liquid waste, no resource conflicts are anticipated.

## PROCESS FLOW DIAGRAM



ENGINEERING STATUS		REFERENCE DRAWINGS		REVISIONS		ENGINEERING RECORD	
NO.	DESCRIPTION	DATE	BY	DATE	DESCRIPTION	NO.	DATE
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(v) Occupations – Pardy's currently employs adequate resources to undertake phase separation of Mud Slops. Current occupations include the following:

- Manager of Waste Operations;
- Field / lab chemist (NOC2112);
- Phase Separation Process Operators (NOC 9212);
- Labourers;
- Vacuum Truck Operators;
- Vacuum Truck Helpers.

These are full time positions with Pardy's and it is anticipated that the undertaking will require addition of staff that will be trained and on-the-job trained to operate equipment related to the phase separation process.

Pardy's has supported and will continue to recruit graduates from the College of the North Atlantic Process Operations Engineering Technology (POET) program, as they possess the theoretical knowledge and applied science background to effectively operate equipment required to manage the mud slops waste stream.

Pardy's is an equal opportunity employer and actively engages the Women in Resource Development Corporation and Office to Advance Women Apprentices to place apprentices in our organization in Operator, Helper, and Mechanic positions. As an executive member to the International Union of Operating Engineers, Local 904, one of our operations staff Katlyn Hutchings also advocates for the placement of Women from the Local 904 with Pardy's. Pardy's maintains active respectful workplace, workplace violence/harassment policies to ensure that all employees and potential employees have a fair, open and supportive workplace that encourages meaningful career employment based on skill and ability without any bias.

(vi) Project Related Documents – None



**APPROVAL OF THE UNDERTAKING**

Pardy's Waste Management and Industrial Services Limited is currently working with the Newfoundland and Labrador Department of Municipal Affairs and Environment, Pollution Prevention Division – Waste Management Section to obtain a Certificate Of Approval pursuant to the Environmental Protection Act to Operate a Waste Management System, for the Phase Separation of Spent Drill Muds, at 30 Kyle Avenue, Mount Pearl, NL.

**SCHEDULE**

Pardy's Waste Management and Industrial Services Limited is prepared to commence receiving spent drill muds (mud slops) immediately following approval from NLDMAEPPD.

**FUNDING**

The undertaking does not require any funding or financing to commence. All costs to operate the system, facility and transportation network will be funded by Pardy's. No grants or funds from a government agency are required.

**CLOSURE**

Pardy's Waste Management and Industrial Services Limited have been managing waste in NL for more than 30 years. We believe in developing sustainable solutions for the residents and industry throughout Newfoundland and Labrador. Pardy's believes in responsible waste management and developing opportunities to ensure that work and employment remain in Newfoundland and Labrador. Pardy's believes in building relationships with customers, suppliers and regulators alike to support the growth of the energy sector and all industry. We humbly request your support in our undertaking.

Respectfully Submitted,

A handwritten signature in blue ink, appearing to read "Steve Moores", with a stylized flourish at the end.

Steve Moores,  
General Manager and Director