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FINAL REPORT

Transportation and Logistics Plan

Smelter and Refinery
Decommissioning/Demolition
Thompson, Manitoba

Prepared for: Vale Canada Ltd.

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1.0 INTRODUCTION

1.1 GENERAL

This Transportation and Logistics Plan (TLP) describes policies, procedures, and protocols for cleaning equipment, loading, and transportation of materials off-Site and on-Site during the decommissioning and demolition of the Smelter and Refinery at the Vale Mine Site (Site) in Thompson, Manitoba. Figure 1.1 presents the Site Location. Figure 1.2 presents a Site Plan.

The TLP was developed in accordance with federal and provincial regulations, which include but are not limited to the following:

- Manitoba Dangerous Goods Handling and Transportation Act (C.C.S.M. c. D12) (Manitoba Act) including regulations:
 - Dangerous Goods Handling & Transportation Regulation (M.R. 55/2003)
 - Generator Registration & Carrier Licensing Regulation (M.R. 175/87)
 - Manifest Regulation (M.R. 139/88)
 - PCB Storage Site Regulation (M.R. 474/88)
- Federal Transportation of Dangerous Goods Act (TDG Act), 1992
- Work Place Safety and Health (WSH) Regulation (M.R. 217/2006 Part 37 - Asbestos)
- Guideline 2002-02E: Criteria for Acceptance of Contaminated Soil at Licensed Waste Disposal Grounds. May 2002
- Guideline 96-05: Treatment and Disposal of Petroleum Contaminated Soil. June 1996, revised December 2010
- Canadian Guidelines for the Management of Naturally Occurring Radioactive Material (NORM), October 2000
- Canadian Nuclear Safety and Control Act, 2000 (CNSC Act)
 - Nuclear Substance and Radiation Devices Regulations
 - Packaging and Transport of Nuclear Substances Regulations (PTNS Regulations)
- PCB Regulation SOR 2008/273 as amended
- The Highway Traffic Act (C.C.S.M. c. H60) including regulations
 - Vehicle Weight and Dimensions on Classes of Highway Regulations (M.R. 575/88)

Manitoba Conservation is developing new regulations for the management of hazardous materials that may require revisions to this Transportation Plan before the decommissioning/demolition occurs in 2015. Manitoba Conservation does not have an expected date of promulgation.

The Contractor will be required to prepare a final Transportation and Logistics Plan that will, at a minimum, meet all requirements of this TLP and submit the Final Transportation and Logistics Plan to Vale for review and approval.

2.0 TRANSPORTATION AND DISPOSAL FACILITIES

2.1 AUTHORIZED TRANSPORTERS

All hazardous waste transporters (Transporters) must be licensed by the Manitoba Conservation and the appropriate provinces through which the trucks will travel to carry hazardous waste. Transporters will comply with applicable provincial and federal hazardous waste transportation requirements including the TDG and Manitoba Act. If wastes are deemed to be non-hazardous, then Transporters will be licensed for general transportation of wastes as required by Manitoba Conservation.

The Transporter must comply with the terms and conditions of their license. The Contractor must provide Vale the names and applicable documentation for all Transporters selected to transport decommissioning/demolition waste off-Site. Potential waste types generated during the Smelter and Refinery decommissioning and demolition include solids, liquids, and mixtures, including:

- Hazardous and Regulated Wastes
 - Radionuclides (nuclear instruments)
 - Lighting ballasts (polychlorinated biphenyl [PCB])
 - Lab pack (unused raw and waste chemical materials)
 - Transformer oil (PCB and non-PCB)
 - Other oils (PCB and non-PCB)
 - Lighting (fluorescent and high-intensity discharge [HID] lighting)
 - Ozone depleting substances (ODS)
 - Mercury-containing devices and liquid mercury (rectifiers)
 - Batteries
 - Glycol
- Asbestos waste (will be transported and disposed on Site)
 - ACM insulation (on pipes and equipment)
 - Other ACM (transite and floor tile)
- Potential Hazardous Bulk Solid/Liquid Wastes
 - Product/residue in pipelines/tanks
 - Refractory bricks (furnaces, converters, roasters, and stack)
 - Potential impacted bricks from tanks and thickener in Refinery
 - Smelter dust

- Concrete/cinder blocks
- Demolition Debris/Non-Hazardous Materials
 - Wood (untreated)
 - Non-ACM insulation
 - Roofing materials
 - Fibre reinforced plastic (piping, hoppers, tank liners and tanks) (Refinery-specific)
 - Creosote wood (rail ties and cribbing)
 - Used filter cloth (washed)
 - Lighting ballasts (non-PCB)
- Recyclable Materials
 - Concrete blocks/cinder
 - Ferrous and non-ferrous metals
- Rinse water
- Petroleum and polycyclic aromatic hydrocarbon- (PAH-) impacted soil

The transporters are required to provide the following documentation:

- Transporter Identification and Regulatory Classification and Status
- Copy of Valid Operating Licenses and Permits for each proposed transport vehicle/container
- Copy of the Manitoba or other provincial waste transport identification number
- Copy of Certificate of Insurance
- TDG Materials Packaging Requirements
- Method Statement
- Signed affidavit and copies stating that all vehicle/rail operators handling hazardous waste are TDG trained in accordance with the TDG Regulations
- Transport drivers/rail operators will need to provide a copy of their valid TDG licence upon arrival at Vale for photocopying/verification by Vale prior to transport

The Transporter(s) shall provide vehicles that are appropriate for accomplishing successful transportation of material from the Site to the licensed treatment, storage, or disposal facility (receiving facility). All motor vehicles/rail cars used to transport waste materials shall be operated and maintained in accordance with the manufacturer's recommendations; Work Place Safety and Health (WSH) Regulation; the Provincial

Railway Act; federal regulations under the TDG Act; provincial regulations under the Manitoba Act; and local regulations. Any motor vehicle/railcar determined to be potentially unsafe and/or unsuitable for their intended use shall be removed.

2.2 DISPOSAL FACILITIES

Prior to shipping waste material off-Site, the Contractor must identify potential receiving facilities for Vale's review and approval, including the following information:

- Copy of the Operating Permit including Provincial license number and any Federal identification number
- Letter stating facility is in compliance with its Federal, Provincial, and local permits and that the permits are current for the duration of the Site activities
- Copy of Certificate of Insurance, location of facility, process description and TSDF-specific packaging requirement for shipment
- Blank forms of proposed shipping and/or disposal documents
- Waste profile requirements
- Additional sampling and analysis of materials that will be conducted by TSDF during receipt of shipments to verify waste profiles

Prior to the removal of any hazardous/regulated material, bulk solid wastes, demolition debris, non-hazardous material, rinse water, or impacted soil from the Site, the Contractor must receive written approval from the designated receiving facility, as well as Vale's approval. The written approval from the designated receiving facility must include the relevant waste profile and any analytical data used to profile the waste. With respect to waste that will be transported to an on-Site area, the Contractor must receive approval from Vale before transporting the material to the disposal area.

3.0 METHODS OF TRANSPORTATION AND DISPOSAL

The Contractor will be responsible for collecting the waste profile samples and obtaining disposal facility approval. The waste profile or hazardous waste manifest will be signed by Vale. The Contractor will not load material for transport and disposal without the approval of Vale. All containers, packaging material and labels used for transporting material from the Site to the designated disposal facilities shall comply with TDG, federal, provincial, and local regulations.

The following sections present potential methods of transportation, general loading procedures and documentation requirements.

3.1 TRANSPORT CONTAINERS

CRA anticipates that waste will be transported off-Site by highway and/or by rail. There are several types of transport containers available for different types of waste that may be suitable for the execution of waste removal activities during the decommissioning/demolition of the Smelter and Refinery, including but not limited to the following:

Road

- Roll-off Containers
- Triaxle Dump Trucks
- Transport Trucks
- Lift Trucks
- Tanker Trucks

Rail

- Standard Gondola (Rail Car)
- Intermodal Boxes (Rail Car)
- Bulk Liquid Rail Cars

The Contractor shall insure that all transport containers are clean prior to loading the waste material and are TDG compliant.

3.2 LOADING PROCEDURES

Transportation vehicles will enter the Site at the designated entrance/exit of the Site and proceed to security check in. All transportation vehicles will be weighed at the scale house prior to entry to the Site and proceed to the designated loading area. The Transporter will provide the weigh scale ticket showing the vehicle weight to Vale prior to being loaded. The locations of the scale house for road vehicles and rail cars are shown on Figure 1.2

Loading operations will be conducted in a controlled manner. Once loaded and before leaving the Site for the receiving facility, the transportation vehicle operator will inspect and verify that the load is arranged and properly secured. All required placards and signage will be placed on the vehicle in accordance with federal, provincial and local regulations. The vehicle will proceed to the weigh scale where a weight scale ticket will be issued and provided to Vale. This weight will be used on all bill of ladings or manifests.

After loading and release from the Site, the transportation vehicle will report to the receiving facility. The transportation vehicle will be weighed at the receiving facility. All weigh tickets will be matched with invoices from the receiving facility.

3.2.1 BULK SOLID MATERIALS

Bulk solid materials may include potential product/residue in pipelines/tanks, refractory bricks from the Smelter furnaces, converters, and stack, bricks from the tanks and thickener in the Refinery, hazardous dust, concrete/cinder blocks, ferrous and non-ferrous metals and demolition debris/non-hazardous materials.

Prior to loading material into the transportation container, the Contractor will inspect the container for cleanliness and holes. The Contractor will not place free liquids or saturated material into containers intended for solid materials. When loading bulk solid material, the materials will be placed in containers in a manner that minimizes dust generation.

All applicable TDG and Canadian requirements will be followed. Other applicable regulations and standards may apply and must be followed including the Canadian Nuclear Safety Commission (CNSC) Packaging and Transportation Regulations and the International Atomic Energy Agency (IAEA) Safety Standards Regulations for the Safe Transport of Radioactive Material. A weatherproof tarp will be provided and secured over each shipment leaving the Site except for enclosed transport units. Transport

vehicles transporting solid hazardous waste must be lined with a minimum 6-mil poly liner.

3.2.2 BULK LIQUID WASTE

Bulk liquid waste, which includes but is not limited to, oil, glycol, product, or rinse water generated from cleaning activities may be transported for off-Site disposal as bulk liquid waste.

Transport vehicles (i.e. tanker trucks) shall be inspected by the Contractor prior to use. All attached piping and valving shall be verified to be sound and in good working order, as well all necessary valves shall be confirmed to be closed prior to loading. All applicable TDG requirements will be followed.

During loading of bulk liquid material, attention will be paid to the presence of any leaks that may occur. The Contractor will correct any leaks and cleanup materials impacted by leaks during loading. The Contractor will replace bulk liquid containers that are unsuitable for transporting liquid waste.

3.2.3 DRUMMED/CONTAINERIZED WASTE

Drummed/containerized waste will be loaded and segregated in accordance with the requirements of Part 5 of the TDG Regulations. Once loaded and before leaving the Site for the receiving facility, the transportation vehicle operator must inspect and verify that the load is properly secured and that there are no visible signs of leaks from the drums/containers that have been loaded onto the vehicle.

3.3 PREPARATION OF OFF-SITE TRANSPORT VEHICLES

The Contractor will be responsible for decontamination of transport vehicles prior to leaving the Site. Any material on the tires or axles of trucks and material on the vehicle resulting from loading operations must be removed. Decontamination activities will include sweeping, brushing and/or steam cleaning, as appropriate.

The Contractor will inspect and document that each vehicle leaving the Site has been properly decontaminated, tarps are secured, proper placards are in place, manifest/documents are correct, appropriate copies of the manifest are retained for filing and/or submission.

3.4 TRANSPORTATION ROUTES AND SITE TRAFFIC CONTROL

Road transportation vehicles will enter and exit the Site through the scale house entrance on the east side of the Site. The anticipated on-Site road transportation routes are shown on Figure 3.1. The Contractor will be responsible for ensuring the roads within the Smelter and Refinery area are suitable for heavy trucks.

Rail cars will enter the Site from the south track and proceed to the rail car scale. The rail car will then proceed to the designated loading area and then back to the scale before exiting the Site. The anticipated on-Site rail transportation routes are shown on Figure 3.2.

In coordination with Vale, the Contractor will schedule the transportation vehicles to and from the Site to minimize the number of transportation vehicles at the Site at any given time. Upon arrival to the Site, the Transporter(s) will check in with Site security and be directed to an on-Site location for further processing (i.e. loading, unloading, short term staging, etc). Transportation vehicles will only be permitted to arrive at the Site during Site operation hours. It is anticipated that an excess of vehicles will not be present at the Site; however, in the event that the scheduling of vehicles is not sufficient to control vehicle flow, Vale will arrange for a staging area for the trucks to wait prior to arrival at the Site.

Road transportation vehicles will utilize the city or provincial paved roads to transport waste to the appropriate off-Site receiving facility. The typical route from the Site will be south on Manitoba Highway 6.

Prior to commencing the off-Site transportation of waste materials, the Contractor will identify a primary and secondary route to each receiving facility for Vale's approval. The secondary route will be used only if the primary route becomes impassible due to weather and road conditions or blockage from traffic accidents. The appropriate provincial officials will be consulted as to whether any proposed routes are scheduled for construction or seasonal closures that will occur during implementation of this project. The Contractor must review Manitoba's Spring Road Restriction Program to ensure there are no load restrictions for the chosen route. The approved transportation routes will be included as an amendment to this TLP.

The materials will be transported from the Site to the approved receiving facility using the approved routes. Any deviation from these intended haul routes will be discussed and approved by Vale prior to deviation.

3.5 DOCUMENTATION

The appropriate documentation will be generated, maintained and copies will be provided to Vale for all material transported from the Site to an off-Site disposal facility in accordance with federal, provincial, and local regulations. Each loaded transport vehicle will be provided with a waste shipment record, waste manifest or bill of lading which identifies the generator, transporter, and disposal facility, the nature of the material, the date and time the material was transported from the Site, and the measured weight or volume of material. The waste shipment record, waste manifest or bill of lading will be signed by Vale, and the Transporter before the material is transported from the Site.

Upon receipt of the material, the receiving facility will be required to sign the waste shipment record, waste manifest, or bill of lading. The receiving facility will submit Copy 3 of the manifest to the Manitoba Conservation within 3 days of receiving the waste and will also send the Generator Copy 6 to Vale within 35 days of receiving the waste.

The Contractor will make all necessary arrangements with the designated receiving facility for materials removed from the Site. Weigh tickets will be obtained from the receiving facility both before and after discharging transported materials to verify tare weights of the transport vehicles. All transportation vehicles will be weighed at the on-Site weigh facility when entering and exiting the Site.

3.6 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance will be conducted by Vale or their designated representative. Transporters will be notified each morning, or upon arrival to the site, of QA/QC activities or health and safety issues pertaining to their operation and as deemed necessary throughout the day or upon a changed condition. Daily inspections will be documented by Vale using the Transporter Inspection Form provided in Appendix A and retained on Site.

Progress of shipments according to the Transporter and disposal facility will be checked weekly, at a minimum. The Contractor will prepare a weekly progress report for submission to Vale. The progress report will identify traveling vehicles, vehicles that have arrived at the disposal facility, loads which have been disposed and procedures to

correct vehicles, which are behind schedule. Vehicles shall be cross-referenced to their unique manifest or bill of lading number.

All hazardous wastes will be documented by a hazardous waste manifest and all non-hazardous wastes shall be documented by a non-hazardous bill of lading. A copy of the manifest or bill of lading will accompany the appropriate load. The Transporter will ensure that the manifest or shipping paper is readily available and recognizable by the authorities in the case of an accident or inspection. The Transporter will present the manifest to the disposal facility's representative upon arrival at the disposal facility.

4.0 SPILL PREVENTION AND RESPONSE

The handling and transport of containerized waste will be, at all times, conducted in a controlled and safe manner that will minimize damage to the waste containers and prevent release of the contents as per Part 5 of the TDG Regulation. Part 5.4 states that a person must load and secure dangerous goods in a means of containment and must load and secure the means of containment of transport in such a way as to prevent, under normal conditions of transport, damage to the means of containment or to the means of transport that could lead to an accidental release of the dangerous good.

In the event that a drum or container of liquid is spilled, the Contractor will immediately respond to the spill as described below. If the material is a TDG regulated material and the size of the release is greater than the reportable quantity or emission level as set forth in Part 8 of the TDG Regulations the Contractor will follow the protocol as per Part 8 of the TDG Regulation.

Any spilled liquids will be confined to the immediate area of the spill by dyking around the spill with native material or with an inert absorbent and the liquids will be pumped with the use of a portable hand pump into a repack drum. Any residual liquids that cannot be pumped will be absorbed with a sufficient quantity of inert absorbent to ensure that no free liquids remain. If the spill occurred on soil, outside of a previously identified contaminated area, the Contractor will immediately consult with the Vale to determine the appropriate response.

If the spilled liquid consists of decontamination water, the decision to excavate the visibly affected soils will be based on whether the water was generated from a source known to exhibit contamination. The Contractor will immediately consult with Vale to determine the appropriate response.

Part 8 the TDG Act requires persons in charge of facilities (including transport vehicles, vessels and aircraft) to report any release of a hazardous substance in a quantity equal to or greater than its reportable quantity, as soon as that person has knowledge of the release, to the following:

- a) Manitoba Department of Conservation at (204) 945-4888 and either the local police or the fire department
- b) The person's employer
- c) The consignor of the dangerous goods
- d) For a road vehicle, the owner, lessee or charterer of the road vehicle
- e) For a railway vehicle, CANUTEC at (613) 996-6666

- f) For a ship, CANUTEC at (613) 996-6666, a Vessel Traffic Services Centre or a Canadian Coast Guard radio station
- g) For an aircraft, an aerodome or an air cargo facility, CANUTEC at (613) 996-6666 and the nearest Regional Civil Aviation Office of the Department of Transport and, if the aerodome is an airport, the operator of the airport
- h) For Class 1, Explosives, and Class 6.2 Infectious Substances, CANUTEC at (613) 996-6666
- i) For an accidental release from a cylinder that has suffered a catastrophic failure, CANUTEC at (613) 996-6666

All spills must be immediately identified to the Contractor to evaluate and complete the reporting requirements. The Contractor will be notified of these events and provided with the reporting information. The Contractor will report all required information as detailed in TDG Act Part 8.2 and then follow-up with a 30 day report as required by TDG Act Part 8.3.

The contact information for CANUTEC is listed below:

CANUTEC:

Information: (613) 992-4624

Emergency: (613) 996-6666

Facsimile: (613) 954-5101

CANUTEC@tc.gc.ca

The contact information for TDG for the Prairie and Northern Region is listed below:

Prairie and Northern Region

Winnipeg: (204) 983-5969

Facsimile: (204) 983-8992

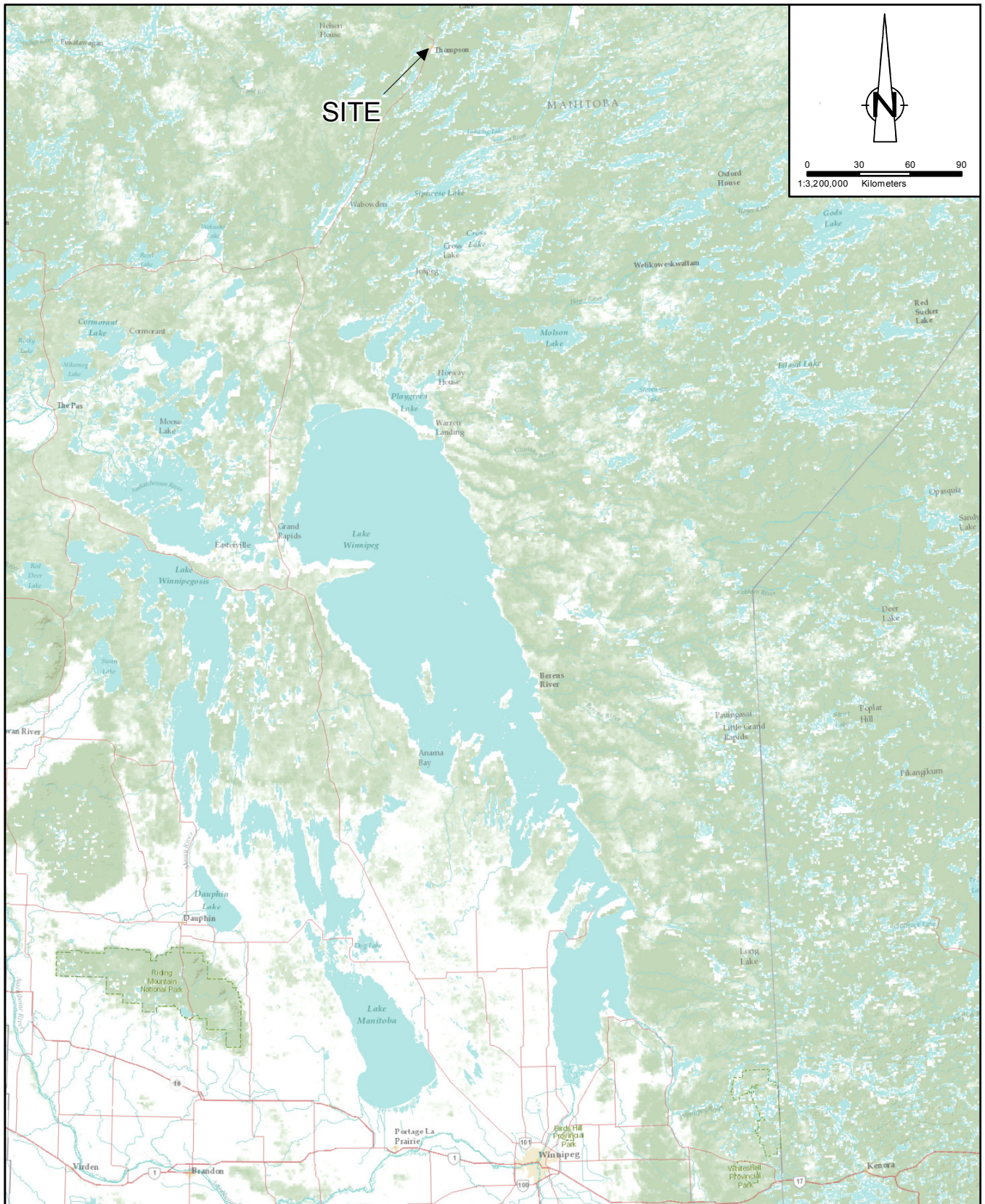
Saskatoon: (306) 975-5105

Facsimile: (306) 975-4555

E-mail: TDG-TMDPNR@tc.gc.ca

Transport Canada Dangerous Goods Directorate Internet address

<http://www.tc.gc.ca/eng/tdg/safety-menu.htm>



Source: ESRI Topographic Basemap, Accessed 2012; Coordinate System: NAD 1983 UTM Zone 14N

figure 1.1

SITE LOCATION MAP
VALE-MANITOBA OPERATIONS
Thompson, Manitoba



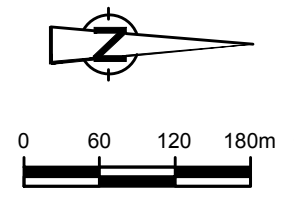
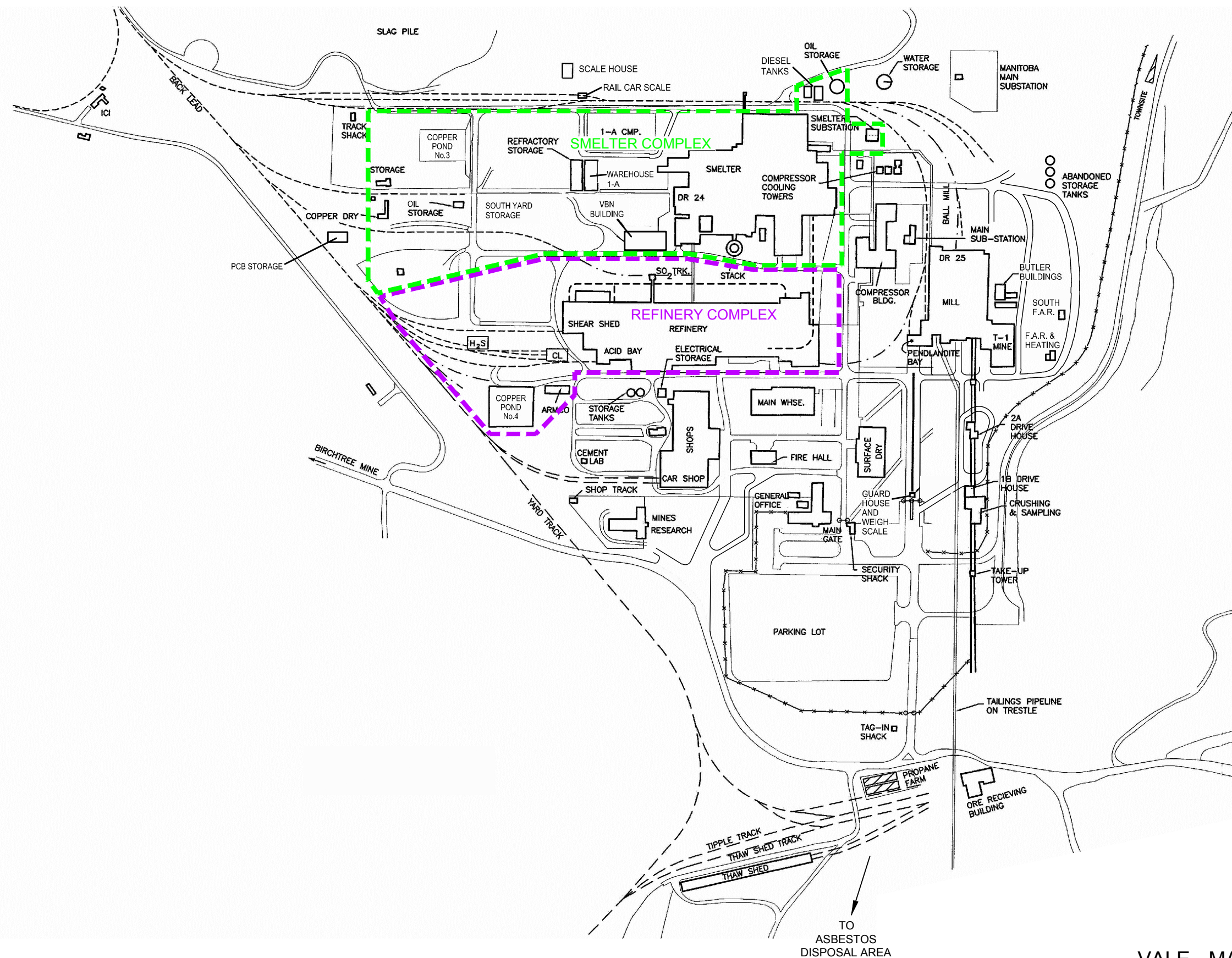
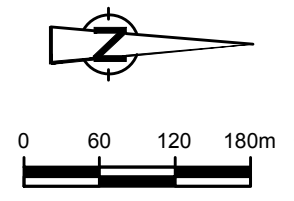
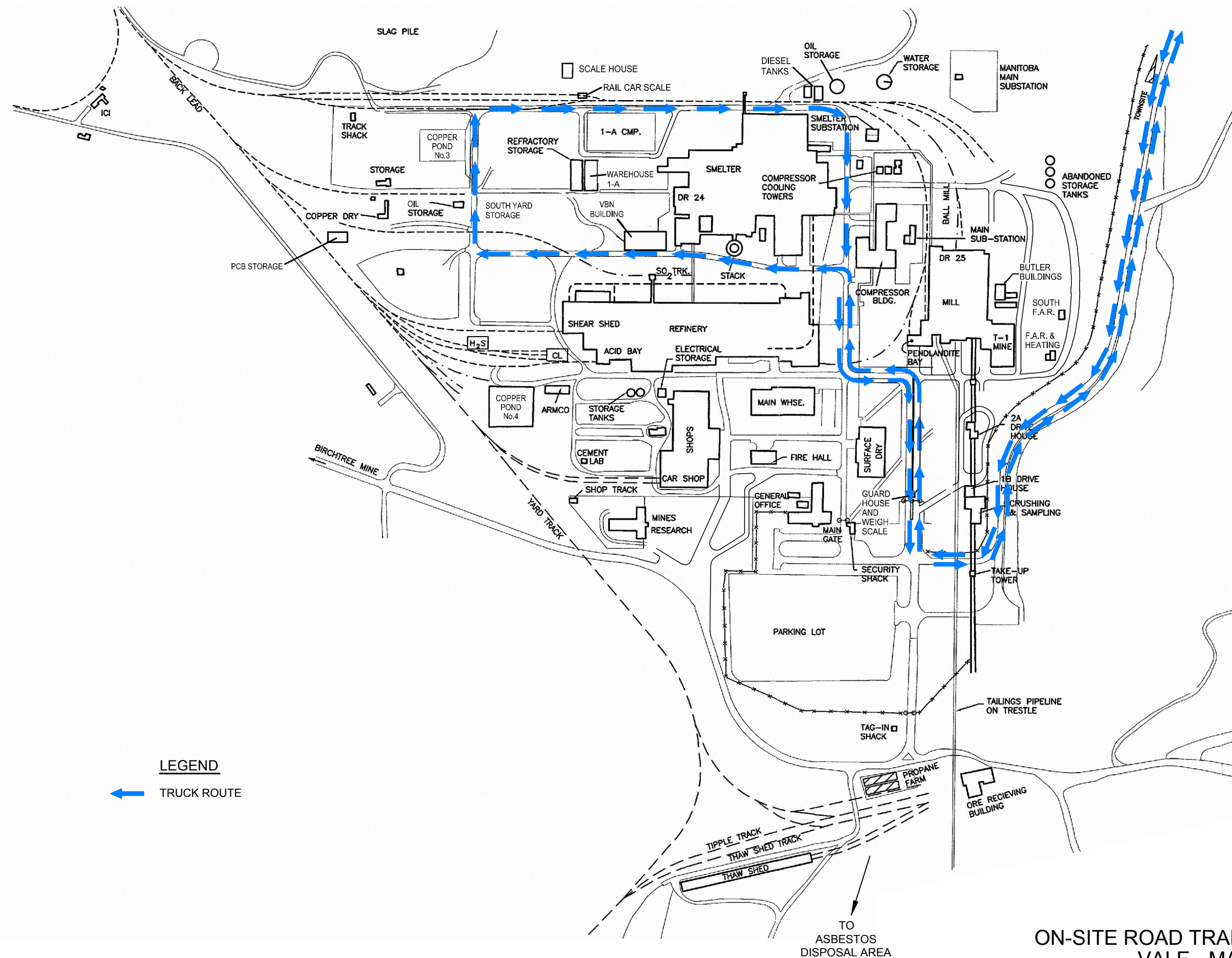


figure 1.2
 SITE PLAN
 VALE - MANITOBA OPERATIONS
 Thompson, Manitoba



SOURCE: AMEC EARTH & ENVIRONMENTAL LIMITED, 2003 MINE CLOSURE PLAN, THOMPSON PLANT, SITE PLAN.

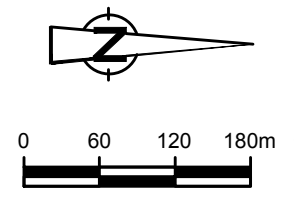
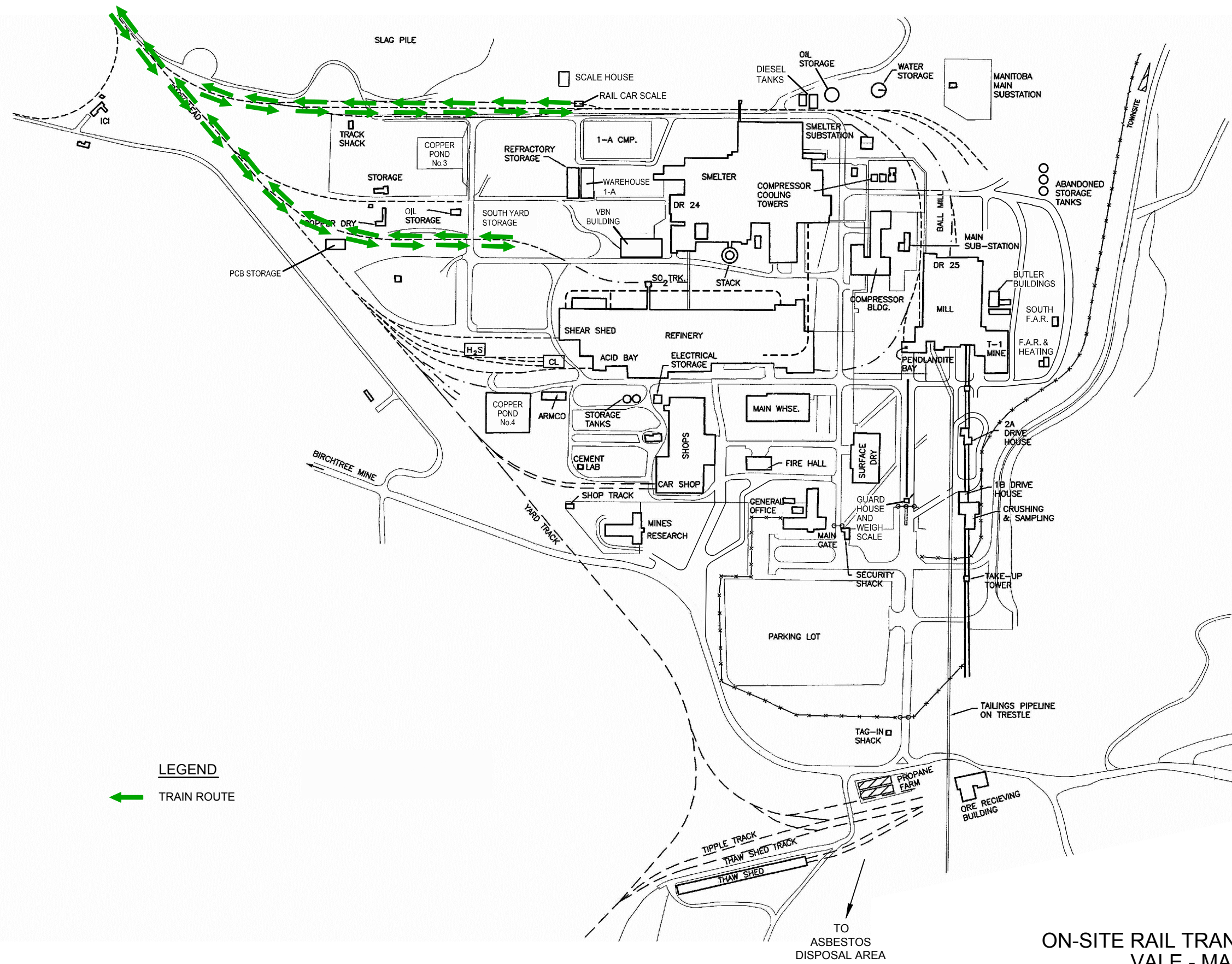


LEGEND
 ← TRUCK ROUTE

figure 3.1
 ON-SITE ROAD TRANSPORTATION ROUTE
 VALE - MANITOBA OPERATIONS
 Thompson, Manitoba



SOURCE: AMEC EARTH & ENVIRONMENTAL LIMITED, 2003 MINE CLOSURE PLAN, THOMPSON PLANT, SITE PLAN.



LEGEND
 ← TRAIN ROUTE

figure 3.2
 ON-SITE RAIL TRANSPORTATION ROUTE
 VALE - MANITOBA OPERATIONS
 Thompson, Manitoba



SOURCE: AMEC EARTH & ENVIRONMENTAL LIMITED, 2003 MINE CLOSURE PLAN, THOMPSON PLANT, SITE PLAN.

APPENDIX A

TRANSPORTER INSPECTION FORM

Transporter Vehicle Inspection
McInerney Farm Site
Southport, NY

Date: _____

Time: _____

Transporter: _____

Truck Number: _____

Trailer Number: _____

Driver: _____

Driver License: VALID INVALID

Expiration: _____

Insurance: VALID INVALID

Expiration: _____

Pre-load Visual Inspection: Tires: acceptable unacceptable

comments _____

Windshield: acceptable unacceptable

comments _____

Lights: Front acceptable Back acceptable

comments _____

Back-up Alarm: acceptable unacceptable

comments _____

Cleanliness: acceptable unacceptable

comments _____

Liner acceptable unacceptable

comments (if applicable) _____

Acceptable to Load: YES NO

inspector initials _____

Post-load Visual Inspection: Loaded YES NO

comments _____

Decon YES NO

comments _____

Tarped YES NO

comments _____

Placard/label NA YES

comments _____

Manifest NA Number

comments _____

Bill of Lading NA YES

comments _____

Acceptable for Transport: YES NO

inspector initials _____