1.0 PURPOSE

The purpose of this guideline is to describe best practices around moving any load on project sites using equipment such as mobile cranes, vehicle mounted articulating cranes, tower cranes, gantry cranes, overhead travelling cranes, electric hoists, tugger-hoists, or other hoisting equipment. It also applies to the use of lifting devices & attachments.

This guideline does not apply to manual cargo handling, including the use of manual hoists.

For swing stages and tower climbing scaffolds refer to the Scaffold Checklist (NAV-TP-0283).

2.0 REFERENCE DOCUMENTATION

The following documents were used in the development of this document or are related to it. The most recent revision shall be used.

INS-0021	Vale Global Fatal Risk Standards INS-0021 (RAC's) Appendix 4 – Cargo handling
CSA Z150-11	Safety Code for Mobile Cranes
CSA Z248-04	Code for Tower Cranes
CSA B167-08	Overhead Travelling Cranes
O.Reg. 213/91	Construction Projects (sections 150 to 180)
O.Reg. 854	Mines and Mining Plants (sections 189; 192; 195)
SPEC-18005	Vale Engineering Standard Specifications - Cranes
OETIO Doc – May 2012	OETIO Ratio Review for Hoisting Engineer Branch 1, 2, 3
NAV-WF-0086	Lift Assessment Process
NAV-TP-0088	Lift Plan Template
NAV-TP-0089	Mobile Crane / Man-Lift Audit
Link	10 Questions for a Safe Lift

3.0 PERSONNEL REQUIREMENTS

The people involved in planning and performing the lift must be fit for duty and competent.

For the purposes of this guideline, the personnel involved directly in hoisting operations are: Facility Owner's Representative / Project Manager (Constructor/EPCM), Crane Owner (contractor, 3rd party supplier, or facility owner), Crane Operator, Lift Supervisor.

The safe operation and use of cranes is the responsibility of all parties involved in the process.

4.0 PLANNING A LIFT

Work on project sites often involves lifting and placing many types of materials under many different circumstances. Although large or complicated lifts are easily recognized as requiring additional planning, the hazards associated with smaller lifts may be less obvious.

A Lift Plan should be prepared regardless of the specifics of the lift. Lift Plans include a systematic risk assessment of important load factors and site factors. The type of Lift Plan required is based on a Lift Assessment, which determines if the lift is Standard, Non-Standard or Critical.

The Lift Plan must be readily available at the lift site.

5.0 LIFT CLASSIFICATION

For lifts of greater than 20 tonnes additional care must be taken with all assessments.

5.1 CRITICAL LIFTS

Refer to the lift plan template for criteria requiring a Critical Lift Plan.

Critical Lift Plans shall be developed by qualified personnel. A Professional Engineer must review and apply their seal to the Critical Lift Plan; and the crane / hoist operator, the lift supervisor, the rigger, and the Vale Representative must review and sign it prior to the lift.

Special rules apply when lifting personnel with a crane or hoist. For Ontario see O.Reg. 213/91 section 153.

5.2 NON-STANDARD LIFTS

Refer to the lift plan template for criteria requiring a Non-Standard Lift Plan.

Non-Standard Lift Plans shall be developed by qualified personnel. A Professional Engineer may be requested to review the Non-Standard Lift Plan. The crane / hoist operator, the lift supervisor, the rigger, and the Vale Representative must review and sign it prior to the lift.

5.3 STANDARD LIFTS

Refer to the lift plan template for criteria requiring a Critical or Non-Standard Lift Plan.

If all of the following apply, a written lift plan is NOT required:

- The lift is not Critical, and is not Non-Standard as defined above;
- The loads have known or evaluated weight, shape and center of gravity;
- The radius at which the load must be handled is within the rated capacity of the crane at that radius;
- The lift will be performed under temperate environmental conditions;
- Standard rigging and lifting equipment will be used.

For a Standard Lift follow best practices for hoisting and rigging.

5.4 LIFT ASSESSMENT REVIEW

There may be situations where the Lift Classification seems unnecessarily conservative. In these cases it may be helpful to perform a Risk Analysis to systematically assess what could happen, and the likelihood and the consequences of that event. Apply the Vale SafeProduction tools in the Risk Analysis process and act accordingly.

Note: changes in site conditions or lifting procedures may require re-assessment of the lift.

Refer to the Lift Classification Flow Chart.

SafeProduction Risk Matrix

LIKELIHOOD	CONSEQUENCES				
	Low	Minor	Moderate	Major	Severe
Certain (> 1/month)	Moderate	High	Extreme	Extreme	Extreme
Likely (every 1 - 2 years)	Moderate	High	High	Extreme	Extreme
Possible (every 2 - 10 years)	Low	Moderate	High	High	Extreme
Unlikely (every 10 - 30 years)	Low	Moderate	Moderate	High	High
Rare (1/lifetime of facility)	Low	Low	Low	Moderate	High

6.0 GENERAL ISSUES

The assessment and/or lift plan shall consider, but not be limited to the following:

- Ground conditions: consider the ground conditions, outrigger or crawler track requirements, and if necessary the design of mats necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift. It is recommended that an underground utility locate permit be completed. For unknown or poor soil conditions, a Geotechnical soil survey is recommended;
- Wind velocity and weather extremes: review the weather forecast for the day of the lift. Site-specific forecasts may be available from the local Vale Environmental Group for some Vale sites (e.g. Sudbury Smelter Complex), including accurate wind velocity at various heights;
- The size and weight of load to be lifted, including all rigging components;
- The lift geometry and procedures, including crane or hoist position, height of the lift, the load radius, and the boom length and angle for the entire range of the lift. A site drawing shall be included to identify placement, locations of crane, adjacent process equipment and/or facilities; Multi-part or sequenced lifts may require more than one diagram to show the entire sequence, if each step has different hazards and/or requirements. Where needed, provide individual assessments and lift plans for each step.
- Proximity to other cranes, facilities, structures or process equipment, and power lines;

- For floating crane or derricks, the lift plan shall describe the operating base (platform) condition and any potential maximum list / trim.

7.0 MOBILE CRANE OPERATOR QUALIFICATIONS (LICENSING SETS)

7.1 ONTARIO

Boom Truck Operator (0 to 8 Tons): MTCU Certification Program #P930030

Mobile Crane Operator (15 Ton +): MTCU Hoisting Engineer Branch 1 (License 339A)

Mobile Crane Operator (8 to 15 Ton to): MTCU Hoisting Engineer Branch 2 (License 339C)

Tower Crane Operator: MTCU Hoisting Engineer Branch 3 (License 339B)

7.2 MANITOBA (*TO BE CONFIRMED*)

Boom Truck Operator (0 to 8 Tons): MTCU Certification Program #P930030

Mobile Crane Operator (15 Ton +): MTCU Hoisting Engineer Branch 1 (License 339A)

Mobile Crane Operator (8 to 15 Ton to): MTCU Hoisting Engineer Branch 2 (License 339C)

Tower Crane Operator: MTCU Hoisting Engineer Branch 3 (License 339B)

7.3 NEWFOUNDLAND & LABRADOR (*TO BE CONFIRMED*)

Boom Truck Operator (0 to 8 Tons): MTCU Certification Program #P930030

Mobile Crane Operator (15 Ton +): MTCU Hoisting Engineer Branch 1 (License 339A)

Mobile Crane Operator (8 to 15 Ton to): MTCU Hoisting Engineer Branch 2 (License 339C)

Tower Crane Operator: MTCU Hoisting Engineer Branch 3 (License 339B)

8.0 APPENDICES

Appendix A: Revision and Transition Notes

Appendix A: Revision and Transition Notes

(Revisions are listed in reverse chronological order with most recent revision at the top.
Revision notes describe: what was changed, why it was changed, and the plan to implement the change, including whether changes are retroactive)

Revision Control Information

Rev #	Date	Nature of Change	Page inserted, replaced, revised or cancelled	Approved by document owner
1	Nov 23/12	Document Development		
2	Jan 23/13	Minor revisions		T. Hirschfeld
2B	Nov 26/13	Minor	Critical and Non-Standard Lift Plan templates merged into one document. Updated reference table	T.Hirschfeld