



*MTS IN THE
MINING & METALLURGICAL INDUSTRY*

In its more than 40 years of service to industry, *MTS* has implemented important projects in the world-wide Mining & Metallurgical Industry.

The *MTS System* has been installed in more than 30 projects in 12 countries (see map below) and 4 languages for the following companies:

- ▶ International Nickel (nickel, copper, iron)
- ▶ Cominco (zinc, lead, gold)
- ▶ Placer Dome (gold)
- ▶ Monarch Minera (gold)
- ▶ Greenstone Resources (gold)
- ▶ Ampac (gold)
- ▶ Iron & Steel of Trinidad-Tobago (iron)
- ▶ Pegasus Gold (gold)
- ▶ BHP Billiton – Cerro Matoso (nickel)
- ▶ Iron Ore Company of Canada (iron)
- ▶ Cape Breton Development (coal)
- ▶ Peñoles, Mexico (phosphate rock)



RELATED FACT SHEETS

- *About MTS*
- *Process Maps*
- *Task & Competency Maps*
- *Operations Manuals*

This fact sheet features the involvement of *MTS* with International Nickel Company (Inco) the world's largest producer of nickel.

The *MTS* -Inco business relationship started in the early 70's with the training of instrument technicians in Sudbury, Ontario Canada. This early successful intervention led over the next 30 years to a series of projects which included, in chronological order:

- **Copper Cliff Nickel Refinery.** Installation of the *MTS* Documentation & Training Methodology for the then new pressure carbonyl process plant.
- **Exmibal, Guatemala.** Installation of the *MTS* Documentation & Training Methodology in operations and maintenance for a grass-root lateritic mine and processing plant with a local inexperienced workforce.
- **Soroako Indonesia.** Installation of the *MTS* Documentation & Training Methodology in operations and maintenance for a grass-root lateritic mine and processing plant with a local inexperienced workforce. *MTS* also installed a full publications operation (digitizing and printing) and trained a local Inco team to reproduce the *MTS* manuals in Bahasa Indonesian language. In the late 90's *MTS* did a training needs assessment of the maintenance workforce and designed the corresponding training interventions.
- **Ontario Division.** Installation of the full *MTS* Methodology for mining and surface operations and maintenance, including training and certification by *MTS* of Inco writers and trainers.
- **Clydach South Wales UK.** Installation of the *MTS* Documentation & Training Methodology in operations for an existing nickel refinery with new technologies. The *MTS* work was done in four interventions: 1) Original development (1991-92) of training/operating manuals and training of Inco trainers; 2) Training Audit (1993) of the effectiveness of the installed *MTS* System; 3) Repeat (1995) the original work for the then new plating-on-nylon string process; 4) Repeat (1998) of the work for the then new foam plating process.

About MTS: The Company

1. What Is It?

MTS is an international consulting and contracting firm with 40 years of service to industry in 34 countries

2. What Is It For?

MTS services are designed to improve business results by effective process management and people's performance

3. What Does It Do?

MTS provides a complete system of process management and training.

4. What Does It Consist Of?

As a company, *MTSWorld* is a federation of operating licensees (LLC's). Currently these are: *MTSWorld North America*, *MTSWorld Gulf Coast*, *MTSWorld South America*, *MTSWorld Mexico* and *MTSWorld International*. The *MTS* people are professionals with years of hands on experience in industry and business

5. How Does It Work?

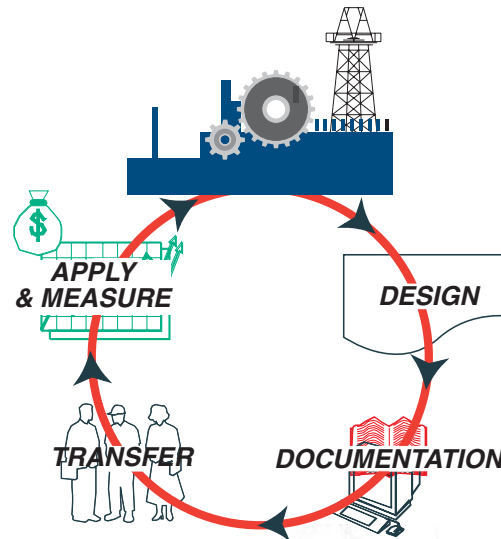
MTS services are delivered on a customized project basis. The entire *MTS System* or parts of it can be delivered depending on the customer's needs.

For more details, see *About The MTS System* on the right hand column of this fact sheet.

For additional details about The *MTS System* modules (components) see separate Fact Sheets.

About MTS: The System

The *MTS System* as a whole is represented as follows.



1. The Design Phase includes:

- ◆ Analysis of Technology-Organization-People
- ◆ Process Maps
- ◆ Competency Maps
- ◆ Program Design
- ◆ Implementation Plan Development

2. The Documentation Phase includes:

- ◆ Developing process and equipment manuals
- ◆ Training Writers (Write-To-Learn™ strategy)
- ◆ Electronic conversion of documents
- ◆ Modules from the MTS Library

3. The Transfer Phase includes:

- ◆ Learning-How-To-Learn™
- ◆ Training Facilitators
- ◆ Gap Assessment
- ◆ Training Vs. Gap

4. The Apply & Measure Phase includes:

- ◆ Training Measurement
- ◆ Business Impact Measurement
- ◆ Audits
- ◆ Certification
- ◆ Integration of Initiatives
- ◆ Sustainment and Optimization

Description of Process Maps

1. What Is It?

A process map is a graphical representation of a business or technical process. **MTS** defines a process as a group of related functions or activities characterized by having...

- ▶ Distinct inputs & outputs (interprocess links)
- ▶ Subprocesses with intraprocess links

2. What Is It For?

Process Maps provide the context for:

- ▶ Establishing Operating Standards
- ▶ Developing Descriptions & Procedures
- ▶ Operating the Process
- ▶ Training on the Process
- ▶ Optimizing the Process
- ▶ Troubleshooting the Process

3. What Does It Do?

Process Maps enable the user to clearly see the processes' inputs and outputs plus the intraprocess and interprocess critical interfaces (also known as hand offs). This in turns allows for the establishment of input-output-intraprocess-interprocess specs which are essential for the control and optimization of the process.

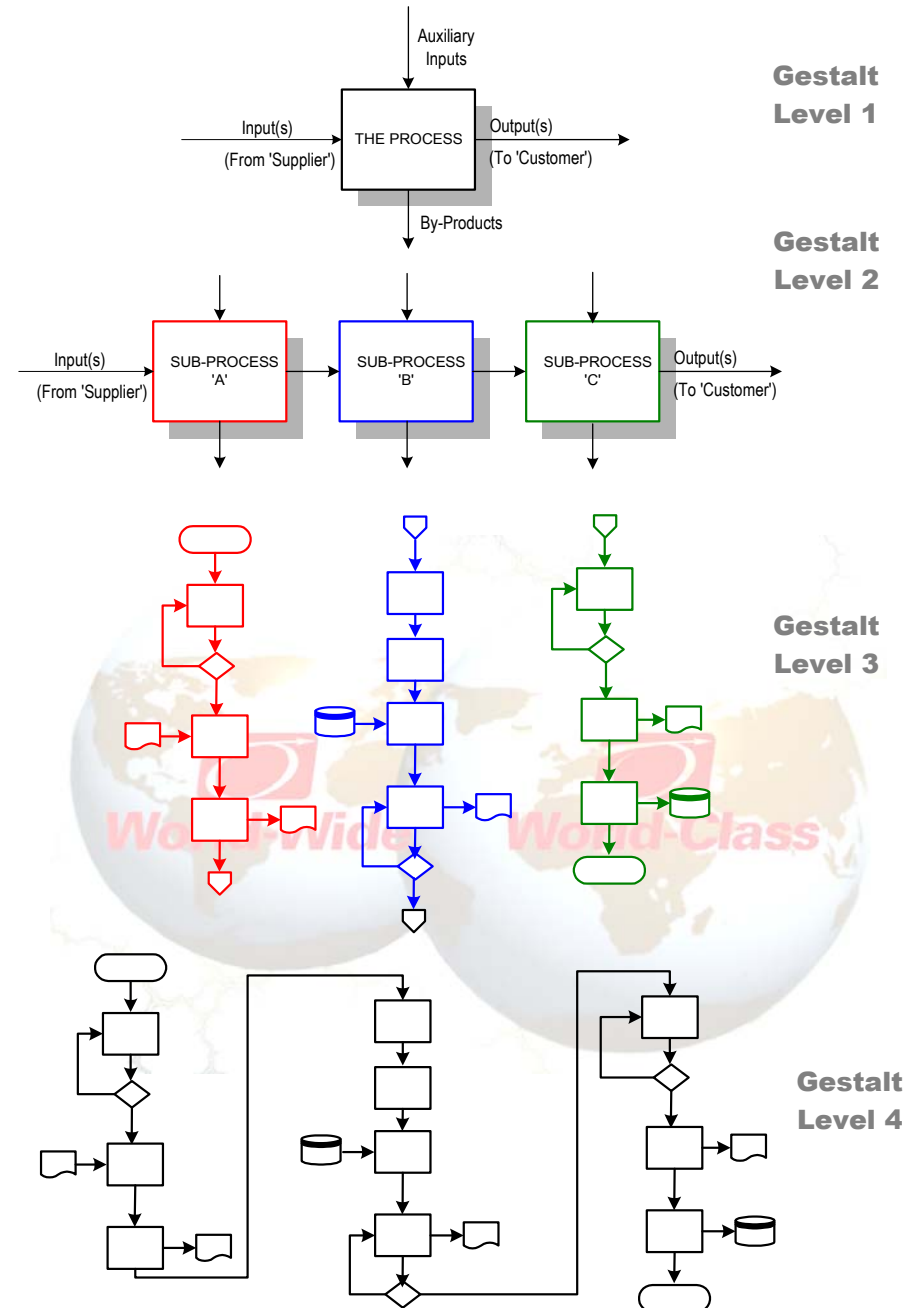
4. What Does It Consist Of?

MTS style Process Maps are developed in a hierarchy called gestalt¹ (whole-part-whole). See example on the right hand column of this fact sheet.

5. How Does It Work?

Process Maps can be developed by **MTS** people or by customer people under the guidance of **MTS**. Typically associated with the development of Process Maps is the development of Task & Competency Maps and Competency Performance Indicators. See separate Fact Sheets.

Example of a Typical Process Map Hierarchy



¹ Gestalt structure is one of the pillars of the MTS Documentation and Training System. The principal justification lies in the fact that the adult learning mind has a strong preference for dealing with structures and patterns, rather than with isolated facts.

Description of Operations Manual

1. What Is It?

An *MTS* Operations Manual is a written document that describes the 'why' and the 'what' of a specific operating process.

1. What Is It For?

An Operating Manual can be used for the following purposes:

- ▶ Establishing Operating Standards
- ▶ Operating the Process
- ▶ Training on the Process
- ▶ Optimizing the Process
- ▶ Certification

2. What Does It Do?

The Operating Manual provides the requisite information about what people must *Do*, *Know* and *Use* (derived from the Competency Maps) in order to understand and operate the process to best standards.

3. What Does It Consist Of?

An *MTS* style Operating Manual consists of a descriptive section (the why, which provides the knowledge or understanding of the process) and a prescriptive section (the procedures which provides the what to do and how). The descriptive portion is based on the answers to *10 Key Questions™* (see more details on the right hand column). The procedures portion contains detailed work instructions including risks and safeguards on quality, safety, environment and costs. The manual includes text and figures.

4. How Does It Work?

Operating Manuals can be developed by *MTS* people or by customer people under the guidance of *MTS*. In the latter case, the writers need to participate in the *MTS* Course Write-To-Learn (see separate Fact Sheet).

Index of a Typical MTS Operations Manual

1:000 INTRODUCTION

- ▶ About This Manual
- ▶ Competency Matrix (Analysis Sheet)

2:000 PROCESS DESCRIPTION (*10 Key Questions™*)

- ▶ What Is It
- ▶ What Is It For
- ▶ What Does It Do
- ▶ What Does It Consist Of
- ▶ How Does It Work
- ▶ Evidence of Good Operation
- ▶ Operating The Process
- ▶ Troubleshooting
- ▶ Problem Solving
- ▶ Risks & Safeguards

3:000 PROCESS OPERATION (Procedures)

- ▶ Preparation for Startup
- ▶ Startup
- ▶ Follow-up
- ▶ Normal Operation
- ▶ Normal Shutdown
- ▶ Emergency Shutdown
- ▶ Special Procedures

4:000 CONCLUSION

- ▶ Summary
- ▶ Feedback

5:000 FIGURES

- ▶ Inputs & Outputs Block Diagram
- ▶ Functional Block Diagram (Sub-Processes)
- ▶ Flow Diagrams (For Each Sub-Process)
- ▶ Equipment Details
- ▶ Flows & Control Diagrams (For Each Sub-Process)
- ▶ Integrated Flows & Controls (Whole Process)
- ▶ Normal Operating Conditions
- ▶ Control Strategy
- ▶ Troubleshooting Tree

6:000 EXHIBITS