QUALITY PLAN
POWER TRANSFORMERS MANUFACTURING

CUSTOMER: SIDOR C.A.
PROJECT: POWER TRANSFORMERS FOR R5 SUBSTATION ENLARGEMENT
Job Quality Assurance Plan

ABB Transformers
Pereira
<table>
<thead>
<tr>
<th>PARTICULAR ACTIVITIES</th>
<th>DOCUMENT</th>
<th>RESPONSIBLE</th>
<th>OUTPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>To define and to update the scope of the System of Management</td>
<td>MGIPTG001</td>
<td>Manager of PTQ</td>
<td>Scope of the Mgt. System</td>
</tr>
<tr>
<td>To define and to update the processes of the System of Management and interaction</td>
<td></td>
<td></td>
<td>QIT</td>
</tr>
<tr>
<td>To lead the definition of the Program and Indications of the System of Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To give support to the update of Aspects and Environmental Impacts and Dangers and Risks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To define and to communicate practices for the Operational Environmental Control and of OHS for the processes, suppliers and contractors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To identify and access to Legal Requisites and other acquired requisites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To lead the planning of changes that affect the System of Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To identify and to plan the response to potential situations of accidents and emergencies, and to prepare and to mitigate the possible illnesses that are associated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To carry out activities of verification of the operational controls defined at the environmental level and CHES</td>
<td>PAPTQ001 - 002</td>
<td>Manager of PTQ</td>
<td>Records of Operational Control</td>
</tr>
<tr>
<td>To carry out the external management of the reservoir</td>
<td>PAPTQ002 - 003</td>
<td></td>
<td>Quality records</td>
</tr>
<tr>
<td>To take care of the minor injuries</td>
<td>PAPTQ004</td>
<td></td>
<td>Record of Evaluation of Simulations</td>
</tr>
<tr>
<td>To support technically the Processes of Manufacture</td>
<td>PAPTQ005</td>
<td></td>
<td>Matrix of Environmental Aspects</td>
</tr>
<tr>
<td>To carry out periodic tests to the procedures of preparation and response before emergencies</td>
<td>PAPTQ006 - 007</td>
<td></td>
<td>Matrix of Dangers and Risks</td>
</tr>
<tr>
<td>To prepare and to execute Programs of calibration / verification (including software when necessary)</td>
<td>PAPTQ008</td>
<td></td>
<td>Graphic of Central Control</td>
</tr>
<tr>
<td>To update and to communicate the Legal Requisites applicable to the activities, products and services carried out and given by the Organization</td>
<td>NEZCP046</td>
<td>Manager of PTQ</td>
<td>Record of Evaluation of Simulations</td>
</tr>
<tr>
<td>To evaluate periodically the fulfillment of the Legal Requisites and others applicable and to keep records of the evaluation</td>
<td></td>
<td></td>
<td>Matrix of Dangers and Risks</td>
</tr>
<tr>
<td>To manage the Legal Fulfilment with the Interested Parties</td>
<td></td>
<td></td>
<td>Matrix of Dangers and Risks</td>
</tr>
<tr>
<td>To keep the program: School of the Quality</td>
<td>Quality School</td>
<td>Competent and Careful Personnel</td>
<td>Post of Action</td>
</tr>
<tr>
<td>To coordinate the activities of Continuous Improvement and QIT</td>
<td></td>
<td></td>
<td>Records of Continuous Improvement</td>
</tr>
<tr>
<td>To plan and to carry out the Audits of the Mgt. System</td>
<td>NEZZP036</td>
<td>Manager of PTQ</td>
<td>General Manager</td>
</tr>
<tr>
<td></td>
<td>NTC ISO 9001:2000</td>
<td></td>
<td>Certification Board of Mgt. System</td>
</tr>
<tr>
<td></td>
<td>NTC ISO 14001:2004</td>
<td></td>
<td>Processes of Mgt. System</td>
</tr>
<tr>
<td></td>
<td>NTC OHSAS 18001:2000</td>
<td></td>
<td>Interested Parties</td>
</tr>
</tbody>
</table>

**MANAGEMENT OF RESOURCES**

- **Human Resources**
  - Manager of PTQ
  - Assistant of Integral Quality
  - Records of previous Audits
  - Professional Requisites
  - Responsible for Audits
  - Auditors
  - Suppliers
  - Customers
  - General Manager

- **Material and Infrastructure**
  - Equipment Officil
  - Computing Equipments
  - Information Technology Resources (internal, internet, databases, SSA, CDP, BSN, CRB)
  - Room of Metrology
  - Equipment Classrooms
  - Room of conferences with audio-visual aids (video beam, VHS, TV and projector)
  - Brigade Location: Nursing Stations
**PROCESS**  
Engineering

**LEADER**  
Manager of Engineering

**OBJECTIVE**  
To define and to plan the activities that allow to obtain designs that meet the requisites agreed in the contract and to achieve their ratification and the later satisfaction of the clients, at the same time the costs of engineering and materials foreseen in the selling are met, and also the technical requisites of the product are met.

<table>
<thead>
<tr>
<th>SUPPLIER</th>
<th>INPUT</th>
<th>ACTIVITY</th>
<th>DOCUMENTS</th>
<th>RESPONSIBLE</th>
<th>OUTPUT</th>
<th>CLIENT</th>
</tr>
</thead>
</table>
| PTO       | Record Meeting SUM  
Plan of Invoicing  
Technical specifications | To prepare a program of Engineering  
To study Technical Specifications  
To review or to perform Check List | ITPTE001  
PAPTE001  
PAPTE003 | Manager of Engineering  
Electrical and Mechanical Designers | Program of Engineering  
Records of Order Clearing | PTO |
| PTE  
PTM  
PTS  
BA      | Technical norms  
Technical specifications of the Client  
Price Database  
Technical instructions of BA | To prepare a Pre-design  
To do a Technical Offer | ITPTE001  
ITPTE010  
ITPTE011 | Designers of Offers | Technical Offer | PTM |
| PTM  
PTE  
BA  
PTPR  | Technical specifications of the Client  
Technical and Commercial offer  
Technical norms  
Technical instructions of BA | To draw up electrical design  
To do a Structure in BaaN  
To carry out Cards of Manufacture  
To prepare information for tests | ITPTE002 - ITPTE009 | Electrical Designers | Cards of Manufacture  
Plans  
Electrical design  
Structure of Materials  
Data for Tests  
Technical Support | PTM  
PTD  
PTP  
PTO |
| PTM  
PTE  
BA  
PTPR  | Technical specifications of the Client  
Technical and Commercial offer  
Technical norms  
Technical instructions of BA  
Electrical Design | To carry out a design of Active Part  
To carry out a design of assemble, connections y cubing  
To carry out a design of isolations (only TradeStar)  
To carry out Plans for approval (if it is needed by the client)  
To carry out external design  
To do a Structure in BaaN | ITPTE002 - ITPTE009 | Mechanical Designers | Plans of Manufacture  
Technical Support | PTM  
PTD  
PTP  
PTO |
| PTO,  
PTQ  
PTD  
PTP  
Electrical and Mechanical Designers | Requests of Changes of Design | To review, to verify and to validate the Electrical and/or Mechanical Design  
To control changes of Electrical and/or Mechanical design | PAPTE004  
PAPTE002 | Manager of Engineering  
Electrical and Mechanical Designers | New Designs | PTP  
PTD |

**MANAGEMENT OF RESOURCES**

<table>
<thead>
<tr>
<th>HUMANS</th>
<th>INFRASTRUCTURE</th>
</tr>
</thead>
</table>
| Manager of Engineering  
Electrical Design Engineer  
Mechanical Design Engineer | Equipped offices  
Computing Equipment (computers, printer and plotter)  
Information technology resources (Intranet, Internet, software of design, database BA) |
### OBJECTIVE
To plan and to carry out the production of the Power transformers, under controlled conditions that assure the fulfillment of the requirements of the Product and the Organization.

### SUPPLIER
<table>
<thead>
<tr>
<th>INPUT</th>
<th>Activity</th>
<th>Documents</th>
<th>Responsible</th>
<th>OUTPUT</th>
<th>CUSTOMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTP</td>
<td>Product</td>
<td>To inspect and to test the product in process</td>
<td>PAPTQ011, PAPTQ001, PAPTQ004</td>
<td>Quality records (Sigma Cards)</td>
<td>Sub-process of Room of Tests</td>
</tr>
<tr>
<td>PTO</td>
<td>Intake</td>
<td>To prepare isolations, To paper conductors, To wind, To dry and to press Windings</td>
<td>ITPTP004, ITPTP005, ITPTP024, ITPTP025, ITPTP029</td>
<td>Leader and Operators of Windings</td>
<td>Block of Windings</td>
</tr>
<tr>
<td>PTE</td>
<td>Warehouse Standard and customized materials, approved, and minor raw materials</td>
<td>To separate plates by groups, To prepare table for stacking, To stack, press and put vertically the cores, To strain or to apply Assestand</td>
<td>ITPTP003, ITPTP008</td>
<td>Leader and Operators of Assembling</td>
<td>Verticized Core</td>
</tr>
<tr>
<td>PTS</td>
<td>Sub processes of Cores, Windings and Warehouse</td>
<td>To prepare isolations, To paper conductors, To wind, To dry and to press Windings</td>
<td>ITPTP004, ITPTP005, ITPTP024, ITPTP025, ITPTP029</td>
<td>Leader and Operators of Assembling</td>
<td>Active part assembled and connected</td>
</tr>
<tr>
<td>PTP</td>
<td>Active connected part</td>
<td>To prepare cubing</td>
<td>ITPTP015, ITPTP029, ITPTP038, ITPTP042</td>
<td>Leader and Operators of Assembling</td>
<td>Transformer finished and ready for tests</td>
</tr>
<tr>
<td>PTE</td>
<td>Sub processes of Assembly and Connections and Warehouse</td>
<td>To prepare protocols of tests</td>
<td>ITPTP045</td>
<td>Leader and Operators of Assembling</td>
<td>Sub-process of Room of Tests</td>
</tr>
<tr>
<td>PTP</td>
<td>Transformer for tests General information of Tests</td>
<td>To test electrical Tests, To test control wiring, To prepare protocols of tests</td>
<td>PAPTQ102, PAPTQ111, PAPTQ112, PAPTQ114, PAPTQ116, PAPTQ222</td>
<td>Transformer released by Room of Tests, Protocols of Tests, Minutes of Controlling, Reports of Feedback to the Design</td>
<td>PTP, PTO, PTE</td>
</tr>
<tr>
<td>PTE</td>
<td>Sub process of Room of Tests Released Transformer for Shipment Packaging Packing List</td>
<td>To test airtightness, to dismantle external accessories, to do identification and marking, to coordinate their packaging</td>
<td>ITPTP238</td>
<td>Leader and Operators of Assembling and Shipping</td>
<td>Transformer ready for shipping Registration in BaaN</td>
</tr>
</tbody>
</table>

### MANAGEMENT OF RESOURCES
#### HUMANS
- Manager of Production
- Planner of Production
- Supervisor of Production
- Operator of Insulations
- Assistant of Windings
- Assistant Assembly Windings
- Paper Operator
- Leader of Windings
- Operator of Windings
- Operator Assembly Windings
- Assistant of Assembling
- Assembling Leader
- Operator of Oils
- Wiring Operator
- Operator of Connections
- Operator of Shipments
- Operator of Cubing and Final Assembly
- Operator of Oils
- Operator Laboratory PTP
- Technician of Laboratory of Oils

#### INFRASTRUCTURE
- Plant of manufacture of Power transformers
- Equipped offices
- Computing equipment
- Information technology resources (Internet, Internet, databases, BaaN System/Recursos informáticos (Internet, Internet, Bases de Datos, Sistema BaaN)
- Room of Tests for transformers of Potency and Laboratory of Oils
- Equipment for control and personal protection
- Computing equipment
- Equipped offices
- Laboratory PTP
- Laboratory of Oils

### INFRASTRUCTURE
- Machine and equipment of plant to manufacture the product in accordance with the provisions of the instructions of BA and the Production Manuals of LDT and TrafoStar
- Operation Laboratory PTP
A little of history (*Integral Quality milestones*)

- 1990: ABB Group arrives to Pereira’s factory through a global acquisition of Westinghouse T&D segment
- 1996: Quality Management System is certified with ISO 9001 by BVQi
- 1999: Environmental Management System is certified with ISO 14001 by BVQi
- 2002: Philip Crosby’s Quality Improvement Process is implemented
  - QIT: Quality Improvement Team is established with the local Top Management
  - QS: Quality School program is launched to give all people training in Quality issues, technical competence and to encourage their Quality Awareness
- 2003: Six Sigma tool is implemented for TrafoStar power transformers
- 2005: Occupational Health and Safety Management System is certified with OHSAS 18001 and the 3 Management Systems are integrated in QHSE
- 2006: BASC Management System is certified by the WBO (Business Alliance for Secure Commerce)
Last 10 years improvement profile and our VISION

World Class Manufacturer

- 1996: ISO 9001
- 1999: ISO 14001
- 2002: QIP
- 2005: OHSAS 18001 + SGI QHSE
- 2006: BASC
- 2009: ABB

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We have a great VISION

- In 2009 ABB Pereira will be a World Class Manufacturing plant
- Happy people doing well their work

General view of windings shop in Chonqing

All employees celebration
The Integral Quality way

- Zero Failures
- Zero Impacts
- Zero Accidents

- TPT & TTPT reduction
- On Time Delivery
- Customer Satisfied

- COPQ's reduction
- Cash Flow
- More orders

- Stability & Safe labor
- Greater EBIT
- Best prices

A good present for Everybody!
Our Integral Policy show us the way

POLÍTICA DE GESTIÓN INTEGRAL

Hacer nuestro trabajo bien desde la primera vez para lograr la satisfacción de los Clientes, a través de la entrega oportuna de Transformadores y Servicios que cumplan sus requisitos, y generar la rentabilidad esperada.

Para ello estamos orientados a:

- Promover la Competencia y Conciencia de nuestros Colaboradores como principal activo de la Organización;
- Elevar la Calidad de Vida de nuestros Colaboradores, mejorando sus condiciones de Salud y Seguridad en el trabajo;
- Reducir la generación de residuos y el consumo de Recursos Naturales en el ciclo de vida del producto;
- Mejorar continuamente la eficacia de nuestros Procesos;
- Prevenir prácticas de contrabando, narcotráfico, terrorismo y en general toda clase de comercio ilícito, en los procesos de la Organización;
- Cumplir con los requisitos legales y demás requisitos adquiridos.

Soluciones Transformadoras

Gerente General
ABB Transformadores
QHSE and BASC Policy (Translation)

Do well our work since first time to get Customer's Satisfaction by means of Quality Products and Quality Services delivered on time, producing the budgeted profitability.

To get this, our commitment is:

- Promote people's Competence and Awareness as our greatest asset
- To rise the life's quality of our employees by means of the continuous improvement in H&S issues
- Reduce waste generation and natural resources consumption in our processes
- Improve continuously our Processes efficacy
- Prevent illegal practices in our processes (terrorism, illegal trade, drugs traffic, etc.)
- Fulfill all the legal requirements in our processes
Our Zero Defects Objectives

**QHSE Objectives**

**Zero COPQ**

- **Quality ISO 9001**
  - 100% OTD
  - Zero Test Failures
  - 100% Customer Satisfaction

- **Environ. ISO 14001**
  - Zero Oil Spilling
  - Zero Electrical Energy Waste

- **OHSAS 18001**
  - Zero Lost Day Incidents

- **BASC**
  - Zero contamination

ZD does not mean that we will not have failures, it means that we will not be happy with any failure!
The Quality Strategy

1. Philip Crosby’s – QIT – Quality Improvement Process:
   - Quality School
   - Quality Improvement Team
   - Zero defects philosophy

2. Integration QHSE + BASC
Quality Improvement Process launching since 2002
Quality School’s principle:

“The Competence and Consciousness of our employees are our greatest assets”.

BA PPTR Mnger.
since 2002

Quality School launching

Quality Class Room
Quality School structure

Course for Managers – QIT
(12 Hours in one weekend)
Course to get internal Quality Instructors

Course for White collars
(25 Hours in 10 weeks)
Each Improvement Project
1000 USD Savings

Course for Blue collars
(15 Hours in 6 weeks)
Each Improvement Project
1000 USD Savings

Quality Education System (QES)

Quality Throughout Work Team (QTWT)

QS: Every body talking same language: Quality!
EMC:

- General Manager
- Quality Manager
- Controller
- Logistic Manager
- Human Resource Manager
- Engineering Manager
- Production Manager
- Marketing Manager
- Supply Manager
- Order Handling Manager

The QIT in 2002. Today it has 10 members and they meet each two weeks with the following agenda…
# Quality Improvement Team

## Basic Cyclic Agenda

<table>
<thead>
<tr>
<th>1st Meeting</th>
<th>2nd Meeting</th>
<th>3rd Meeting</th>
<th>4th Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement Projects - QS -</td>
<td>Quality Performance Index</td>
<td>Balance Score Card</td>
<td>CCRP and Customer Satisfaction</td>
</tr>
<tr>
<td>Managment Systems´ Integration</td>
<td>Quality Action Plans on going</td>
<td>Training Program &amp; Quality School</td>
<td>Follow up OHSAS 18001</td>
</tr>
<tr>
<td>Metalshop supplies</td>
<td>Follow up to QHSE Objectives</td>
<td>Environmental Management System –</td>
<td>NCR Power Transformers</td>
</tr>
<tr>
<td>5S and Housekeeping</td>
<td>Six Sigma &amp; dpmo’s</td>
<td>Audit Reports</td>
<td>NCR Distribution Transformers</td>
</tr>
</tbody>
</table>

In each session at least three of this topics are reviewed
QHSE + BASC Integration

Advantages we have from the QHSE integration

1. People develop a holistic processes’ approach
2. One integral Policy easier to implement and follow
3. Less number of internal and external audits, we pass from 12 to 4 per year
4. One integral Manager’s review
5. Integral operational control for Environmental and OHS systems
6. One integral induction program for new employees
7. More efficient use of IS resources and leaner documentation
8. Less number of registers
9. Prevention of lawful nonconformity
10. One integral Manual book (it is an interactive document)
QHSE + BASC Certifications

ISO 9001 since 1996

ISO 14001 since 1999

OHSAS 18001 since 2005

BASC since 2006
Certifies are not enough to be World Class

- **BELIEFS**
  - ISO 9001, ISO 14001, OHSAS 18001, BASC, etc.

- **SYSTEM**
  - Resources
  - ISO 9001, ISO 14001, OHSAS 18001, BASC, etc.

- **PROCEDURES**
  - MP, TI, Manuals, etc.

- **BEHAVIORS**

- **VALUES**

- **STRUCTURE**

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Traditional Focus

World Class Focus
QHSE Management evolution

By Abraham Maslow (1908 – 1970)
The Integral Employee knows, wants and has will power!
Next steps

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Rooms accreditation acc. to ISO – IEC 17025</td>
<td>June /08</td>
</tr>
<tr>
<td>Implement Social Responsibility Management System acc. to SA 8000 Standard</td>
<td>December /08</td>
</tr>
<tr>
<td>Integrate QHSE + BASC + SR</td>
<td>December /08</td>
</tr>
<tr>
<td>Columbian Quality Management Award</td>
<td>December /08</td>
</tr>
<tr>
<td>Iberoamerican Quality Management Award</td>
<td>December /09</td>
</tr>
</tbody>
</table>
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