



Reliability Study Users Manual

26-April-2004



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Introduction

The software tool developed by Cigré Reliability and Maintenance Working Group has been designed to ease the data collection process and perform a limited number of validation processes resulting in a high degree of data integrity. The software tool employs Microsoft Excel™ and is compatible with version 97 and later. The software tool is comprised of five major components:

- Utility Identification
- Equipment Population
 - Disconnectors and Earthing Switches
 - Instrument Transformers
 - GIS
 - SF₆ Circuit Breakers
- Equipment Failure
 - Disconnectors and Earthing Switches
 - Instrument Transformers
 - GIS
 - SF₆ Circuit Breakers
- GIS Maintenance
- Definitions

Hardware and Software Requirements

The Cigré working group A3.06 Survey tool has an intuitive design and for many users requires only a few words of instruction. This manual is designed for users who are less familiar with Microsoft Excel™

The survey tool can be run on any IBM compatible computer that contains the following software packages:

- Windows 98 or Newer
- Excel 97 or newer

It is recommended that at least 100 Mbytes of free space be available.

Installation of the Software Tool

The software tool provided is a self-extracting compressed or zip file. By double clicking on the file with your mouse, it will automatically inflate and install in a



directory of your choice on your computer. It is suggested that you create a special Cigré Reliability Survey folder and store this tool, all population and failure files in this folder for easy access.

The software tool is a Microsoft Excel™ Template named "cigre_reliability.xlt". The template contains preferred formatting, standardized text such as page headers and row and column labels, formulas, Visual Basic for Applications Macros, and custom toolbars.

Use of Macros

The software tool has been programmed with numerous macros that ease the data entry process. These macros have been tested by the committee members and do not compromise your computers security or data protection schemes. It is suggested that the when the tool is opened, the user selects the option to Enable Macros.

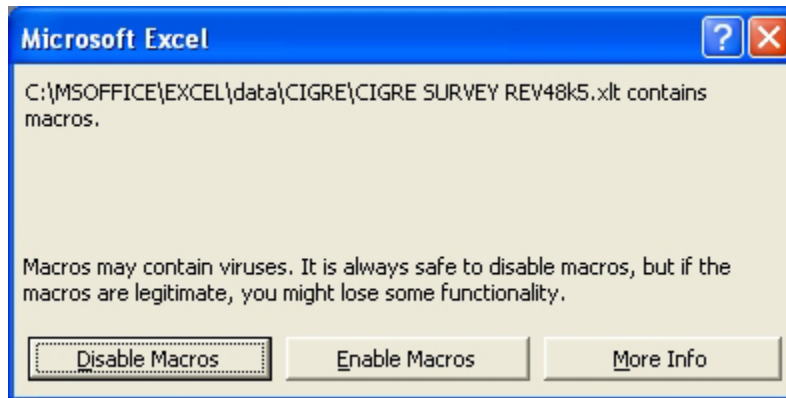


Figure 1 Macro Dialog

Unfortunately, the spread of viruses through macros is troublesome to many companies and may disallow or reduce the ease of using this tool. If your company cannot use this tool, data can be submitted to the Cigré working group in the form of a fixed format data file (see appendix 1).



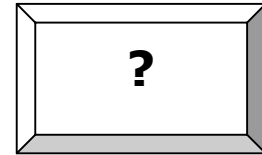
Multi Language Support

The survey tool supports numerous languages to increase its ease of use. Languages supported include:

- Czech
- Croatian
- English
- French
- German
- Italian
- Japanese
- Norwegian
- Polish
- Spanish

Definitions

For the survey to be of high value it is extremely important that users adhere to a strict set of standard definitions. On the survey tool, the user will find numerous buttons with an embedded question mark. These buttons take you to the standard definition applicable to the question being filled out. It is very important that the respondent follow these definitions.



Process Overview

General

All information from utilities should pass through both the country representatives and the assigned Cigré Working Group member before it is forwarded to the database manager. It is stressed that a practical and pragmatic approach should be applied. The various countries may be dealt with differently.

Confidentiality

The basic principle is that results are open within the Cigré Working Group on a need-to-know basis, and kept confidential to the outside world.



Population Cards

The population cards for each equipment group must be completed annually. The cards reflect the current population at only one particular time during the year. This time may be any date convenient to the utility and need not be either the first or last date of the year. The completed population cards should be immediately sent to Cigré. The card can be sent either to the National Cigré representative or the appointed Working Group Representative.

The Cigré Working Group representative will review each population card for accuracy and completeness. Working either directly with the utility or through the National Cigré Representative, corrections to the population cards will be made.

After the population cards are reviewed by the assigned Cigré Working Group Representative, the data will be added to the reliability study database.

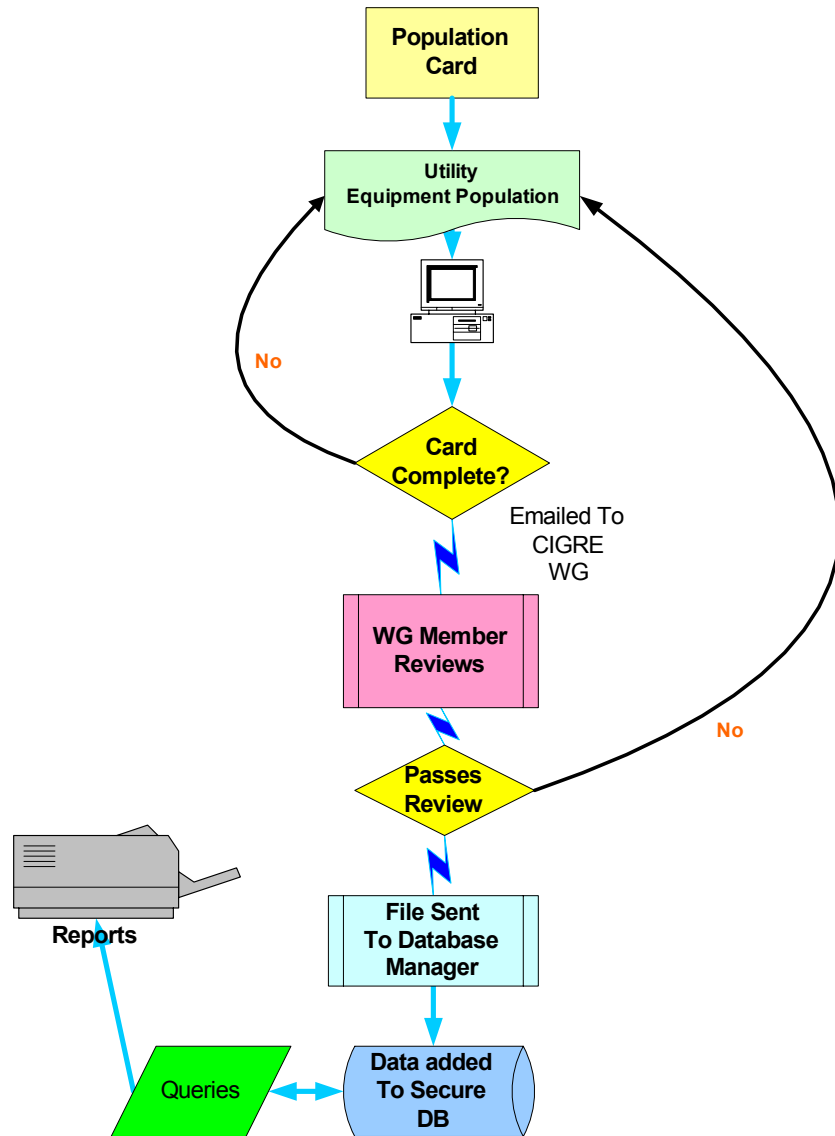


Figure 2 Population Card Process Diagram

GIS Maintenance Cards

A maintenance cards for GIS maintenance activities should be completed each year. The cards reflect the current GIS maintenance philosophy. The completed maintenance card should be immediately sent to Cigré. The card can be sent either to the National Cigré representative or the appointed Working Group Representative.



The Cigré Working Group representative will review each maintenance card for accuracy and completeness. Working either directly with the utility or through the National Cigré Representative, corrections to the maintenance cards will be made.

After the maintenance cards are reviewed by the assigned Cigré Working Group Representative, the data will be added to the reliability study database.

Failure Cards

A failure cards for all failed items should be completed soon after the investigation process is complete. The cards reflect the best available information about the failure. The completed failure card should be immediately sent to Cigré. The card can be sent either to the National Cigré representative or the appointed Working Group Representative.

The Cigré Working Group representative will review each failure card for accuracy and completeness. Working either directly with the utility or through the National Cigré Representative, corrections to the failure cards will be made.

After the failure cards are reviewed by the assigned Cigré Working Group Representative, the data will be added to the reliability study database.

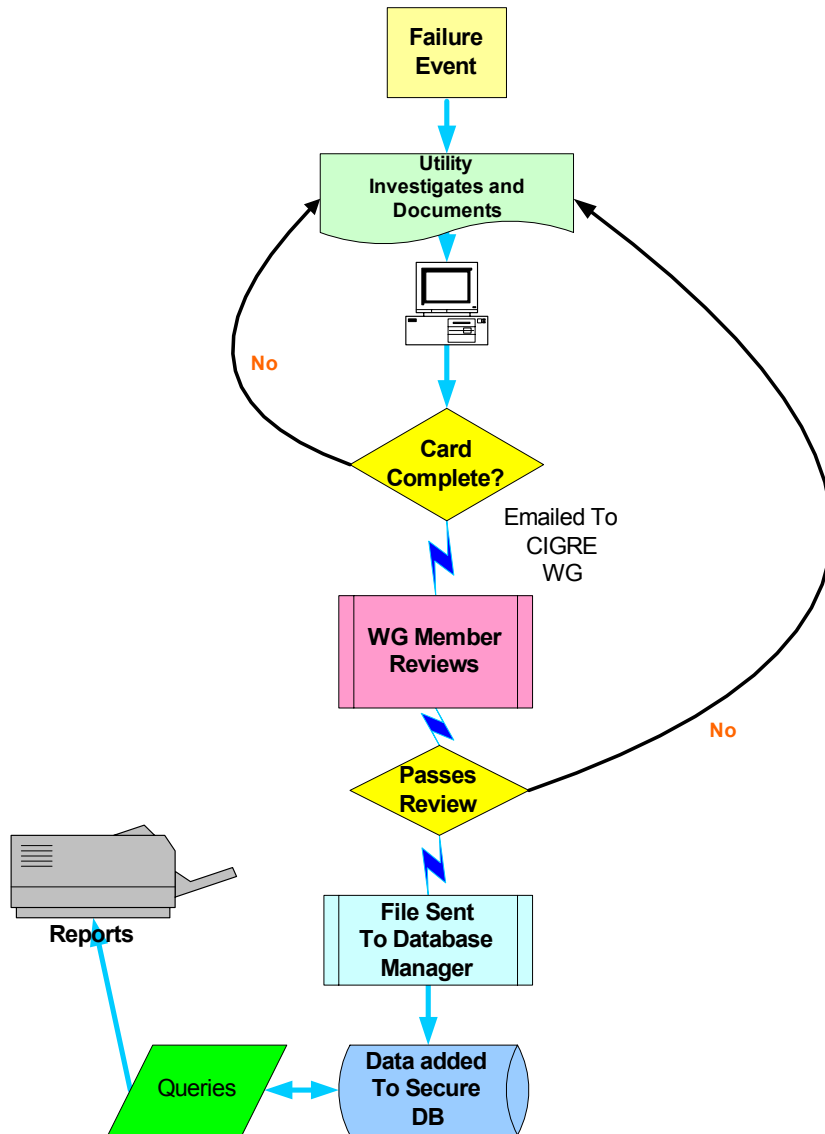


Figure 3 Failure Card Process Diagram

Setting the Translation Language

The user can change the language of the form by selecting one of the various translations. To change the language, using your mouse, click on the language dropdown box and select the desired translation:

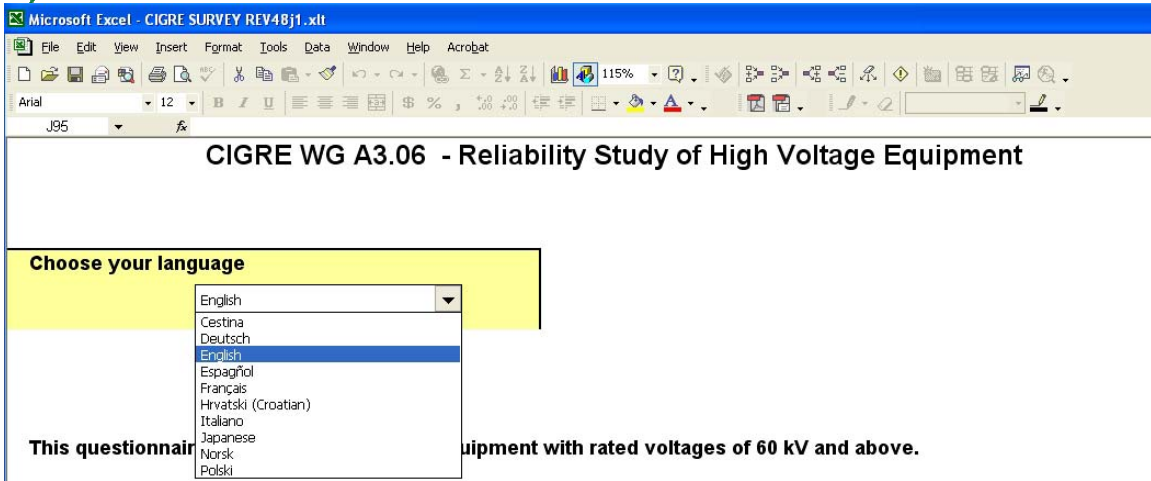


Figure 4 Translation Selection Screen



Utility Information

The utility Information section should be completed by the main utility contact. The information entered here will be re-used by all the population, failure and maintenance cards and so it should be saved as soon as it is complete to avoid having to re-enter the data at a later time.

CIGRE WG A3.06 - Reliability Study of High Voltage Equipment	
<p>Choose your language</p> <p>English</p>	
<p>This questionnaire applies to high voltage equipment with rated voltages of 60 kV and above.</p>	
<p>What year are you referring to?</p> <p>Card number</p> <p>1</p>	<p>2004</p>
Utility Information	
Country	CANADA
Utility name	Canadian Hydro
Short utility name (max. 7 char.)	CHYDRO
Ownership	Government owned
Utility type	Generation, transmission and distribution
Mailing address	1234 Electron Way
Contact name	Thomas Edison
Telephone	432-123-9876
Fax	432-123-9876
E-mail	tom@chydro.com

Figure 5 Utility Information Screen

Main Menu

Below the utility information section is the main navigation menu for the survey tool. The Main Menu performs the following functions:

- Navigates to a selected Population Card
- Navigates to a selected Failure Card
- Navigates to the GIS Maintenance Card



- Identifies Cards that have been fully completed

 The button with an embedded question mark is a link to a pertinent definition.


Main Menu					
Which card do you want to fill out?					
	SF6 Circuit Breakers (Including Circuit Switchers/Load Break Switches)	 ?	Disconnectors and Earthing Switches	Instrument Transformers	Help
Population Error free?	<input type="button" value="Go to"/> No	<input type="button" value="Go to"/> No	<input type="button" value="Go to"/> No	<input type="button" value="Go to"/> No	
Failure Filled out?	<input type="button" value="Go to"/> No	<input type="button" value="Go to"/> No	<input type="button" value="Go to"/> No	<input type="button" value="Go to"/> No	
Maintenance Filled out?		<input type="button" value="Go to"/> No			

Figure 6 Main Menu

Population Cards

By pressing one of the appropriate "Go to" buttons on the Main Menu; the respondent is presented with an introductory page that reminds them to follow the following rules:

- The rated voltage must be greater than or equal to 60 kV.
- For further information please click on the '?' buttons
- If text in the cells is cut off, adjust the line height or zoom.
- All types of SF6 CBs are covered (AIS, dead tanks and GIS).
- Please send an updated card each year to the CIGRE working group.
- Aggregate three single phase CBs as only one CB.
- Do not leave any answers incomplete: populate with best available information or expert opinion
- The population table has to be filled in with integers only



You are about to fill in a

**Single Pressure SF6 Circuit Breaker (CB) Population Card
(Including Circuit Switchers / Load Break Switches)**

back to main
menu

If this was an error, you can return to the main menu.

To proceed, please keep in mind the following rules:

- The rated voltage must be greater than or equal to 60 kV.
- For further information please click on the '?' buttons
- If text in the cells is cut off, adjust the line height or zoom.
- All types of SF6 CBs are covered (AIS, dead tanks and GIS).
- Please send an updated card each year to the CIGRE working group.
- Aggregate three single phase CBs as only one CB.
- Do not leave any answers incomplete: populate with best available information or expert opinion
- The table has to be filled in with integers only

Go to CB Population card

Figure 7 Population Card Introduction Screen

The population cards contain a summary table for each of the various equipment groups as well as respondent utility, contact and date information. The population section of the form is filled in with integer numbers only.



[back to main menu](#)

Single Pressure SF6 Circuit Breaker (CB) Population Card

If text in the cells is cut off, adjust the line height or zoom.

Rated Voltage Class	Main Function	Kind of Service	Operating Mechanism	Type of Enclosure	Location		Number of CBs manufactured in Period							Maintenance Philosophy		
					?	?	before 1979	1979-1983	1984-1988	1989-1993	1994-1998	1999-2003	2004-2007			
1: 60kV ... <100 kV	1: Cir. breaker 2: Cir. switcher / load break switch	1: Overhead line	1: Hydraulic	1: GIS - 1 phase	1: Indoor										1: Time based	
2: 100kV ... <200 kV		2: Transformer	2: Pneumatic	2: GIS - 3 phase	2: Outdoor											2: Condition based
3: 200kV ... <300 kV		3: Cable	3: Spring	3: Live tank	3: Live tank	3: GIS: Indoor-Normal										3: Run to failure
4: 300kV ... <500 kV		4: Shunt reactor	4: Other	4: Dead tank	4: Dead tank	4: GIS: Indoor-Special										4: Combination
5: 500kV ... <700 kV		5: Capacitor				5: GIS: Outdoor-Normal										5: Other
6: >= 700 kV		6: Bus-coupler				6: GIS: Outdoor-Special										
	7: Other				7: hybrid GIS: Indoor-Normal											
					8: hybrid GIS: Indoor-Special											
					9: hybrid GIS: Outdoor-Normal											
					10: hybrid GIS: Outdoor-Special											

Utility name	Canadian Hydro
Contact person for CB population card	Robert Joule
Telephone	423.123.8765
E-mail	rjoule@chydro.com
Date of filling in	1/1/2004

1	2	1	3	4	2	6	4	22	33	24	15	4	4
---	---	---	---	---	---	---	---	----	----	----	----	---	---

Figure 8 Population Card

It should be noted that it will generally take several lines to fully identify the population of each equipment group. If a line is not fully completed, the survey tool will indicate an error has occurred.



[back to main menu](#)

Single Pressure SF6 Circuit Breaker (CB) Population Card

If text in the cells is cut off, adjust the line height or zoom.

Rated Voltage Class	Main Function	Kind of Service	Operating Mechanism	Type of Enclosure	Location	Number of CBs manufactured in Period							Maintenance Philosophy																																									
?		?	?		?	?									?																																							
1: 60<= ... <100 kV	1: Cir. breaker	1: Overhead line	1: Hydraulic	1: GIS - 1 phase	1: Indoor	before 1979									1: Time based																																							
2: 100<= ... <200 kV		2: Transformer	2: Pneumatic	2: GIS - 3 phase	2: Outdoor										1979-1983	1984-1988	1989-1993	1994-1998	1999-2003	2004-2007	2: Condition based																																	
3: 200<= ... <300 kV	2: Cir. switcher / load break switch	3: Cable	3: Spring	3: Live tank	3: GIS: Indoor-Normal																3: Run to failure																																	
4: 300<= ... <500 kV		4: Shunt reactor	4: Other	4: Dead tank	4: GIS: Indoor-Special																4: Combination																																	
5: 500<= ... <700 kV		5: Capacitor			5: GIS: Outdoor-Normal																5: Other																																	
6: >= 700 kV		6: Bus-coupler			6: GIS: Outdoor-Special																																																	
		7: Other			7: hybrid GIS: Indoor-Normal																																																	
					8: hybrid GIS: Indoor-Special																																																	
					9: hybrid GIS: Outdoor-Normal																																																	
					10: hybrid GIS: Outdoor-Special																																																	
Please check the line below marked in red																																																						
<table border="1"> <tr> <td>Utility name</td> <td colspan="6"></td> <td>Please answer</td> </tr> <tr> <td>Contact person for CB population card</td> <td colspan="6"></td> <td>Please answer</td> </tr> <tr> <td>Telephone</td> <td colspan="6"></td> <td>Please answer</td> </tr> <tr> <td>E-mail</td> <td colspan="6"></td> <td>Please answer</td> </tr> <tr> <td>Date of filling in</td> <td colspan="6"></td> <td>Please answer</td> </tr> </table>															Utility name							Please answer	Contact person for CB population card							Please answer	Telephone							Please answer	E-mail							Please answer	Date of filling in							Please answer
Utility name							Please answer																																															
Contact person for CB population card							Please answer																																															
Telephone							Please answer																																															
E-mail							Please answer																																															
Date of filling in							Please answer																																															
1	2														Error																																							
2	2														Error																																							

Figure 9 Error Message in Population Card

Failure Cards

By pressing one of the appropriate "Go to" buttons on the Main Menu; the respondent is presented with an introductory page that reminds them to follow the following rules:

- The rated voltage must be greater than or equal to 60 kV.
- For further information please click on the '?' buttons
- All types of SF6 CBs are covered (AIS, dead tanks and GIS).
- When asked for a date, please enter the year with 4 digits (e.g. 2005).
- One failure card should be filled in per failure event.
- Do not leave any answers incomplete: populate with best available information or expert opinion



You are about to fill in a

Single Pressure SF6 Circuit Breaker (CB) Failure Card (Including Circuit Switchers / Load Break Switches)

back to main
menu

If this was an error, you can return to the main menu.

To proceed, please keep in mind the following rules:

- The rated voltage must be greater than or equal to 60 kV.
- For further information please click on the '?' buttons
- All types of SF6 CBs are covered (AIS, dead tanks and GIS).
- When asked for a date, please enter the year with 4 digits (e.g. 2005).
- One failure card should be filled in per failure event.
- Do not leave any answers incomplete: populate with best available information or expert opinion

Go to CB Failure card

Figure 10 Introduction to Failure Card

The failure card is comprised of a series of questions that are to be answered for each failure. The answers to the questions are of three types:

- Dates
- Check boxes
- Drop down lists



Microsoft Excel - CIGRE SURVEY REV48j1.xls:2

back to main menu

Please check question 2.1

Extract form & Save

Single Pressure SF6 Circuit Breaker (CB) Failure Card (Including Circuit Switchers / Load Break Switches)

Utility name	Canadian Hydro	
Contact person for CB failure card	Robert Watt	
Telephone	432-123-9087	
E-mail	nwatt@chydro.com	
Date of filling in	Jan-04	
Substation name if CB is in GIS		
Utility reference failure ID	2004-CB-01	Please answer

1 Function

1.1 Main function

?	Circuit breaker
?	Circuit breaker
?	Circuit switcher / Load break switch
?	Circuit switcher / Load break switch

Figure 11 Typical Failure Card

GIS Maintenance Card

By pressing GIS Maintenance "Go to" button on the Main Menu, the respondent is presented with an introductory page that reminds them to follow the following rules:

- The rated voltage must be greater than or equal to 60 kV.
- For further information please click on the '?' buttons
- This card may be filled out only once if the company's strategy does not change within the 4 years period of the survey.
- This card is "voltage class focused". If your strategy is identical for several GIS voltage classes, you can fill data in one common sheet for these classes.



- Please, use English in those parts where you are supposed to write text. If you cannot use English, please, select from one of the languages mentioned in pull-down list in the very first MENU sheet of the survey.
- Do not leave any answers incomplete: populate with best available information or expert opinion

You are about to fill in a

GIS Maintenance Card

back to main
menu

If this was an error, you can return to the main menu.

To proceed, please keep in mind the following rules:

- The rated voltage must be greater than or equal to 60 kV.
- For further information please click on the '?' buttons
- This card may be filled out only once if the company's strategy does not change within the 4 years period of the survey.
- This card is "voltage class focused". If your strategy is identical for several GIS voltage classes, you can fill data in one common sheet for these classes.
- Please, use English in those parts where you are supposed to write text. If you cannot use English, please, select from one of the languages mentioned in pull-down list in the very first MENU sheet of the survey.
- Do not leave any answers incomplete: populate with best available information or expert opinion

Go to GIS Maintenance card

Figure 12 GIS Maintenance Card Introduction

The maintenance card is comprised of a series of questions that are to be answered for each failure. The answers to the questions are of three types:

- Freeform comments
- Check boxes
- Drop down lists



back to main
menu

Please check question
2,2

GIS Maintenance Card

Utility name	Canadian Hydro
Contact name for GIS maintenance card	George Buss
Telephone	432-123-9834
E-mail	gbuss@chydro.com
Date of filling in	1/1/2005

1 GIS Identification
1,1 Rated voltage class

200<= ... <300 kV

?

- 60<= ... <100 kV
- 100<= ... <200 kV
- 200<= ... <300 kV
- 300<= ... <500 kV
- 500<= ... <700 kV
- >=700 kV

Figure 13 GIS Maintenance Card

Saving Your Data

To save your data, click on the "Extract Form and Save button" to save your current card to your Cigré directory. During the save process, you have the ability to re-name your file, make sure your utility name or acronym is embedded in the file name.

Send Your Files to Cigré

Files can be saved separately and sent to Cigré after they are complete. To send the file, follow these three steps:

1. Validate the card has been completed by looking for an OK or absence of "error" at the top of the card or an OK in the main menu.



back to main menu Thank you for having completed this questionnaire.
OK

**Single Pressure SF6 Circuit Breaker (CB) Failure Card
(Including Circuit Switchers / Load Break Switches)**

Extract form & Save

Utility name	Canadian Hydro
Contact person for CB failure card	Robert Watt
Telephone	432-123-9087
E-mail	rwatt@chydro.com
Date of filling in	Jan-04
Substation name if CB is in GIS	none
Utility reference failure ID	2004-CB-01

Figure 14 Fully Completed Card

The button with an embedded question mark is a link to a pertinent definition.

Main Menu					
Which card do you want to fill out?	SF6 Circuit Breakers (Including Circuit Switchers/Load Break Switches)	GIS	Disconnectors and Earthing Switches	Instrument Transformers	Help
Population Error free?	No	No	No	No	
Failure Filled out?	OK	No	No	No	
Maintenance Filled out?		No			

Figure 15 Completed CB Failure Card

- Click on the "Extract Card and Save" button located at the top of the Card of interest. This launches a procedure that removes all other cards from the file except the one just edited. To validate your choice click "yes" in the window with "Do you want to save this card and send it back to CIGRE"? After withdrawal of the unused cards you will have the choice where to save the information. The format under which it is stored is an



Excel worksheet. You will be able to edit it later on in Microsoft Excel. The special filename is proposed. It summarizes important information for the review process inside the WG: type of card, year referred to, the country code the short name of the utility and a date stamp that allows to differentiate between same card types saved at different dates of the year.

back to main menu

Thank you for having completed this questionnaire.
OK

**Single Pressure SF6 Circuit Breaker (CB) Failure Card
(Including Circuit Switchers / Load Break Switches)**

Extract form & Save

Utility name	Canadian Hydro
Contact person for CB failure card	Donald Watt
Telephone	432-123-8734
E-mail	don.watt@chydro.com
Date of filling in	1/1/2004
Substation name if CB is in GIS	None
Utility reference failure ID	2004-cb-1

Figure 16 Extract Form and Save Button

3. Send the data to your Cigré A3.06 working group representative



APPENDIX 1

Survey respondents who want to extract their population data from their Asset Management System and send it directly to the Cigré working group as a text file may do so. A separate file from each equipment type should be created following the following rules:

- Format shall be ASCII text
- Filed delimiters shall be the "~" (ASCII character 126)
- The file will be name with a three character file extension of "dat"
- Data files will be ordered as below
- Each record shall include the utility name
- Each record shall include the four-digit year of the extract.

Disconnectors and Earthing Switches Population File

Utility Name

Survey Year

Voltage Class

- 1 : 60<= ... <100 kV
- 2 : 100<= ... <200 kV
- 3 : 200<= ... <300 kV
- 4 : 300<= ... <500 kV
- 5 : 500<= ... <700 kV
- 6 : >=700 kV

Application

- 1 : GIS - 1 phase
- 2 : GIS - 3 phase
- 3 : Air insulated switchgear

Kind

- 1 : Disconnector
- 2 : Earthing switch
- 3 : Combined (3 pos.) DC / ES
- 4 : Other (e.g. compact)



Design

- 1 : Center break
- 2 : Double break
- 3 : Knee type
- 4 : Vertical
- 5 : Semi-pantograph
- 6 : Pantograph
- 7 : GIS disconnecter
- 8 : Low speed ES
- 9 : High speed ES
- 10 : Other

Kind of Service

- 1 : Line
- 2 : Transformer
- 3 : Busbar
- 4 : Earthing switch
- 5 : Other

Operating Mechanism

- 1 : Electric motor
- 2 : Pneumatic
- 3 : Spring
- 4 : Manual
- 5 : Other

Location

- 1 : Indoor
- 2 : Outdoor
- 3 : GIS: Indoor-Normal
- 4 : GIS: Indoor-Special
- 5 : GIS: Outdoor-Normal
- 6 : GIS: Outdoor-Special
- 7 : hybrid GIS: Indoor-Normal
- 8 : hybrid GIS: Indoor-Special
- 9 : hybrid GIS: Outdoor-Normal
- 10 : hybrid GIS: Outdoor-Special

Population Manufactured before 1974

Population Manufactured in years 1974-1983



Population Manufactured in years 1984-1993

Population Manufactured in years 1994-2003

Population Manufactured in years 2004-2007

Maintenance Philosophy

- 1 : Time based
- 2 : Condition based
- 3 : Run to failure
- 4 : Combination (e.g. RCM)
- 5 : Other

GIS Population File

Utility Name

Survey Year

Substation Name

Voltage Class

- 1 : 60<= ... <100 kV
- 2 : 100<= ... <200 kV
- 3 : 200<= ... <300 kV
- 4 : 300<= ... <500 kV
- 5 : 500<= ... <700 kV
- 6 : >=700 kV

GIS Part Extent

- 1 : Fully GIS
- 2 : Hybrid GIS

Year of Manufacturer

Location

- 1 : Indoor-Normal
- 2 : Indoor-Special
- 3 : Outdoor-Normal
- 4 : Outdoor-Special

Number of CB Bays



Type of Busbar Enclosure

- 1 : 1 phase
- 2 : 3 phase

Type of CB Enclosure

- 1 : 1 phase
- 2 : 3 phase

Number of SF6 Air Bushings

Number of Cable Boxes

Number of Interface Chambers

Maintenance Philosophy

- 1 : Time based
- 2 : Condition based
- 3 : Run to failure
- 4 : Combination (e.g. RCM)
- 5 : Other

Instrument Transformers Population File

Utility Name

Survey Year

Voltage Class

- 1 : 60<= ... <100 kV
- 2 : 100<= ... <200 kV
- 3 : 200<= ... <300 kV
- 4 : 300<= ... <500 kV
- 5 : 500<= ... <700 kV
- 6 : >=700 kV

Kind

- 1 : MVT-Magnetic (inductive) voltage transformer
- 2 : CVT-Capacitor voltage transformer
- 3 : CCVT-Combined current and voltage transformer
- 4 : OCT-Optical or electronic current transformer
- 5 : OVT-Optical or electronic voltage transformer
- 6 : CT-Current transformer (other than optical or electronic)



Application

- 1 : GIS - 1 phase
- 2 : GIS - 3 phase
- 3 : AIS (free standing)
- 4 : Others

Insulation of Active Part

- 1 : Oil / paper
- 2 : Resin
- 3 : SF6
- 4 : Air (for optical and electronic CT or VT)
- 5 : Other

CT Primary Arrangement

- 0 : Not a CT
- 1 : Hair-pin or eye bolt
- 2 : Bar primary or top core
- 3 : Cascade
- 4 : Ring
- 5 : Optical or electronic
- 6 : Unknown

Location

- 1 : Indoor
- 2 : Outdoor
- 3 : GIS: Indoor-Normal
- 4 : GIS: Indoor-Special
- 5 : GIS: Outdoor-Normal
- 6 : GIS: Outdoor-Special
- 7 : hybrid GIS: Indoor-Normal
- 8 : hybrid GIS: Indoor-Special
- 9 : hybrid GIS: Outdoor-Normal
- 10 : hybrid GIS: Outdoor-Special

Population Manufactured before 1979

Population Manufactured in years 1979-1983

Population Manufactured in years 1984-1988

Population Manufactured in years 1989-1993



Population Manufactured in years 1994-1998

Population Manufactured in years 1999-2003

Population Manufactured in years 2004-2007

Maintenance Philosophy

- 1 : Time based
- 2 : Condition based
- 3 : Run to failure
- 4 : Combination (e.g. RCM)
- 5 : Other

Single Pressure SF6 Circuit Breaker Population

Utility Name

Survey Year

Voltage Class

- 1 : 60<= ... <100 kV
- 2 : 100<= ... <200 kV
- 3 : 200<= ... <300 kV
- 4 : 300<= ... <500 kV
- 5 : 500<= ... <700 kV
- 6 : >=700 kV

Main Function

- 1 : Cir. breaker
- 2 : Cir. switcher / load break switch

Kind of Service

- 1 : Overhead line
- 2 : Transformer
- 3 : Cable
- 4 : Shunt reactor
- 5 : Capacitor
- 6 : Bus-coupler
- 7 : Other

Operating Mechanism

- 1 : Hydraulic
- 2 : Pneumatic
- 3 : Spring



4 : Other

Type of Enclosure

- 1 : GIS - 1 phase
- 2 : GIS - 3 phase
- 3 : Live tank
- 4 : Dead tank

Location

- 1 : Indoor
- 2 : Outdoor
- 3 : GIS: Indoor-Normal
- 4 : GIS: Indoor-Special
- 5 : GIS: Outdoor-Normal
- 6 : GIS: Outdoor-Special
- 7 : hybrid GIS: Indoor-Normal
- 8 : hybrid GIS: Indoor-Special
- 9 : hybrid GIS: Outdoor-Normal
- 10 : hybrid GIS: Outdoor-Special

Population Manufactured before 1979

Population Manufactured in years 1979-1983

Population Manufactured in years 1984-1988

Population Manufactured in years 1989-1993

Population Manufactured in years 1994-1998

Population Manufactured in years 1999-2003

Population Manufactured in years 2004-2007

Maintenance Philosophy

- 1 : Time based
- 2 : Condition based
- 3 : Run to failure
- 4 : Combination (e.g. RCM)
- 5 : Other



APPENDIX 2

Data flow

- A. The WG country representative sends instructions and questionnaires to participating utilities in his/her assigned countries.
- B. Each participating utility sends completed forms (population cards, failure cards, and maintenance cards) to the relevant WG country representative, who checks incoming data.
- C. When the WG country representative is not convinced that incoming forms are correct; he/she may consult a specialist in the relevant Task Force within the Working Group. The specialist will give guidance to the country representative, but shall not make any changes to the forms.
- D. When the WG country representative is of the opinion that incoming data are incomplete or in error, he/she will bring up the matter with the utility, and seek corrections. This will normally take place after consultation with a TF specialist, according to C.
- E. When the WG country representative is convinced that everything is in order; he/she will send the data to the database manager.
- F. At regular intervals the database manager sends all accumulated data for a type of equipment to the relevant Task Force members for analysis and evaluation.

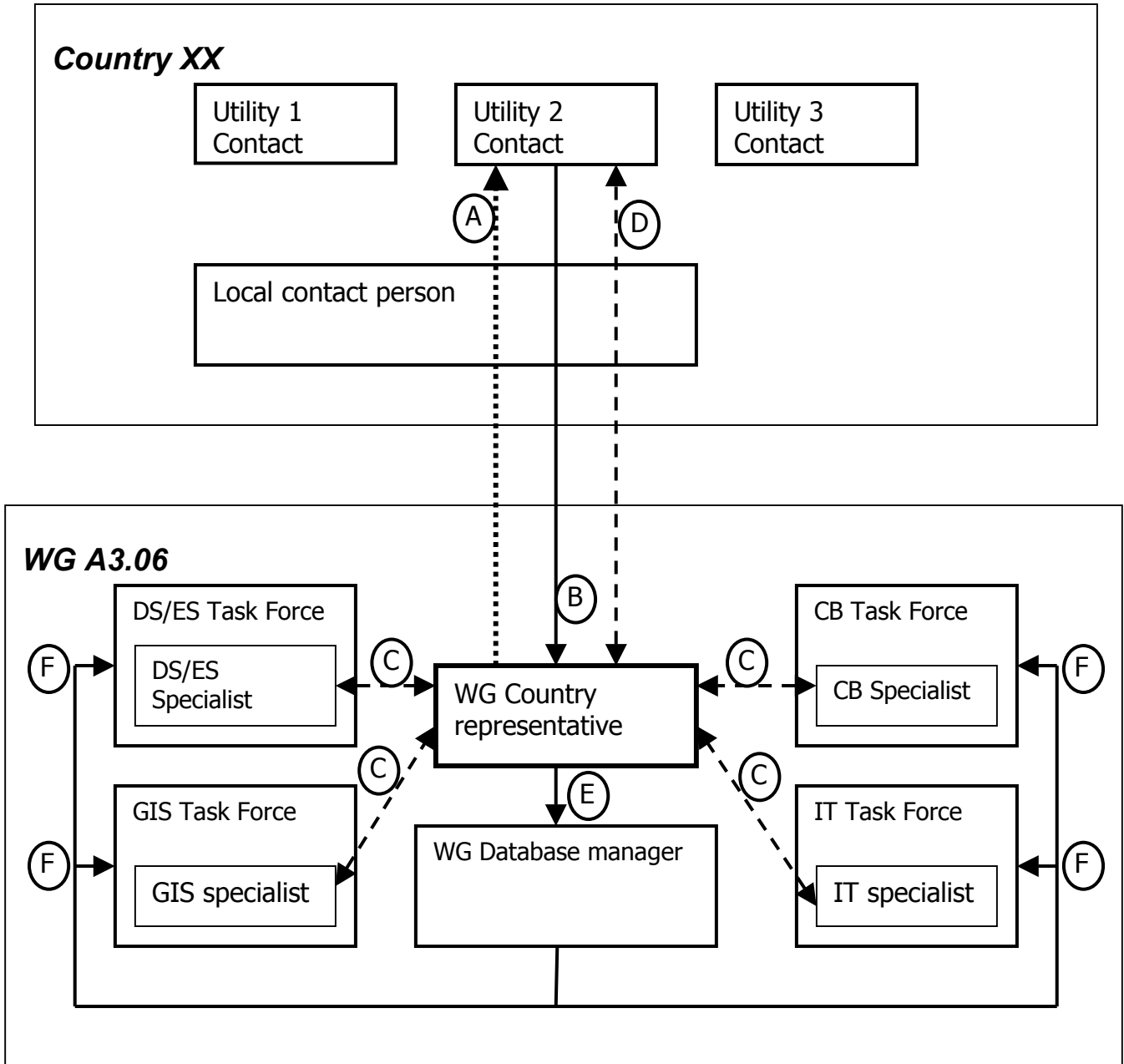


Figure 17 Data collection and handling data flow



Data Collection Functions

Utility contact person

The utility will get blank forms from the WG country representative, who will also assist if there are problems in filling in data. Completed forms are e-mailed to the WG country representative. When there is a local contact person in the country, this person will assist, in close collaboration with the WG country representative.

WG country representative

In a specific country, the WG country representative is responsible for presenting the survey to utilities, in order to reach agreement on participation, and for continuous contacts with participating utilities. He/she may assign a local contact person in the country in order to strengthen and facilitate the process.

The WG country representative provides blank forms to participating utilities, and receives completed forms. He/she shall review completed forms. If in doubt about the correctness of a form, he/she may consult an equipment specialist within the WG, and shall send forms with incomplete or incoherent information back to the utility for correction until they are acceptable. When convinced that the completed form is in good order, he/she shall forward it to the WG database manager.

The WG country representative shall keep record of the flow of forms from participating utilities, and actively contact participating utilities if forms are missing. The record should include the following information:

- The type of form received (population, failure, maintenance)
- The revision of the survey tool that was used for the form
- The arrival date of the form
- The date of approval of the form
- The name of the person who approved the form (either the WG country representative himself or an equipment specialist within the WG)
- The file name (he/she may rename it)
- The current status of all utility correspondence.

The WG country representative does not have to store backup copies of forms that have been received (but is free to do so).

WG country representatives per country are shown in the document "WG A3.06 Contact network".



Local contact person

The local contact person will assist in the contacts with participating utilities in his/her country. Upon agreement with the WG country representative, and in close collaboration, the local contact person may take responsibility for the data flow between participating utilities and the WG country representative. In such cases the local contact person will be a link in data flow items A, B and D as described below.

Local contact persons per country are shown in the document "WG A3.06 Contact network".

WG database manager

The WG database managers compact incoming data into a database, and perform consistency checks between failure and population data. At regular intervals the database managers send all accumulated data for a type of equipment to the relevant Task Force members for analysis and evaluation.

The WG database managers are responsible for security copies of all data.

Task forces; specialists

Within the WG four TFs have been established, one for each equipment type under study: Circuit breakers, instrument transformers, disconnectors/earthing switches, and GIS. The members of these TFs are equipment specialists. When called upon by a WG country representative, these specialists will give guidance in evaluation of forms with questionable information. In this role the specialist shall only give advice, and shall not make any changes to the forms.

The Task Forces are made up of the following specialists:

Task Force			
Circuit breakers	Instrument transformers	Disconnectors and earthing switches	GIS
Manuel López Dirk Makareinis Kresimir Mestrovic Antoni Hyrczak Carl Sölver	André Giboulet Dagmar Kopejtkova Jan Ostlund Francis Waite	Ferruccio Dianin Antoni Hyrczak Johan Krone Bruno Nicol	André Giboulet Koichiro Ikebe Dagmar Kopejtkova Matthias Kudoke