



IEEE Alternative Gases Task Force

Nenad Uzelac, task force chair

Presentation to IEEE switchgear ADSCOM

April 27, 2017

Agenda

- ▶ TF Motivation
- ▶ Member Introduction
- ▶ TF Deliverables
- ▶ Report Outline
- ▶ Schedule / Meetings
- ▶ Team leads
- ▶ Open discussion
- ▶ Next steps

Motivation

- ▶ In the last few years, some new gases and gas mixtures emerged. Have potential for replacing SF6
- ▶ Number of published papers, studies and pilot projects
- ▶ IEC, CIGRE and Current Zero Club are investigating
- ▶ ADSCOM Committee approved forming IEEE switchgear Task force at Spring 2016 meeting
- ▶ Each subcommittee appointed representative(s)
- ▶ Also, IEEE substation committee appointed representatives

ADSCOM approved the task force

**IEEE/PES SWITCHGEAR COMMITTEE
Switchgear ADSCOM Meeting Minutes
Hilton Head, SC, USA
Thursday, April 28, 2016**

	Agenda Item	Presenter
25	Alternatives to SF ₆	Nenad Uzelac
<p>CIGRE and IEC investigating alternative gases to SF₆. Nenad Uzelac proposes that we start an ADSCOM discussion group to scope out the potential issues and a proposed boundary of the project, and how it might affect standardization.</p> <p>Motion to form a task force alternative gases to SF₆ was made by Nenad Uzelac The motion was seconded by John Webb. The motion passed unanimously with no abstentions.</p> <p>Nenad Uzelac agreed to chair the task force, and begin work over the summer with interested parties.</p>		

Also, IEEE substation committee members joined the task force, so it effectively became a joined TF between IEEE switchgear and substation committee

Members

Role	Last Name	First name	Affiliation
Member	Ashtekar	Koustubh	Eaton
Member	Becker	George	POWER Engineers Inc
Member	Biasse	Jean Marc	Schneider
Member	Byron	Eldridge	Schneider
Member	DiLillo	Pat	Con Edison
Member	Ficheux	Arnaud	GE
Member	Franck	Christian	ETH Zurich University
Member	Graber	Lukas	Georgia Tech
Member	Grossman	Peter	Siemens
Member	Hermosillo	Victor	GE
Member	Hrncir	Dan	Eaton
Member	Houston	James	Southern Co
Member	Kriegel	Martin	ABB
Member	Leiter	Carol	BPA
Member	Leufkens	Paul	Power Projects Leufkens
Member	McCord	Neil	Southern States
Member	Olsen	Ted	Siemens
Member	Owens	John	3M
Member	Reigart	Carl	Hubbell
Member	Rhein	David	Hubbell
Member	Schiffbauer	Daniel	Toshiba
Secretary	Trost	Karla	G&W Electric
Chair	Uzelac	Nenad	G&W Electric
Member	Wen	Jerry	BC Hydro
Member	Yu	Li	Eaton

Project Schedule

- ▶ June - July – Create team and team leads
- ▶ July – October 2016 – Literature review
 - Published White papers (with respect to new gases)
 - Standards review (with respect to SF6)
- ▶ July – December 2016 – collect contributions
 - Power points
 - Word documents
 - White papers
- ▶ January – March 2017 – write and review report
- ▶ April 2017 – present report

Technical Report Outline

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Working group
produced a technical
report

Task Force meetings

- ▶ Kick off Webex meeting – July 2016
- ▶ Webex meeting – August 2016
- ▶ IEEE fall meeting – October 2016
- ▶ Webex meeting – November 2016
- ▶ Meeting during JTCM in New Orleans , January 2016
- ▶ Webex meeting – February 2017
- ▶ Webex meeting – March 2017
- ▶ IEEE spring meeting – April 2017

Results

#	Committee	Subcommittee	Working Group	Document	Impact on Document	Recommend Action
1	Substations	GIS	K1	C37.122	Combination	New Standard
2	Substations	GIS	K2	none	Technical – Data	Revision
3	Substations	GIS	K3	C37.122.2	Combination	New Standard
4	Substations	GIS	K4	C37.122.3	Combination	New Standard
5	Substations	GIS	K5	C37.122.4	Editorial	Revision
6	Substations	GIS	K6	none	None	None
7	Substations	GIS	K7	C37.017	Editorial	Revision
8	Substations	GIS	K8	C37.122.5	None	None
9	Substations	GIS	K9	C37.122.6	Combination	Revision
10	Substations	GIS	K10	none	Technical – Data	Revision
11	Substations	GIS	K11	C37.122.1	Combination	New Standard
12	Substations	GIS	K12	C37.123	Combination	New Standard
13	Substations	GIS	Joint	C37.20.9	Combination	New Standard
14	Substations	GIS	K13	C37.122.10	None	None
15	Substations	GIS	K14	C37.122.9	Combination	New Standard
16	Substations	GIS	K15	C37.122.7	Combination	New Standard
17	Substations	GIS	K16	none	None	None
18	Substations	GIS	K17	none	None	None
19	Substations	GIS	K18	C37.122.8	Combination	Revision
20	Switchgear	RODE	WG37.60	C37.60	Combination	New Standard
21	Switchgear	RODE	none	C37.74	Combination	New Standard\)
22	Switchgear	RODE	none	C37.63	Combination	New Standard
23	Switchgear	RODE	WG37.62	C37.62	Combination	New Standard
24	Switchgear	General	none	C37.100.1-2007	Combination	Revision
25	Switchgear	General	none	1247-2005	Editorial	Revision
26	Switchgear	Switchgear Assemblies	None	C37.20.3	None	None
27	Switchgear	Switchgear Assemblies	None	C37.20.4	None	None
28	Switchgear	Switchgear Assemblies	None	C37.20.6	None	None
29	Switchgear	Switchgear Assemblies	C37.20.7	C37.20.7	None	None
30	Switchgear	Switchgear Assemblies	C37.20.9	C37.20.9	Technical	Add recommendations when available
31	Switchgear	Switchgear Assemblies	C37.20.10	C37.20.10	Editorial	Revision
32	Switchgear	Switchgear Assemblies	None	C37.21	None	None

33	Switchgear	Switchgear Assemblies		C37.23	C37.23	None	None
34	Switchgear	Switchgear Assemblies		C37.24	C37.24	None	None
35	Switchgear	Adscom		C37.59	C37.59	None	None
36	Switchgear	Switchgear Assemblies		C37.81	C37.81	None	None
37	Switchgear	Switchgear Assemblies		C37.82	C37.82	None	None
38	Switchgear	HVCB		C37.04	C37.04	Technical	None
39	Switchgear	HVCB		C37.06.1	C37.06.1	None	None
40	Switchgear	HVCB		C37.09	C37.09	Technical	Revise
41	Switchgear	HVCB		C37.010	C37.010	Technical	Revision
42	Switchgear	HVCB		C37.012	C37.012	None	None
43	Switchgear	HVCB		C37.013	C37.013	Combination	New Standard
44	Switchgear	HVCB		C37.10	C37.10	None	None
45	Switchgear	HVCB		C37.10.1	C37.10.1	Technical	Revision
46	Switchgear	HVCB		C37.011	C37.011	None	None
47	Switchgear	HVCB		C37.015	C37.015	None	None
48	Switchgear	HVCB		C37.081	C37.081	None	None
49	Switchgear	HVCB		C37.083	C37.083	None	None
50	Switchgear	HVS		C37.30.1	C37.30.1	Technical	Revision
51	Switchgear	HVS		C37.30.2	C37.30.2	None	None
52	Switchgear	HVS		C37.30.3	C37.30.3	Technical	Revision
53	Switchgear	HVS		C37.30.4	C37.30.4	None	None
54	Switchgear	HVS		C37.30.5	C37.30.5	None	None

Results

- ▶ Out of 54 standards, 28 would need to be either modified or would require new standards
- ▶ 26 standards would require no modifications
- ▶ Out of 28 standards that need to be modified some standards would only require editorial changes, others would require technical changes

Recommendations

1. Make this report available for Switchgear and Substations standards attendees (now)
 - Password protected
2. Extend the mandate of the Task Force to edit this document and prepare it for publishing with IEEE Xplore (till fall 2017)

Recommendations (cont)

3) Create a Working Group to develop two different guides (one at a time) in Fall 2017

- The first guide would document steps for working groups to use in their evaluation of alternate insulating mediums in regards to **performance characteristics** within the individual product standards.
- The second guide would be similar in nature and provide guidelines for how to document the **handling** of specific gaseous insulating mediums throughout the life cycle of the individual products.
- Each Working Group should include representation from Switchgear, Substations, and the IEC

Recommendations (cont)

- 4) Create liaisons with active CIGRE and IEC Working groups. Specifically, create a liaison with 62271-4 standard for Gas Handling.