

ASHRAE MEETING MINUTES – Salt Lake City, UT

TC 2.3 - Gaseous Air Contaminants/Removal Equipment TC Meeting

Tuesday June 24, 2008

13:00 - 15:30

Hilton Hotel – Grand Ball Room A (Upper Level)

NOTICE:

These meeting minutes have been approved and are official.

- The meeting was called to order at 1:10 pm by Chairman Dean Tompkins. The meeting attendee list is as follows:

Name	Email address
(Member – 8)	
Mark Stutman	stutmanm@camfilfarr.com
Gemma Kerr	gemma.kerr@inairenvironmental.ca
Karin Foarde	kkf@rti.org
Paolo Tronville (International Member)	paolo.tronville@polito.it
Dean Tompkins	dtompki@wisc.edu
Kyung-Ju Choi	kchoi@aafintl.com
William Lull	ashrae@garrisonlull.com
Eric Kuiper (International Member)	erik@mail.ashrae.org
(Corresponding Members & Visitors)- 30	
Barney Burroughs	heburroughs@mindspring.com
Matt Middlebrooks	mmiddlebrooks@filtrationgroup.com
Kathleen Owen	mko@rti.org
Marilyn Listvan	mlistvan@yahoo.com
Derald Welles	dwelles@ix.netcom.com
Dave Chojnowski	davidc@uic.edu
Catherine Jacquiod	catherine.jacquiod@saint-gabain.com
Mick Flom	mflom@lmstechnology.com
Shane Tincher	stincher@clair.com
Bob Burkhead	bob@blueheaventech.com
Gary Luepke	gluepke@trane.com
Tom Kelly	Thomas.j.kelly@carrier.utc.com

Monroe Britt	monroebritt@bellsouth.net
Rakesh Goel	rakesh.goel@lennoxind.com
Steve Zitin	szitin@bioclimatic.com
Brian Monk	brian.monk@carrier.utc.com
Nicole Tebano	ntebano@fiberweb.com
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Bruce Duffy	b.duffy@tridim.com
Bob Culbert	ener.bob@steril-aire.com
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John Perry	jd27@meadwestvaco.com
Ken Mead	kmead@cdc.gov
Eric Chen	echen@ahrinet.org
Shannon Schoppman	sschoppman@fiberweb.com
Jim Hanley	hanley@rti.org
Charles Wilkin	cbw200@comcast.net
Den Low	denlow@inayair.com
Chris Muller	cmuller@purafil.com

- Review of Roster Update
- Dean will remain on as Chair for 1 more year, Nick Agopian will become chair June 2009, Matt Middlebrooks becoming Vice Chair June 2009
- Attendee self-introductions were made.
- Voting membership was identified.
- TC 2.3 in Salt Lake City has 12 voting members. Roster check at TC 2.3:

	<u>Present</u>	<u>Absent</u>
1) Paolo Tronville (International Member)	X	
2) Karin Foarde	X	
3) Nick Agopian (Vice Chair)		X
4) Ez Khalifa		X
5) Dean Tompkins (Chair)	X	
6) KJ Choi	X	
7) William Lull	X	
8) Gemma Kerr	X	
9) Bob Hendry		X
10) Mark Stutman	X	
11) Erik Kuiper (International Member)	X	
12) Phil Winters		X
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Totals:	8	4

A quorum was achieved with 8 voting members present. (Needed for quorum: 50% + 1 of voting members.)

After Salt Lake City, Phil Winters, Ez Khalifa, Bob Hendry, and Dr. Karin Foarde will be rolling off the roster and become corresponding members. Rolling on to become voting members of the TC will be Dr. Marilyn Listvan, Jeff Roseberry, Chris Muller, Barney Burroughs.

Motion: Approve New York meeting minutes

By: Marilyn Listvan

Seconded: Bill Lull

Results: For-8 / Against- 0 / Abstain-0 / Absent 4 (**8-0-0-CV**)

Background/Discussion: Revised minutes sent to members via email, will also be added to web site with corrections made.

MOTION APPROVED to accept the Meeting Minutes from NY with the knowledge that the requested changes discussed will be made.

- Minutes to be published within 60 days following the minutes.

Subcommittee Reports Made:

Membership (Dean Tompkins, reporting for Nick Agopian)

The current TC 2.3 leadership team is:

- Chair – Dean Tompkins
- Vice Chair – Nick Agopian
- Secretary – Shannon Schoppman
- Research – Karin Foarde
- Planning – Nick Agopian
- Membership – Nick Agopian
- Standards – Paolo Tronville
- Program – Dean Tompkins
- ALI Coordinator (ASHRAE Learning Institute) – Barney Burroughs
- Handbook – Gemma Kerr
- International – Paolo Tronville, Erik Kuiper
- Webmaster – Erik Kuiper
- Publications – Marilyn Listvan

Research (Karin Foarde, Chair, reporting)

- The minutes from NYC, Winter Meeting 2008, were reviewed and changes submitted.
- Developing new strategic plan 2010-2015: will be requesting input. There will be an email sent requesting participation in a web-based survey. Participation is strongly recommended as it will impact our research.
- USGBC has requested participating as co-funders. Will be handled within RAC right now as the mechanism is not clear. Mark RTAR or Work Statement (WS) if authors think appropriate.
- WS authors are no longer discouraged from writing RTARS and WS. The number and quality of RTARS and WS were down because researchers were not participating. RAC has instituted a number of checks and balances to limit any conflict of interest. Liaisons need to be *ex officio* members of PES.
- Project Monitoring Subcommittee (PMS) meetings should be scheduled separately and then reviewed at the Research Subcommittee meeting. The meetings are open. Whether or not data is released at the meeting is the decision of the TC, but it should be pointed out that the data belongs to ASHRAE and cannot be used if it is handed out. Use “do not cite or quote”.
- RTARS or WS cosponsored with or supported by other TCs need to be voted on by that TC too.

1. Presentations/Up-Dates on Current Research Project

a. 1457-RP “By-product Production from Photocatalytic Oxidation Associated with Indoor Air cleaning Devices” has been awarded to Dean Tompkins University of Wisconsin.

[PMS- Eric Kuiper (Chair), Gemma Kerr, Matt Middlebrooks, Kathleen Owen, Marilyn Listvan]

The objective of this project is to investigate products released during photocatalytic oxidation of selected indoor air contaminants to obtain data and improve and make safer air cleaners that use this technology.

A presentation was made by Ramsey Kropp, Dean Tompkins’ student. A significant effort has already been made. The PMS reported being pleased with the progress. RAC says that quarterly reports need to be submitted to Mike Vaughn.

b. 1302-RP “Comparison of Gas Phase Air Filtration Equipment (GPAFE) Lab Tests to Field Experience.” Principal Investigator – Donald H. Stedman, University of Denver

[PMS- Gemma Kerr (Chair), Bill Lull, Matt Middlebrooks, Paolo Tronville, and Nick Agopian]

The objective of this project is to provide directly comparable performance data and methods (i.e., correlate approaches) to make comparisons for various media used in GPAFE designs at both accelerated (high challenge concentration) and application (very low challenge concentration) conditions within a lab setting.

Final report was received in October. The PMS has sent a letter to the contractor with required corrections. He has responded that he will get to it when he can. The PMS will send him a letter informing him that he needs to request a no cost extension or ASHRAE will close the project and they will not get their final payment.

c. 1243-TRP “Detection and Measurement of Gaseous Byproducts of Fungal Growth That Affect Indoor Environments - Phase II”. Principal Investigator – Don Cortes/Elliot Horner, AQS.

[PMS- Karin Foarde (Chair), Paul Nelson, Brian Krafthefer, Marilyn Listvan, Gemma Kerr and Charlene Bayer].

The final technical paper has never been submitted. ASHRAE wants to know if it will happen. I have repeatedly contacted them but there has been no paper and they have ceased to respond. Barney has volunteered to contact Marilyn Black.

2. Work Statements & RTARs

a. RTAR-1548 “In-duct full-scale laboratory-evaluated comparison of photocatalytic oxidation (PCO) filters versus dry-scrubbing media filters” was prepared by Dean Tompkins and submitted for the March 3rd deadline. It has been accepted and a WS may be submitted. Jensen, Nick, Erik, and Brad Stanley will co-author..

b. RTAR “Lab Comparison of testing challenge concentration (high) to application challenge concentrations (low) for GPAFE” was proposed by Matt Middlebrooks. He will start drafting it. Bill Lull, Paolo Tronville, Mark Stutman, and Nick Agopian will review.

3. Research Plan

TC 2.3 2008-2009 Research Plan

Projects	Champion (co-authors)	Priority
Evaluate current (cost effective) sensors for indicating End of Service for GPAFE	Matt Middlebrooks (Erik, Marilyn, Jensen)	
Impact of Desiccant Media on Gaseous Contaminants – continuation of RP-475 (check #)	Dean (Bill Lull)	
Effectiveness of Ozone Filtration Devices for Improving IAQ	Jensen Zhang (Dean, Gemma)	

Other ideas considered-

- PCO System Effectiveness over Time
- Evaluate Sensors to Control Air Cleaning Devices for Energy Effectiveness (cost effective, real-time) – Optimize renewability for GPAFE

TC 2.3 2007-2008 Research Plan

Projects	Person Responsible	Priority
Real lab environment comparison tests of PCO vs. carbon filter (flow, pressure drop, RH, temp, multiple VOCs, etc)	Dean Tompkins	1
Evaluation of combined particulate and gaseous filters (combi-filters): What happens to gas phase contaminant levels with particulate loading?	Paolo Tronville	2
Evaluating formaldehyde cleaning devices	Jensen Zhang	2

Other ideas considered-

- What is impact of desiccant wheels on gaseous contaminants?
- Determining/evaluating end of service life of filterbed material.
- Correlation between high and low inlet concentration and media (granular) life – not answered in #1302-TRP.

- **Motion:** Approve the Research Plan of TC 2.3 as stated above.
By: Paulo Tronville
Seconded: Gemma Kerr
Results: For- 8/ Against- 0 /Abstain-0 / Absent-4 (8-0-0-CV)
Background/Discussion: Rankings are done by first submitted.

Publications (Marilyn Listvan, Chair, reporting)

The joint TC 2.03 and 2.04 Publications Meeting was held on June. 23, 2008 in Salt Lake City, Utah and had 7 members present.

- IAQ Proceedings CD: ASHRAE Publications is still expecting our document for Special Publications. The remaining efforts include scanning the IAQ Proceedings which is almost complete. Action: Marilyn finished/repared scans to ASHRAE by 10/08.
- IAQ Applications: Is no longer acted on.
- Article topics and authors were solicited and encouraged to prepare up to a 2,5000 word article for an ASHRAE Journal article.
- ASHRAE news releases. Contact: [Jodi Dunlop](mailto:Jodi_Dunlop); Phone: 678-539-1140; email jdunlop@ahsrae.org .
- Karin Foarde will attempt to convert an ARTI report into an ASHRAE Journal article on UV light effects.
- Gemma Kerr may produce a second (and third?) manuscript for ASHRAE TRANSACTIONS based on work for RP-961.
- Gemma Kerr may work on an ASHRAE Journal or SHORT Insights article on - “How to investigate Odor Problems in Real Buildings.”

- Paulo Tronville will put together a small summary for the ISO standard (ISO TC 142).
- Nick Agopian has info for an application - “Use of Filtration in Process Applications”
- Emerging Technologies paper - Photocatalytic Oxidation (PCO) - Catherine Jacquioid and Dean Tompkins may have an abstract for a paper for PCO applications.
- Barney Burroughs and a 15-building project. Action: Barney invited to write-up his seminar talk.
- Charlie Seyffer (an Engineered Systems article is coming out after Sept. '08 “LEED & Air Filtration” but may give to Journal if cannot get agreement on content.)
- Charlie Seyffer will consider authoring an Insights summary of previous “52.2 issues”
- Nick Agopian, Chris Mueller, Charlie Seyffer to author “How can we apply filtration to reduce Outdoor air with IAQ method”
- Monroe Britt should consider a write-up for ASHRAE Journal entitled “Problems with 52.2 – lab variations.” A summary of results he presented at 52.2 & NAFA. (Tom Justice volunteered to help “edit”.)
- A request for volunteer reviewers of articles was made so that good information is provided by TC 2.03.
- Additional comments include: (a) Advanced IAQ Guide which is open for public comments on the website (July 25 – Aug 17, 2008), and (b) Advanced Energy Design Guide open for public comments on website (July 14 – July 26, 2008).

Program (Dean Tompkins, Chair, reporting)

- Program(s) proposed for Chicago, 2008: Theme-Sustainable Urban Design

<u>Name</u>	<u>Title</u>	<u>Co-Sponsor</u>	<u>Chair</u>
Seminar	Ozone Removal for Sustainable IAQ Design	None	Matt Middlebrooks
Seminar	Case Studies-Standard 62-IAQ Procedure for Sustainability	TC 2.4/SSPC 62.1	Barney Burroughs
Seminar	Building Integration with Formaldehyde Cleaning Devices	None	KJ Choi
Forum	How can the IAQ Procedure be made Acceptable for Broad Application	M. Stutman	

Motion: Accept the Program as presented at the meeting and listed above.

Motion Made by: Karin Forde

Second: Mark Stutman

Results: For-8 / Against-0 / Abstain-0 / Absent-4 **(8-0-0-CV)**

Discussion: 62.1 can Co-Sponsor IAQ Procedure Forum

Handbook (Gemma Kerr, Chair, reporting)

Motion: TC Voted to Approve Handbook sub-committee final approved version of Chapter 12 for submission to ASHRAE Publications Committee

Motion Made By: Gemma Kerr

Motion Seconded By: Mark Stutman

Vote: For-8/Against-0/Abstain-0/Absent-4 **(8-0-0-CV)**

Discussion: None

Motion: TC Approve Handbook sub-committee final approved version of Chapter 13 for submission to ASHRAE Publications Committee

Motion Made By: Gemma Kerr

Motion Seconded By: Dean Tompkins

Vote: For-8/Against-0/Abstain-0/Absent-4 (8-0-0-CV)

Discussion: None

Agenda for Chicago - Relinquish authorship responsibilities of Chapter 13 (Odor) to TC 2.1

Chapter 45 - Matt Middlebrooks will revise Chapter 45 which is due in 2011.

- Need help/participation for applications revision.
- Committee is down to 5 people working on the section.
- The next meeting will be Chicago (Jan 26, 2009: 4:15-6:00).

Standards (Paolo Tronville, Chair)

- Updates given on standards within scope of ASHRAE TC 2.3
 - a) GPC 27P “Procedures for measurement of gases in indoor environments.” Gemma Kerr reported that there is a Table of Contents, and to expect some text by Chicago.
 - b) SPC 145.1 “Laboratory Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Loose Granular Media” - Chris Muller has the galley proofs. For publication the standard now only needs final approval from ASHRAE Standards Committee, possibly at their October meeting or earlier by letter ballot.
 - c) SPC 145.2 “Laboratory Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Air Cleaning Devices” - Kathleen Owen has taken over from Doug VanOsdell. At the meeting there was discussion regarding challenge gases and concentrations. A subcommittee was set up to sort this out. The document is currently very long, but could be made smaller by putting gas challenge information in an appendix. At the forum on Wednesday it is hoped to get a better idea of what people want from the standard. Completion is anticipated in 1 year plus. Paolo said that we need to move soon or ISO may move without us.
 - d) SPC 145.3 “Field Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Installed Systems” Chris Muller reported that there is currently no activity on this standard. A champion is needed in order to move forward. This will be a guideline not a standard. Chris will talk to Barney Burroughs for his opinion on what needs to go in the guideline. There may be more interest in creating procedures for testing non-sorbent devices than for sorbent ones, and in looking at testing in occupied spaces as well as in HVAC systems.
- **Updates given by TC Liaisons**
 - e) TC 2.4 “Particle Filtration” – Gemma Kerr reported that Standard 52.2 has been approved for publication by ASHRAE Standards Committee. Standard 52.1 is currently undergoing a public review which will result in it being withdrawn. Guideline 26 is at the proof stage. Guideline 17 has been reactivated under Erik Kuiper and a new (nearly final) draft will be produced by the Chicago meeting.
 - f) TC 2.9 “Ultraviolet Air and Surface Treatment” – Karin Foarde indicated that Standard

185, which includes two test methods for microbial removal performance (one for air, one for surface), will be ready for public review soon.

- g) TC 5.4 “Industrial Process Air cleaning” - Paolo Tronville reported that the forum this morning on Clean Room standards from 9.11 indicated a problem with metal vapor at high temperature going through HEPA filters then condensing. Is harsh environment filtration relevant to TC 2.3?
 - h) TC 9.6 “Health Care Facilities” – Paolo Tronville reported that there was a report from a forum regarding odors from chemotherapy drugs. This may be relevant, but there was support for dropping this TC from the Agenda.
 - i) TC 9.11 “Clean Spaces” – Matt Middlebrooks reported that TC 9.11 is putting together a design guide plus a short course on clean room design. The design guide is expected to be ready by Louisville. There will be reference to gas phase filters. It was determined that these do not conflict with IEST design material.
 - j) SSPC 62.1 “Ventilation and IAQ High Rise Buildings” – Chris Muller reported that, following public review, the proposed reduction in ozone level at which remediation would be needed did not pass, so non-attainment level remains as before. The change would have increased the number of people requiring extra filtration from 9 million to 160 million. Additionally, the IAQ procedure may change to use of the mass balance calculation. However, the procedure will not be removed from the Standard.
 - k) SSPC 62.2 “Ventilation and IAQ Low Rise Buildings” – Chris Muller reported that there is nothing on air cleaning in the Standard 62.2.
 - l) SPC 161 “Air Quality Within Commercial Aircraft” – Paolo Tronville reported that the Standard is published, so can strike this item from the Agenda.
 - m) SPC 170 “Ventilation of Healthcare Facilities” – Paolo reported that the Standard is ready for publication also.
 - n) GPC 28 “Air Quality in Commercial Aircraft” (see SPC 161) – Paolo reported that this Guideline will be published by the Chicago meeting.
- **Information Exchange**
 - o) IEST WG–CC035 “Design Considerations for Airborne Molecular Contamination Filtration Systems in Cleanrooms” – Matt Middlebrooks will be chair of this group. They have produced a guideline (like Chapter 45), it contains recommendations for inclusion of AMC filters. No test method is included. The completed document is ready to submit to IEST.
 - p) ITRI (Taiwan) – Chris Muller reported that ITRI are still doing full-scale filter testing at low levels of contaminant challenge. Their method is not published, and it is difficult to get information on it.
 - q) ISO/TC 142 “Cleaning Equipment for Air and Other Gases” WG8 “Gas-phase air cleaning devices” – *Matt Middlebrooks*
 - i) NWIP 10121 -1 "Media" and -2 "Devices"
 - Matt and Chris are experts and not committee members. At the Beijing TC 142 meeting, the committee decided to do like Standard 145, media plus full scale devices tests as separate documents. Next meeting may be September or October, but may delay to December in Philadelphia. They may adopt 145.1.
 - ii) US Technical Advisory Group (TAG) – no report given.
 - r) ISO/TC 22/SC7/WG3 “Air and oil filters” – *Paolo Tronville*

- i) ISO/DIS 11155-2: 2007 “Road vehicles - Air filters for passenger compartments - Part 2: Test for gaseous filtration.” Paolo reported that this has been approved as a draft international standard. It uses toluene, n-butane and SO₂ as challenges. The US is participating.
- s) ISO/TC 118 “Compressors and pneumatic tools, machines and equipment” /SC4 “Quality of compressed air” – *Paolo Tronville*
 - i) ISO 12500-2:2007 “Filters for compressed air - Test methods - Part 2: Oil vapors.” Paolo reported that there is a completed procedure; this is also a draft international standard.
 - t) ISO/TC 205 “Building environment design”
 - i) ISO 16814:2008 “Building environment design - Indoor air quality - Methods of expressing the quality of indoor air for human occupancy.” Paolo reported that ASHRAE has the secretariat. They have published a document related to IAQ, but it is not too useful, as it has three different approaches included.
 - u) ISO/TC209 “Clean-rooms and associated controlled environments” – *Chris Muller*
 - i) ISO 14644-8:2006 “Classification of airborne molecular contamination.” - Chris reported that the 2006 revision is a classification scheme for chemical concentrations in spaces. It does recommend monitoring methods for obtaining concentrations.
- Identify any document not mentioned above that is relevant for testing gas-phase media and devices: Everyone please alert Paolo on anything world wide, and he will add to the agenda.. Matt suggested that there is a military document from the US, but it is very specialized, and does not use always best method.
- ASHRAE TCs have been requested to prepare a 5-year plan. The Standards Sub-Committee should feed into this and Planning Sub-Committee should take the lead.
- There is interest in energy consumption of filtration equipment including fan. This is a possible research project. We want ultimately to produce a standard. If TC 2.4 wants to proceed with this, do their filters need a different document from 2.3?

Planning (Dean Tompkins reporting for Nick Agopian)

- Preparation of design and practical filter installation documents for Standard 62.1 IAQ procedure. This effort was initiated at the TC meeting in New York. KJ Choi pointed out that ASHRAE and EPA are in the process of producing an Advanced IAQ Design Guide, and this might overlap with our proposed documents
- The energy conservation seminar was rated #3 at the Program meeting, and was not scheduled in Salt Lake City
- The tutorials have not advanced since the meeting in New York City. Matt said he had several presentations which could be utilized, including some good overviews though permission from other authors will need to be obtained before using them. He can distribute

1. Gemma agreed to prepare abstracts of TC 2.3's three Handbook chapters for posting on the TC website. This will be done before Chicago.
2. The mission statement written by KJ was reviewed and will be presented for discussion at the TC meeting.
3. Doug VanOsdell's survey on barriers to use of GPAFE has also slipped through the cracks with his retirement. It was not reactivated.

Under New Business, Dean said that 5-year plans for TCs were on the Agenda at the TC Chairs meeting. The Planning Subcommittee is the appropriate place to develop such a plan for TC 2.3. Nick will work on this and Gemma agreed to help

ASHRAE also wants the TCs to perform Management By Objectives (MBO), i.e. prepare a short list of tasks and then carry them out within a reasonable timeframe. Dean's Subtask document will form the basis for this.

The Objectives arising out of this meeting are:

1. Finalize and approve the TC Mission Statement (this has been done; see below).
2. Start preparation of design document for IAQ Procedure
3. Start preparation of practical filter installation document for IAQ Procedure
4. Prepare one tutorial
5. Prepare abstracts for the three Handbook chapters and post on the website
6. Prepare the MBO document
7. Prepare a draft 5-year plan

The timeframe for completion of these is the Chicago meeting.

Dean to ask Subcommittee Chairs to obtain a 5-yr plan for TC 2.3

TC 2.3 Mission Statement

A TC 2.3 (KJ Choi) has commented on the Mission Statement for TC 2.03 that it should consider including the following three sentences after the TC 2.03 SCOPE

- TC 2.3 recognizes the continuing need for basic education and training to individuals, academia, and related industries.
- TC 2.3 needs to continue to encourage fundamental and basic research, and to promote continuing education and training.

- TC 2.3 needs to communicate effectively to its constituency with the mission of building its membership.

Motion: Amend TC SCOPE as shown in Discussion below

Motion Made By: Bill Lull

Motion Seconded By: Karin Forde

Results: For-8 / Against-0 / Abstain-0 / Absent-4 (8-0-0-CV)

Discussion / Modifications Desired:

- 1 – Eliminate first statement-redundant with second statement.
- 2 – Modify the 2nd statement to read: “TC 2.3 will encourage fundamental and basic research, and promote basic and continuing education and training.”
- 3 – Modify the 3rd statement to read: “TC 2.3 will promote effective communication to its constituency.”

Website (www.ashrae.org) (Erik, Chair, reporting)

No information for inclusion in the minutes was reported.

New Business:

- SSPC 62.1 - Chris Muller reporting - There is discussion of dropping IAQ procedure, because it may not be an effective approach.
- TC 9.9 - Chris Muller reporting - Writing a book entitled “Particulate and Gaseous Contaminations in Common Environments.” An invitation was offered to review the book.
- TC 9.11 - Matt Middlebrooks reporting – Writing a Guideline for Clean Rooms. An invitation was offered to co-author and review the guideline.
- At the New York City ASHRAE Meeting (Jan. 2008) the TC voted to send letter to the Green building Council. Dean Tompkins drafted the letter and forwarded to Chris Muller for his review.

Motion: To adjourn the meeting.

Motion Made By: Gemma Kerr

Motion Seconded By: Erik Kuiper

Vote Results: For 8/Against-0/Abstain-0/Absent-0 (8-0-0-CV)

Motion Passed

Meeting Adjourned at 15:30.