Proposed Code Modifications

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WITH COMMENTS

TAC: Electrical

Total Mods for **Electrical** in **Approved as Modified: 1**

Total Mods for report: 8

Sub Code: Building

E6498 1

Date Submitted	11/22/2015	**Section**	110.9	**Proponent**	Mo Madani
Chapter	1	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Modified
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

6491, 6492, 6493, 6494, 6496

Summary of Modification

The proposed code change requires as part of the close out inspection ensuring that the existing swimming pool bonding system is complete and terminated properly.

Rationale

The proposed code change provides for provisions necessary to prevent electrocution in swimming pools. Also, see upleaded files.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Further enforcement/inspections would be necessary by the enforcement agencies to implement this prevision.

Impact to building and property owners relative to cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to industry relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to small business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed code change has the potential of reducing electrocution in swimming pools

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed code change does not discriminate against materials or products.

Does not degrade the effectiveness of the code

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Is the proposed code modification part of a prior code version? No

Alternate A3

Move the proposed modification from "110.9" to "110.3 Required Inspections, Electrical" and add the following:

4. Existing Swimming Pools. To be made after all repairs or alterations are complete, all required electrical equipment, GFCI protection, and equipotential bonding are in place.

(E6498-A3)

Alternate Language

2nd Comment Period

6498-A3

Proponent Jennifer Hatfield **Submitted** 6/21/2016 **Attachments** Yes

Rationale

The additional language would clarify that the purpose of this inspection is to determine these things are in place for what was actually altered or repaired and not beyond. Example, installing a new pump or heater would not require a pool built before the equipotential bonding grid was required to be installed, which would require pulling up the deck. Also may help address issues such as the 30-inch clearance in front of the electrical equipment because some older pools may not have the ability to comply with this "newer" requirement.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

May add an additional inspection to be added to permits.

Impact to building and property owners relative to cost of compliance with code

Increase in cost do to additional inspection and cost to comply.

Impact to industry relative to the cost of compliance with code

Increase in cost do to additional inspection and cost to comply.

Impact to Small Business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, increases safety on existing pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6498-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

Neutral

1st Comment Period History

E6498-G2

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. In this proposal there is no specific text to review, so this proposal cannot be implemented or even properly addressed. There are no criteria as to nature of the inspection and/or tests, protocols, pass/fail criteria, enforcement and qualification strategies that are essential for effective implementation. The Committee needs to be aware that implementation of such a program can result in potentially significant costs for existing pools if demolition has to be done to allow the inspector access to pool and deck steel and other covered and inaccessible objects required to be inspected.

2. This proposal, if properly implemented, actually has the real potential of reducing risks. Pool shock incidents are associated with improper, poor defective, damaged or nonexistent bonding.

3. New Jersey has a bonding test program for non-residential pools. Effective implementation of such a program cannot be accomplished by a simple code proposal; a complete and comprehensive program must be developed.

Move the proposed modification from "110.9" to "110.3 Required Inspections, Electrical" and add the following:

4. Existing Swimming Pools. To be made after all repairs or alterations are complete, all required electrical equipment, GFCI protection, and equipotential bonding are in place.

Section 110 – Inspections

Section 110.9 Add to read as follows:

Section 110.9 Existing Swimming Pools – Electrical

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015 MEETING SUMMARY REPORT

WEDNESDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding swimming pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs voted unanimously to recommend the Commission approve the consensus package of recommendations from the TACs. The TACs' specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring

existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.

PROJECT OVERVIEW

The 2015 Florida Legislature identified the need to evaluate the electrical aspects of swimming pool safety focusing on minimizing electrocution risks linked to swimming pools. In response, the Florida Building Commission approved a research project (technical enrichment) for a *Swimming Pool Electrocution Prevention Study*. In order to implement the project the Commission convened a process to develop recommendations for pool safety focused on the prevention of electrocution in swimming pools. The Commission determined that the project would be evaluated and recommendations developed by convening concurrent meetings of the Commission's Swimming Pool Technical Advisory Committee and Electrical Technical Advisory Committee (TAC). The objective of the project is to evaluate key topical issues, and as appropriate develop code amendment proposals designed to minimize electrocution risks linked to swimming pools.

In response to the Commission's direction the Swimming Pool TAC and Electrical TAC agreed that the initial Phase I scope of the project is to determine whether to recommend a proposed code amendment that would require low voltage lighting in residential swimming pools for new construction. Once the Swimming Pool TAC and the Electrical TAC conclude their evaluation of low voltage lighting they will evaluate additional project relevant topics in Phase II of the project: specifically bonding, grounding, retrofitting of existing pools, and education.

AGENDA ITEM OUTCOMES

OPENING AND MEETING ATTENDANCE

The meeting was opened at 10:00 AM once a quorum was established for the Swimming Pool and Electrical TACs respectively, and the following members participated:

Swimming Pool TAC: James Batts (chair), Jordan Clarkson, Bill Dumbaugh, Kevin Flanagan, John O'Conner, Mark Pabst, Gordon Shepardson, Bob Vincent, and John Wahler. (9 of 11)

Absent Members:
Tom Allen, and Corky Williams.

Electrical TAC: Kevin Flanagan (chair), Neal Burdick, Ken Castronovo, Leonard Devine, Jr. (*Alternate: Nelson Montgomery*), Shane Gerwig, David Rice (*Alternate: Steve Mitchell*), Joe Territo, Clarence Tibbs, and Dwight Wilkes. (9 of 11)

Absent Members:
Oriol Haage, and Roy Van Wyk.

DBPR Staff Present

Norman Bellamy, Chris Burgwald, Jim Hammers, April Hammonds, Mo Madani, and Jim Richmond.

Commissioners Present

Fred Schilling, Jim Schock, and Jeff Stone.

Meeting Facilitation and Reporting

The TAC Chairs meeting was facilitated by Jeff Blair from the FCRC Consensus center at Florida State University. Information at: http://consensus.fsu.edu/

CONSENSUS CENTER

Background and Supporting Documents

The agenda and relevant background and supporting documents are linked to each agenda item. The Agenda URLs for the October 14, 2015 TAC meetings are as follows:

http://www.floridabuilding.org/fbc/commission/FBC_1015/Swimming_Pool_TAC/Swimming_Pool_TAC_Agenda_101415.htm

http://www.floridabuilding.org/fbc/commission/FBC_1015/Electrical_TAC/Electrical_Agenda_TAC_101415.htm

AGENDA REVIEW

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the agenda for the October 24, 2015 meeting as posted/presented.

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the agenda for the October 14, 2015 meeting as posted/presented.

Following are the key agenda items approved for consideration:

- To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- To Adopt Consensus Recommendations for Submittal to the Commission
- To Consider Public Comment
- To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

The complete Agenda is included as *"Attachment 1"* of this report.

(See Attachment 1—Agenda)

APPROVAL OF SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

APPROVAL SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS
Requirement for Low Voltage Lighting in Residential Pools for New Construction

At the September 28, 2015 meeting the Swimming Pool TAC and the Electrical TAC voted to approve in concept a code amendment proposal requiring low voltage lighting in residential pools for new construction, with the understanding that relevant safety data and other documentation would be evaluated prior to a final vote on any recommendation submitted to the Florida Building Commission.

At the October 14, 2015 meeting the TACs were asked to offer options regarding possible requirement for low voltage lighting in residential pools for new construction. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. Jeff explained that members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations.

Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked a series of options regarding low voltage lighting in residential pools for new construction.

The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN

Identification of Issues and Options, and Acceptability Ranking of Options in Turn

Jeff explained that the TACs would address each of the four key issues in turn by topic, and that members would be invited to propose and comment on options before the TAC members ranked them. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. The Phase II topics are Bonding, Grounding, Retrofitting of Existing Swimming Pools, and Education of Contractors and Consumers. Jeff explained that TAC members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations. Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked the proposed options for acceptability. All of the options proposed are included in the ranking results. Following are the option(s) ranked that achieved a consensus level of support (≥ 75% in favor):

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers,

brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools
The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.
The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

TAC ACTIONS

Following the opportunity provided for questions and answers, public comment and discussion, the TACs took the following actions:

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendations.

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendation.

NEXT STEPS

Following are the next steps for the Swimming Pool Electrical Safety Project:

- The Commission will evaluate the TACs' (Swimming Pool TAC and Electrical TAC) consensus package of recommendations at the October 15, 2015 meeting.
- The Commission will take the lead with ensuring Code amendments are proposed consistent with any recommendations approved by the Commission regarding swimming pool electrical safety requirements.

ADJOURNMENT

After a determination that a quorum was still present the Swimming Pool TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

After a determination that a quorum was still present the Electrical TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

ATTACHMENT 1
OCTOBER 14, 2015 MEETING AGENDAS

FLORIDA BUILDING COMMISSION
SWIMMING POOL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE ELECTRICAL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES

- ➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- ➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- ➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- ➢ To Adopt Consensus Recommendations for Submittal to the Commission
- ➢ To Consider Public Comment
- ✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

FLORIDA BUILDING COMMISSION
ELECTRICAL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE SWIMMING POOL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES
➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
➢ To Adopt Consensus Recommendations for Submittal to the Commission
➢ To Consider Public Comment
✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

ATTACHMENT 2
OPTIONS ACCEPTABILITY RANKING RESULTS

I. PHASE I RECOMMENDATIONS

LOW VOLTAGE LIGHTING IN RESIDENTIAL SWIMMING POOLS FOR NEW CONSTRUCTION

Low Voltage *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements).**				
Swimming Pool TAC (6-3) 67%	5	1	1	2
Electrical TAC (5-4) 56%	4	1	1	3
Option B: **Maintain NEC requirements for new residential pools**				
Swimming Pool TAC (7-2) 78%	6	1	1	1
Swimming Pool TAC (6-3) 67%	5	1	1	2
Revised Ranking *Electrical TAC* (5-4) 56%	4	1	3	1
Option C: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements) for energy conservation purposes.**				
Swimming Pool TAC (7-2) 78%	5	2	1	1
Swimming Pool TAC (4-5) 44%	2	2	2	3
Revised Ranking *Electrical TAC* (6-3) 67%	2	4	0	3
Revised Ranking *Electrical TAC* (5-4) 56%	3	2	1	3
Option D: **Require LED pool lights with plastic niches or without niches in new construction.**				
Swimming Pool TAC (3-6) 33%	2	1	3	3
Electrical TAC (2-7) 22%	1	1	4	3

Option E: **All residential pools shall meet the requirements of code and shall be require a monitoring device to detect stray currents in the water.**				
Swimming Pool TAC (2-7) 22%	**0**	**2**	**5**	**2**
Electrical TAC (3-6) 33%	**1**	**2**	**6**	**0**

II. PHASE II RECOMMENDATIONS

1. BONDING

No specific options were evaluated for bonding.

2. GROUNDING

Grounding *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).**				
Swimming Pool TAC **(9-0) 100%**	**4**	**5**	**0**	**0**
Electrical TAC **(9-0) 100%**	**5**	**4**	**0**	**0**

3. RETROFITTING OF EXISTING POOLS

Retrofitting *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.**				
Swimming Pool TAC (5-3) 63%	**2**	**3**	**3**	**0**
Electrical TAC **(6-2) 75%**	**4**	**2**	**2**	**0**

4. EDUCATION INITIATIVES FOR CONTRACTORS AND CONSUMERS

Education *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Initiate a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.**				
Swimming Pool TAC **(9-0) 100%**	**9**	**0**	**0**	**0**
Electrical TAC **(9-0) 100%**	**8**	**0**	**0**	**0**

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015

RECOMMENDATIONS TO THE FLORIDA BUILDING COMMISSION

MONDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

TAC ACTIONS

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 2 consensus recommendations from the TAC (grounding and education).

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 3 consensus recommendations from the TAC (grounding, education, and existing swimming pools).

Alternate Language

1st Comment Period History 01/13/2016 - 02/25/2016

6498-A3

Proponent Bryan Holland **Submitted** 2/22/2016 **Attachments** Yes

Rationale

I believe this clarifies the intent of the proposed modification to ensure the electrical safety requirements are installed or reconnected when an existing swimming pool is repaired or altered.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The proposed modification may require an additional inspection to be added to permits for swimming pool repair and alterations.

Impact to building and property owners relative to cost of compliance with code

The proposed modification could increase the cost of compliance with the code while providing an additional level of safety following repairs and alterations to swimming pools.

Impact to industry relative to the cost of compliance with code

The proposed modification could increase the cost of compliance with the code while providing an additional level of safety following repairs and alterations to swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes. The proposed modification increases the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. The proposed modification strengthens and improves the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No.

Does not degrade the effectiveness of the code

No.

TAC: Electrical

Total Mods for **Electrical** in **Approved as Submitted: 5**

Total Mods for report: 8

Sub Code: Building

E6496 2

Date Submitted	11/22/2015	**Section**	454.10.4	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

6491, 6492, 6493, 6494

Summary of Modification

The proposed code change requires GFCI protection be provided for replacement of pool pump motors, if not already in place.

Rationale

The proposed code change provides for provisions necessary to prevent electrocution in swimming pools. Also, see upleaded files.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Further enforcement/inspections would be necessary by the enforcement agencies to implement this prevision.

Impact to building and property owners relative to cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to industry relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to small business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed code change does not discriminate against materials or products.

Does not degrade the effectiveness of the code

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period

E6496-A1

Proponent Jennifer Hatfield **Submitted** 6/21/2016 **Attachments** Yes

Rationale

(1) Language clarified for pumps to maintain consistency with other NEC provisions. (2) Language changed to “underwater luminaires” from “pool lights” to maintain consistency with other NEC provisions. Regarding underwater luminaires (pool lights), the NEC requires GFCI protection only if the luminaires or other equipment operates over the LVCL and, based on the TAC comments, it appears that is also the intent of these changes. The language was revised to clarify this and eliminate possible confusion. GFCIs do not, and cannot, protect low voltage lights and equipment served through transformers and power supplies because they cannot sense ground faults on the low voltage side of the circuit.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

If permit and inspection are required, will be an additional workload. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to building and property owners relative to cost of compliance with code

Increase in cost if permit and inspection required. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to industry relative to the cost of compliance with code

Increase in cost if permit and inspection required. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to Small Business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes as it reiterates current safety requirements.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Reiterates current safety requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6496-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

NEUTRAL

1st Comment Period History

E6496-G2

Proponent Bryan Holland **Submitted** 2/22/2016 **Attachments** No

Comment:

I generally support this proposed modification. Reminding users of the code that GFCI protection is required when swimming pool pump motors or underwater luminaires are repaired or replaced will enhance the electrical safety of existing swimming pools.

1st Comment Period History

E6496-G3

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. No enforcement measures are identified.

2. A retrofit program was implemented in California for non-residential pools only. Enforcement was through the county health departments and was of debatable success due to non-uniform electrical training of the health inspectors. An electrical permit and inspection by knowledgeable, properly trained personnel are necessary for viable enforcement.

3. There is no assurance that a homeowner or other untrained personnel will not try to perform the retrofit to avoid costs, resulting in, at best, no improvement in safety and, at worst, introduction of significant safety hazards. In some cases, the retrofit will require modification of the electrical system.

4. If such a program is to be implemented a uniform, effective enforcement procedure must be established. Otherwise, this will quite possibly increase unlicensed activity due to the additional costs that homeowners will otherwise incur.

Section 454.1.10.4 Swimming Pool - Electrical

454.1.10.4.1 GFCI Protection. Ground-fault Circuit-interrupter shall be provided as follows:

1. Where alteration work includes replacement of pool pump motors*connected to 120-volt and 240-volt single phase branch circuits*, a ground-fault circuit-interrupter shall be provided, if one is not already in place.
2. Where alteration work includes replacement of 120-volt ~~pool lights~~ *underwater luminaires*, a ground-fault circuit-interrupter shall be provided, if one is not already in place*, for all underwater luminaires operating at voltages greater than the Low Voltage Contact Limit.*

Section 454.1.10.4 Swimming Pool - Electrical

454.1.10.4.1 GFCI Protection. Ground-fault Circuit-interrupter shall be provided as follows:

1. Where alteration work includes replacement of pool pump motors, a ground-fault circuit-interrupter shall be provided, if one is not already in place.
2. Where alteration work includes replacement of 120-volt pool lights, a ground-fault circuit-interrupter shall be provided, if one is not already in place.

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015 MEETING SUMMARY REPORT

WEDNESDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding swimming pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs voted unanimously to recommend the Commission approve the consensus package of recommendations from the TACs. The TACs' specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring

existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.

PROJECT OVERVIEW

The 2015 Florida Legislature identified the need to evaluate the electrical aspects of swimming pool safety focusing on minimizing electrocution risks linked to swimming pools. In response, the Florida Building Commission approved a research project (technical enrichment) for a *Swimming Pool Electrocution Prevention Study*. In order to implement the project the Commission convened a process to develop recommendations for pool safety focused on the prevention of electrocution in swimming pools. The Commission determined that the project would be evaluated and recommendations developed by convening concurrent meetings of the Commission's Swimming Pool Technical Advisory Committee and Electrical Technical Advisory Committee (TAC). The objective of the project is to evaluate key topical issues, and as appropriate develop code amendment proposals designed to minimize electrocution risks linked to swimming pools.

In response to the Commission's direction the Swimming Pool TAC and Electrical TAC agreed that the initial Phase I scope of the project is to determine whether to recommend a proposed code amendment that would require low voltage lighting in residential swimming pools for new construction. Once the Swimming Pool TAC and the Electrical TAC conclude their evaluation of low voltage lighting they will evaluate additional project relevant topics in Phase II of the project: specifically bonding, grounding, retrofitting of existing pools, and education.

AGENDA ITEM OUTCOMES

OPENING AND MEETING ATTENDANCE

The meeting was opened at 10:00 AM once a quorum was established for the Swimming Pool and Electrical TACs respectively, and the following members participated:

Swimming Pool TAC: James Batts (chair), Jordan Clarkson, Bill Dumbaugh, Kevin Flanagan, John O'Conner, Mark Pabst, Gordon Shepardson, Bob Vincent, and John Wahler. (9 of 11)

Absent Members:
Tom Allen, and Corky Williams.

Electrical TAC: Kevin Flanagan (chair), Neal Burdick, Ken Castronovo, Leonard Devine, Jr. (*Alternate: Nelson Montgomery*), Shane Gerwig, David Rice (*Alternate: Steve Mitchell*), Joe Territo, Clarence Tibbs, and Dwight Wilkes. (9 of 11)

Absent Members:
Oriol Haage, and Roy Van Wyk.

DBPR Staff Present

Norman Bellamy, Chris Burgwald, Jim Hammers, April Hammonds, Mo Madani, and Jim Richmond.

Commissioners Present

Fred Schilling, Jim Schock, and Jeff Stone.

Meeting Facilitation and Reporting

The TAC Chairs meeting was facilitated by Jeff Blair from the FCRC Consensus center at Florida State University. Information at: http://consensus.fsu.edu/

FCRC CONSENSUS CENTER

Background and Supporting Documents

The agenda and relevant background and supporting documents are linked to each agenda item. The Agenda URLs for the October 14, 2015 TAC meetings are as follows:

http://www.floridabuilding.org/fbc/commission/FBC_1015/Swimming_Pool_TAC/Swimming_Pool_TAC_Agenda_101415.htm

http://www.floridabuilding.org/fbc/commission/FBC_1015/Electrical_TAC/Electrical_Agenda_TAC_101415.htm

AGENDA REVIEW

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the agenda for the October 24, 2015 meeting as posted/presented.

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the agenda for the October 14, 2015 meeting as posted/presented.

Following are the key agenda items approved for consideration:

- To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- To Adopt Consensus Recommendations for Submittal to the Commission
- To Consider Public Comment
- To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

The complete Agenda is included as *"Attachment 1"* of this report.

(See Attachment 1—Agenda)

APPROVAL OF SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

APPROVAL SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS
Requirement for Low Voltage Lighting in Residential Pools for New Construction

At the September 28, 2015 meeting the Swimming Pool TAC and the Electrical TAC voted to approve in concept a code amendment proposal requiring low voltage lighting in residential pools for new construction, with the understanding that relevant safety data and other documentation would be evaluated prior to a final vote on any recommendation submitted to the Florida Building Commission.

At the October 14, 2015 meeting the TACs were asked to offer options regarding possible requirement for low voltage lighting in residential pools for new construction. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. Jeff explained that members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations.

Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked a series of options regarding low voltage lighting in residential pools for new construction.

The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN

Identification of Issues and Options, and Acceptability Ranking of Options in Turn

Jeff explained that the TACs would address each of the four key issues in turn by topic, and that members would be invited to propose and comment on options before the TAC members ranked them. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. The Phase II topics are Bonding, Grounding, Retrofitting of Existing Swimming Pools, and Education of Contractors and Consumers. Jeff explained that TAC members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations. Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked the proposed options for acceptability. All of the options proposed are included in the ranking results. Following are the option(s) ranked that achieved a consensus level of support (≥ 75% in favor):

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers,

brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools
The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.
The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

TAC ACTIONS

Following the opportunity provided for questions and answers, public comment and discussion, the TACs took the following actions:

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendations.

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendation.

NEXT STEPS

Following are the next steps for the Swimming Pool Electrical Safety Project:

- The Commission will evaluate the TACs' (Swimming Pool TAC and Electrical TAC) consensus package of recommendations at the October 15, 2015 meeting.
- The Commission will take the lead with ensuring Code amendments are proposed consistent with any recommendations approved by the Commission regarding swimming pool electrical safety requirements.

ADJOURNMENT

After a determination that a quorum was still present the Swimming Pool TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

After a determination that a quorum was still present the Electrical TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

ATTACHMENT 1
OCTOBER 14, 2015 MEETING AGENDAS

FLORIDA BUILDING COMMISSION
SWIMMING POOL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE ELECTRICAL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES

- ➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- ➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- ➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- ➢ To Adopt Consensus Recommendations for Submittal to the Commission
- ➢ To Consider Public Comment
- ✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015

All Agenda Times—Including Adjournment—Are Approximate and Subject to Change

10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

FLORIDA BUILDING COMMISSION
ELECTRICAL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE SWIMMING POOL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES
➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
➢ To Adopt Consensus Recommendations for Submittal to the Commission
➢ To Consider Public Comment
✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

ATTACHMENT 2
OPTIONS ACCEPTABILITY RANKING RESULTS

I. PHASE I RECOMMENDATIONS

LOW VOLTAGE LIGHTING IN RESIDENTIAL SWIMMING POOLS FOR NEW CONSTRUCTION

Low Voltage *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements).**				
Swimming Pool TAC (6-3) 67%	5	1	1	2
Electrical TAC (5-4) 56%	4	1	1	3
Option B: **Maintain NEC requirements for new residential pools**				
Swimming Pool TAC (7-2) 78%	6	1	1	1
Swimming Pool TAC (6-3) 67%	5	1	1	2
Revised Ranking *Electrical TAC* (5-4) 56%	4	1	3	1
Option C: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements) for energy conservation purposes.**				
Swimming Pool TAC (7-2) 78%	5	2	1	1
Swimming Pool TAC (4-5) 44%	2	2	2	3
Revised Ranking *Electrical TAC* (6-3) 67%	2	4	0	3
Revised Ranking *Electrical TAC* (5-4) 56%	3	2	1	3
Option D: **Require LED pool lights with plastic niches or without niches in new construction.**				
Swimming Pool TAC (3-6) 33%	2	1	3	3
Electrical TAC (2-7) 22%	1	1	4	3

Option E: **All residential pools shall meet the requirements of code and shall be require a monitoring device to detect stray currents in the water.**				
Swimming Pool TAC (2-7) 22%	**0**	**2**	**5**	**2**
Electrical TAC (3-6) 33%	**1**	**2**	**6**	**0**

II. PHASE II RECOMMENDATIONS

1. BONDING

No specific options were evaluated for bonding.

2. GROUNDING

Grounding *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).**				
Swimming Pool TAC **(9-0) 100%**	**4**	**5**	**0**	**0**
Electrical TAC **(9-0) 100%**	**5**	**4**	**0**	**0**

3. RETROFITTING OF EXISTING POOLS

Retrofitting *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.**				
Swimming Pool TAC (5-3) 63%	**2**	**3**	**3**	**0**
Electrical TAC **(6-2) 75%**	**4**	**2**	**2**	**0**

4. EDUCATION INITIATIVES FOR CONTRACTORS AND CONSUMERS

Education *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Initiate a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.**				
Swimming Pool TAC **(9-0) 100%**	**9**	**0**	**0**	**0**
Electrical TAC **(9-0) 100%**	**8**	**0**	**0**	**0**

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015

RECOMMENDATIONS TO THE FLORIDA BUILDING COMMISSION

MONDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

TAC ACTIONS

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 2 consensus recommendations from the TAC (grounding and education).

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 3 consensus recommendations from the TAC (grounding, education, and existing swimming pools).

Date Submitted	12/7/2015	**Section**	454	**Proponent**	Bryan Holland
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Yes. See Modification #6529 and #6530.

Summary of Modification

This modification adds electrical safety requirements to new swimming pools in response to the Commission's "Swimming Pool Electrical Safety Project" approved recommendations.

Rationale

This modification satisfies the electrical safety recommendation for new public & private (commercial) swimming pools as outlined in the Commission's "Swimming Pool Electrical Safety Project". The new language adds requirements for GFCI protection for outlets supplying electrical equipment at new public & private (commercial) swimming pools.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will have no impact on the local entity relative to enforcement of the code. GFCI protection of certain outlets is already required at new commercial swimming pools.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will increase the cost of compliance with the code to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will have no impact on the cost of compliance with the code to industry.

Impact to small business relative to the cost of compliance with code

This proposed modification may increase the cost of compliance with the code to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification will increase the health, safety, and welfare of the general public by expanding the swimming pool outlets required to be GFCI protected at new commercial pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification strengthens the code and improves the electrical safety of new commercial pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exihibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?

NO

Alternate Language

2nd Comment Period

6531-A1

Proponent Jennifer Hatfield **Submitted** 6/21/2016 **Attachments** Yes

Rationale

Both the 2014 & 2017 NEC eliminate the 15 and 20 Ampere restriction regarding pool pumps and now require GFCI protection for personnel on all 120 V and 240 V single phase pool pump motors, regardless of branch circuit current rating, to reduce hazards. Additionally, other proposals addressing pumps require GFCI installation regardless of branch circuit current rating (consistent with requirements in the NEC for new installations). Making the change here brings all sections into consistency. Regarding luminaires and other equipment except pool pump motors, the NEC requires GFCI protection only if the luminaires or other equipment operates over the LVCL and, based on the TAC comments at the 5/24/16 meeting, it appears that is also the intent of these changes. The language was revised to clarify this and eliminate possible confusion. GFCIs do not, and cannot, protect low voltage lights and equipment served through transformers and power supplies because they cannot sense ground faults on the low voltage side of the circuit.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to Small Business relative to the cost of compliance with code

This proposed modification may increase the cost of compliance with the code to small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, provides consistency with the NEC, providing the latest in safety.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, by ensuring language follows newer editions of the NEC.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate, etc.

Does not degrade the effectiveness of the code

Does not.

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6531-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

I SUPPORT

1st Comment Period History

E6531-G2

Proponent Vincent Della Croce **Submitted** 2/7/2016 **Attachments** No

Comment:

Support

1st Comment Period History

E6531-G3

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. This proposal is generally consistent with the NEC. In terms of reference regarding prohibition of lights operating at voltages exceeding the LVCL, the NEC Code Panel has continually rejected such proposals. For example, in the 2017 NEC code cycle, NEC Code Panel CMP-17 (jurisdiction over 680) issued a panel statement rejecting Public Input No. 761-NFPA 70-2014 [Section No. 680.23(A)(4)] which proposed to allow only underwater luminaires over 18 Volts ac: “The code already has provisions and protective requirements that provide safe methods when properly installed and maintained, that allow luminaires above the 18 volt requirement desired here.”

2. The voltage needs to be changed to “exceeding the low voltage contact limit” to maintain consistency with the NEC.

454.1.4.1 Electrical equipment and wiring. Electrical equipment wiring and installation, including the bonding and grounding of pool components shall ~~conform~~ comply with Chapter 27 of the Florida Building Code, Building. Outlets supplying pool pump motors connected to single-phase 120-volt through 240-volt branch circuits, whether by receptacle or by direct connection, and outlets supplying other electrical equipment and underwater luminaires operating at voltages greater than the Low Voltage Contact Limit, connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

454.2.16 Electrical. Electrical equipment wiring and installation, including the bonding and grounding of pool components ~~equipment~~ shall comply with Chapter 27 of the Florida Building Code, Building. Outlets supplying pool pump motors connected to single-phase 120-volt through 240-volt branch circuits, whether by receptacle or by direct connection, and outlets supplying other electrical equipment and underwater luminaires operating at voltages greater than the Low Voltage Contact Limit, connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

454.1.4.1 Electrical equipment and wiring. Electrical equipment wiring and installation, including the bonding and grounding of pool components shall conform with Chapter 27 of the Florida Building Code, Building. Outlets supplying pool equipment and underwater luminaires connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

454.2.16 Electrical. Electrical wiring and equipment shall comply with Chapter 27 of the Florida Building Code, Building. Outlets supplying pool equipment and underwater luminaires connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

E6493 4

Date Submitted	11/22/2015	**Section**	413	**Proponent**	Mo Madani
Chapter	4	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No**

Alternate Language **Yes**

Related Modifications

6491
6492

Summary of Modification

The proposed code change requires GFCI protection be provided for replacement of pool pump motors, if not already in place.

Rationale

The proposed code change provides for provisions necessary to prevent electrocution in swimming pools by requiring GFCI protection.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Further enforcement/inspections would be necessary by the enforcement agencies to implement this prevision.

Impact to building and property owners relative to cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to industry relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to small business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed code change does not discriminate against materials or products.

Does not degrade the effectiveness of the code

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Is the proposed code modification part of a prior code version? No

2nd Comment Period

6493-A1

Proponent Jennifer Hatfield **Submitted** 6/21/2016 **Attachments** Yes

Rationale

(1) Language clarified for pumps to maintain consistency with other provisions. (2) Language changed to “underwater luminaires” from “pool lights” to maintain consistency with other provisions. Regarding underwater luminaires (pool lights), the NEC requires GFCI protection only if the luminaires or other equipment operates over the LVCL and, based on the TAC comments at the 5/24/16 meeting, it appears that is also the intent of these changes. The language was revised to clarify this and eliminate possible confusion. GFCIs do not, and cannot, protect low voltage lights and equipment served through transformers and power supplies because they cannot sense ground faults on the low voltage side of the circuit.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

If permit and inspection are required, will be an additional workload. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to building and property owners relative to cost of compliance with code

Increase in cost if permit and inspection required. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to industry relative to the cost of compliance with code

Increase in cost if permit and inspection required. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to Small Business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes as it reiterates current safety requirements.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

It reiterates current safety requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6493-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

NEUTRAL

1st Comment Period History

E6493-G2

Proponent Bryan Holland **Submitted** 2/22/2016 **Attachments** No

Comment:

While I generally support the concept of this proposed modification, I believe this action is best addressed by modification #6529.

1st Comment Period History

E6493-G3

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. No enforcement measures are identified.

2. A retrofit program was implemented in California for non-residential pools only. Enforcement was through the county health departments and was of debatable success due to non-uniform electrical training of the health inspectors. An electrical permit and inspection by knowledgeable, properly trained personnel are necessary for viable enforcement.

3. There is no assurance that a homeowner or other untrained personnel will not try to perform the retrofit to avoid costs, resulting in, at best, no improvement in safety and, at worst, introduction of significant safety hazards. In some cases, the retrofit will require modification of the electrical system.

4. If such a program is to be implemented a uniform, effective enforcement procedure must be established. Otherwise, this will quite possibly increase unlicensed activity due to the additional costs that homeowners will otherwise incur.

Section 413 Add to read as follows:

Section 413 Swimming Pool - Electrical

413.1 GFCI Protection. Ground-fault Circuit-interrupter shall be provided as follows:

1. Where alteration work includes replacement of pool pump motors *connected to 120-volt and 240-volt single phase branch circuits*, a ground-fault circuit-interrupter shall be provided, if one is not already in place.

2. Where alteration work includes replacement of 120-volt ~~*pool lights*~~ *underwater luminaires*, a ground-fault circuit-interrupter shall be provided, if one is not already in place, *for all underwater luminaires operating at voltages greater than the Low Voltage Contact Limit*.

Section 413 Add to read as follows:

Section 413 Swimming Pool - Electrical

413.1GFCI Protection. Ground-fault Circuit-interrupter shall be provided as follows:

1. Where alteration work includes replacement of pool pump motors, a ground-fault circuit-interrupter shall be provided, if one is not already in place.

2. Where alteration work includes replacement of 120-volt pool lights, a ground-fault circuit-interrupter shall be provided, if one is not already in place.

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015 MEETING SUMMARY REPORT

WEDNESDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding swimming pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs voted unanimously to recommend the Commission approve the consensus package of recommendations from the TACs. The TACs' specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring

existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.

PROJECT OVERVIEW

The 2015 Florida Legislature identified the need to evaluate the electrical aspects of swimming pool safety focusing on minimizing electrocution risks linked to swimming pools. In response, the Florida Building Commission approved a research project (technical enrichment) for a *Swimming Pool Electrocution Prevention Study*. In order to implement the project the Commission convened a process to develop recommendations for pool safety focused on the prevention of electrocution in swimming pools. The Commission determined that the project would be evaluated and recommendations developed by convening concurrent meetings of the Commission's Swimming Pool Technical Advisory Committee and Electrical Technical Advisory Committee (TAC). The objective of the project is to evaluate key topical issues, and as appropriate develop code amendment proposals designed to minimize electrocution risks linked to swimming pools.

In response to the Commission's direction the Swimming Pool TAC and Electrical TAC agreed that the initial Phase I scope of the project is to determine whether to recommend a proposed code amendment that would require low voltage lighting in residential swimming pools for new construction. Once the Swimming Pool TAC and the Electrical TAC conclude their evaluation of low voltage lighting they will evaluate additional project relevant topics in Phase II of the project: specifically bonding, grounding, retrofitting of existing pools, and education.

AGENDA ITEM OUTCOMES

OPENING AND MEETING ATTENDANCE

The meeting was opened at 10:00 AM once a quorum was established for the Swimming Pool and Electrical TACs respectively, and the following members participated:

Swimming Pool TAC: James Batts (chair), Jordan Clarkson, Bill Dumbaugh, Kevin Flanagan, John O'Conner, Mark Pabst, Gordon Shepardson, Bob Vincent, and John Wahler. (9 of 11)

Absent Members:
Tom Allen, and Corky Williams.

Electrical TAC: Kevin Flanagan (chair), Neal Burdick, Ken Castronovo, Leonard Devine, Jr. (*Alternate: Nelson Montgomery*), Shane Gerwig, David Rice (*Alternate: Steve Mitchell*), Joe Territo, Clarence Tibbs, and Dwight Wilkes. (9 of 11)

Absent Members:
Oriol Haage, and Roy Van Wyk.

DBPR Staff Present

Norman Bellamy, Chris Burgwald, Jim Hammers, April Hammonds, Mo Madani, and Jim Richmond.

Commissioners Present

Fred Schilling, Jim Schock, and Jeff Stone.

Meeting Facilitation and Reporting

The TAC Chairs meeting was facilitated by Jeff Blair from the FCRC Consensus center at Florida State University. Information at: http://consensus.fsu.edu/

CONSENSUS CENTER

Background and Supporting Documents

The agenda and relevant background and supporting documents are linked to each agenda item. The Agenda URLs for the October 14, 2015 TAC meetings are as follows:

http://www.floridabuilding.org/fbc/commission/FBC_1015/Swimming_Pool_TAC/Swimming_Pool_TAC_Agenda_101415.htm

http://www.floridabuilding.org/fbc/commission/FBC_1015/Electrical_TAC/Electrical_Agenda_TAC_101415.htm

AGENDA REVIEW

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the agenda for the October 24, 2015 meeting as posted/presented.

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the agenda for the October 14, 2015 meeting as posted/presented.

Following are the key agenda items approved for consideration:

- To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- To Adopt Consensus Recommendations for Submittal to the Commission
- To Consider Public Comment
- To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

The complete Agenda is included as *"Attachment 1"* of this report.

(See Attachment 1—Agenda)

APPROVAL OF SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

APPROVAL SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS
Requirement for Low Voltage Lighting in Residential Pools for New Construction

At the September 28, 2015 meeting the Swimming Pool TAC and the Electrical TAC voted to approve in concept a code amendment proposal requiring low voltage lighting in residential pools for new construction, with the understanding that relevant safety data and other documentation would be evaluated prior to a final vote on any recommendation submitted to the Florida Building Commission.

At the October 14, 2015 meeting the TACs were asked to offer options regarding possible requirement for low voltage lighting in residential pools for new construction. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. Jeff explained that members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations.

Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked a series of options regarding low voltage lighting in residential pools for new construction.

The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN

Identification of Issues and Options, and Acceptability Ranking of Options in Turn

Jeff explained that the TACs would address each of the four key issues in turn by topic, and that members would be invited to propose and comment on options before the TAC members ranked them. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. The Phase II topics are Bonding, Grounding, Retrofitting of Existing Swimming Pools, and Education of Contractors and Consumers. Jeff explained that TAC members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations. Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked the proposed options for acceptability. All of the options proposed are included in the ranking results. Following are the option(s) ranked that achieved a consensus level of support (≥ 75% in favor):

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers,

brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.

The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

TAC ACTIONS

Following the opportunity provided for questions and answers, public comment and discussion, the TACs took the following actions:

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendations.

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendation.

NEXT STEPS

Following are the next steps for the Swimming Pool Electrical Safety Project:

- The Commission will evaluate the TACs' (Swimming Pool TAC and Electrical TAC) consensus package of recommendations at the October 15, 2015 meeting.
- The Commission will take the lead with ensuring Code amendments are proposed consistent with any recommendations approved by the Commission regarding swimming pool electrical safety requirements.

ADJOURNMENT

After a determination that a quorum was still present the Swimming Pool TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

After a determination that a quorum was still present the Electrical TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

ATTACHMENT 1
OCTOBER 14, 2015 MEETING AGENDAS

FLORIDA BUILDING COMMISSION
SWIMMING POOL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE ELECTRICAL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES

- ➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- ➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- ➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- ➢ To Adopt Consensus Recommendations for Submittal to the Commission
- ➢ To Consider Public Comment
- ✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

FLORIDA BUILDING COMMISSION
ELECTRICAL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE SWIMMING POOL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES
➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
➢ To Adopt Consensus Recommendations for Submittal to the Commission
➢ To Consider Public Comment
✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

ATTACHMENT 2
OPTIONS ACCEPTABILITY RANKING RESULTS

I. PHASE I RECOMMENDATIONS

LOW VOLTAGE LIGHTING IN RESIDENTIAL SWIMMING POOLS FOR NEW CONSTRUCTION

Low Voltage *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements).**				
Swimming Pool TAC (6-3) 67%	5	1	1	2
Electrical TAC (5-4) 56%	4	1	1	3
Option B: **Maintain NEC requirements for new residential pools**				
Swimming Pool TAC (7-2) 78%	6	1	1	1
Swimming Pool TAC (6-3) 67%	5	1	1	2
Revised Ranking *Electrical TAC* (5-4) 56%	4	1	3	1
Option C: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements) for energy conservation purposes.**				
Swimming Pool TAC (7-2) 78%	5	2	1	1
Swimming Pool TAC (4-5) 44%	2	2	2	3
Revised Ranking *Electrical TAC* (6-3) 67%	2	4	0	3
Revised Ranking *Electrical TAC* (5-4) 56%	3	2	1	3
Option D: **Require LED pool lights with plastic niches or without niches in new construction.**				
Swimming Pool TAC (3-6) 33%	2	1	3	3
Electrical TAC (2-7) 22%	1	1	4	3

Option E: **All residential pools shall meet the requirements of code and shall be require a monitoring device to detect stray currents in the water.**				
Swimming Pool TAC (2-7) 22%	**0**	**2**	**5**	**2**
Electrical TAC (3-6) 33%	**1**	**2**	**6**	**0**

II. PHASE II RECOMMENDATIONS

1. BONDING

No specific options were evaluated for bonding.

2. GROUNDING

Grounding *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).**				
Swimming Pool TAC **(9-0) 100%**	**4**	**5**	**0**	**0**
Electrical TAC **(9-0) 100%**	**5**	**4**	**0**	**0**

3. RETROFITTING OF EXISTING POOLS

Retrofitting *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.**				
Swimming Pool TAC (5-3) 63%	**2**	**3**	**3**	**0**
Electrical TAC **(6-2) 75%**	**4**	**2**	**2**	**0**

4. EDUCATION INITIATIVES FOR CONTRACTORS AND CONSUMERS

Education *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Initiate a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.**				
Swimming Pool TAC **(9-0) 100%**	**9**	**0**	**0**	**0**
Electrical TAC **(9-0) 100%**	**8**	**0**	**0**	**0**

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015

RECOMMENDATIONS TO THE FLORIDA BUILDING COMMISSION

MONDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

TAC ACTIONS

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 2 consensus recommendations from the TAC (grounding and education).

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 3 consensus recommendations from the TAC (grounding, education, and existing swimming pools).

Date Submitted	11/22/2015	**Section**	709	**Proponent**	Mo Madani
Chapter	7	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments **No** **Alternate Language** **Yes**

Related Modifications

6491, 6492, 6493

Summary of Modification

The proposed code change requires GFCI protection be provided for replacement of pool pump motors, if not already in place.

Rationale

The proposed code change provides for provisions necessary to prevent electrocution in swimming pools. Also, see upleaded files.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Further enforcement/inspections would be necessary by the enforcement agencies to implement this prevision.

Impact to building and property owners relative to cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to industry relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Impact to small business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed code change does not discriminate against materials or products.

Does not degrade the effectiveness of the code

The proposed code change improves the code by providing provisions for reducing electrocution in swimming pools.

Is the proposed code modification part of a prior code version? No

2nd Comment Period

6494-A1

Proponent Jennifer Hatfield **Submitted** 6/21/2016 **Attachments** Yes

Rationale

(1) Language clarified for pumps to maintain consistency with other provisions. (2) Language changed to “underwater luminaires” from “pool lights” to maintain consistency with other provisions. Regarding underwater luminaires (pool lights), the NEC requires GFCI protection only if the luminaires or other equipment operates over the LVCL and, based on the TAC comments, it appears that is also the intent of these changes. The language was revised to clarify this and eliminate possible confusion. GFCIs do not, and cannot, protect low voltage lights and equipment served through transformers and power supplies because they cannot sense ground faults on the low voltage side of the circuit.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

If permit and inspection are required, will be an additional workload. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to building and property owners relative to cost of compliance with code

Increase in cost if permit and inspection required. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to industry relative to the cost of compliance with code

Increase in cost if permit and inspection required. But these GFCI requirements are already found in NEC and via UL 1081 for pumps and therefore should be followed regardless.

Impact to Small Business relative to the cost of compliance with code

The proposed code change has the potential of adding cost to construction and at the same time reducing electrocution in swimming pools.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes as it reiterates current safety requirements.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

It reiterates current safety requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6494-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

NEUTRAL

1st Comment Period History

E6494-G2

Proponent Bryan Holland **Submitted** 2/22/2016 **Attachments** No

Comment:

While I generally support the concept of this proposed modification, I believe this action is best addressed by modification #6529.

1st Comment Period History

E6494-G3

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. No enforcement measures are identified.

2. A retrofit program was implemented in California for non-residential pools only. Enforcement was through the county health departments and was of debatable success due to non-uniform electrical training of the health inspectors. An electrical permit and inspection by knowledgeable, properly trained personnel are necessary for viable enforcement.

3. There is no assurance that a homeowner or other untrained personnel will not try to perform the retrofit to avoid costs, resulting in, at best, no improvement in safety and, at worst, introduction of significant safety hazards. In some cases, the retrofit will require modification of the electrical system.

4. If such a program is to be implemented a uniform, effective enforcement procedure must be established. Otherwise, this will quite possibly increase unlicensed activity due to the additional costs that homeowners will otherwise incur.

Section 709 Add to read as follows:

Section 709 Swimming Pool - Electrical

709.1 GFCI Protection. Ground-fault Circuit-interrupter shall be provided as follows:

1. Where alteration work includes replacement of pool pump motors *connected to 120-volt and 240-volt single phase branch circuits,* a ground-fault circuit-interrupter shall be provided, if one is not already in place.
2. Where alteration work includes replacement of 120-volt ~~pool lights~~ *underwater luminaires*, a ground-fault circuit-interrupter shall be provided, if one is not already in place, *for all underwater luminaires operating at voltages greater than the Low Voltage Contact Limit.*

Section 709 Add to read as follows:

Section 709 Swimming Pool - Electrical

709.1 GFCI Protection. Ground-fault Circuit-interrupter shall be provided as follows:

1. Where alteration work includes replacement of pool pump motors, a ground-fault circuit-interrupter shall be provided, if one is not already in place.
2. Where alteration work includes replacement of 120-volt pool lights, a ground-fault circuit-interrupter shall be provided, if one is not already in place.

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015 MEETING SUMMARY REPORT

WEDNESDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding swimming pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs voted unanimously to recommend the Commission approve the consensus package of recommendations from the TACs. The TACs' specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring

existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.

PROJECT OVERVIEW

The 2015 Florida Legislature identified the need to evaluate the electrical aspects of swimming pool safety focusing on minimizing electrocution risks linked to swimming pools. In response, the Florida Building Commission approved a research project (technical enrichment) for a *Swimming Pool Electrocution Prevention Study*. In order to implement the project the Commission convened a process to develop recommendations for pool safety focused on the prevention of electrocution in swimming pools. The Commission determined that the project would be evaluated and recommendations developed by convening concurrent meetings of the Commission's Swimming Pool Technical Advisory Committee and Electrical Technical Advisory Committee (TAC). The objective of the project is to evaluate key topical issues, and as appropriate develop code amendment proposals designed to minimize electrocution risks linked to swimming pools.

In response to the Commission's direction the Swimming Pool TAC and Electrical TAC agreed that the initial Phase I scope of the project is to determine whether to recommend a proposed code amendment that would require low voltage lighting in residential swimming pools for new construction. Once the Swimming Pool TAC and the Electrical TAC conclude their evaluation of low voltage lighting they will evaluate additional project relevant topics in Phase II of the project: specifically bonding, grounding, retrofitting of existing pools, and education.

AGENDA ITEM OUTCOMES

OPENING AND MEETING ATTENDANCE

The meeting was opened at 10:00 AM once a quorum was established for the Swimming Pool and Electrical TACs respectively, and the following members participated:

Swimming Pool TAC: James Batts (chair), Jordan Clarkson, Bill Dumbaugh, Kevin Flanagan, John O'Conner, Mark Pabst, Gordon Shepardson, Bob Vincent, and John Wahler. (9 of 11)

Absent Members:
Tom Allen, and Corky Williams.

Electrical TAC: Kevin Flanagan (chair), Neal Burdick, Ken Castronovo, Leonard Devine, Jr. (*Alternate: Nelson Montgomery*), Shane Gerwig, David Rice (*Alternate: Steve Mitchell*), Joe Territo, Clarence Tibbs, and Dwight Wilkes. (9 of 11)

Absent Members:
Oriol Haage, and Roy Van Wyk.

DBPR Staff Present

Norman Bellamy, Chris Burgwald, Jim Hammers, April Hammonds, Mo Madani, and Jim Richmond.

Commissioners Present

Fred Schilling, Jim Schock, and Jeff Stone.

Meeting Facilitation and Reporting

The TAC Chairs meeting was facilitated by Jeff Blair from the FCRC Consensus center at Florida State University. Information at: http://consensus.fsu.edu/

CONSENSUS CENTER

Background and Supporting Documents

The agenda and relevant background and supporting documents are linked to each agenda item. The Agenda URLs for the October 14, 2015 TAC meetings are as follows:

http://www.floridabuilding.org/fbc/commission/FBC_1015/Swimming_Pool_TAC/Swimming_Pool_TAC_Agenda_101415.htm

http://www.floridabuilding.org/fbc/commission/FBC_1015/Electrical_TAC/Electrical_Agenda_TAC_101415.htm

AGENDA REVIEW

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the agenda for the October 24, 2015 meeting as posted/presented.

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the agenda for the October 14, 2015 meeting as posted/presented.

Following are the key agenda items approved for consideration:

- To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- To Adopt Consensus Recommendations for Submittal to the Commission
- To Consider Public Comment
- To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

The complete Agenda is included as *"Attachment 1"* of this report.

(See Attachment 1—Agenda)

APPROVAL OF SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

APPROVAL SEPTEMBER 28, 2015 MEETING SUMMARY REPORT

The Electrical TAC voted unanimously, 9 - 0 in favor, to approve the Meeting Summary Report for the September 28, 2015 meeting as posted/presented.

IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS
Requirement for Low Voltage Lighting in Residential Pools for New Construction

At the September 28, 2015 meeting the Swimming Pool TAC and the Electrical TAC voted to approve in concept a code amendment proposal requiring low voltage lighting in residential pools for new construction, with the understanding that relevant safety data and other documentation would be evaluated prior to a final vote on any recommendation submitted to the Florida Building Commission.

At the October 14, 2015 meeting the TACs were asked to offer options regarding possible requirement for low voltage lighting in residential pools for new construction. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. Jeff explained that members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations.

Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked a series of options regarding low voltage lighting in residential pools for new construction.

The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN

Identification of Issues and Options, and Acceptability Ranking of Options in Turn

Jeff explained that the TACs would address each of the four key issues in turn by topic, and that members would be invited to propose and comment on options before the TAC members ranked them. In addition, the public was invited to comment on the options and/or suggest additional options prior to the TACs ranking them for acceptability. The Phase II topics are Bonding, Grounding, Retrofitting of Existing Swimming Pools, and Education of Contractors and Consumers. Jeff explained that TAC members would be asked to rank each proposed option in turn utilizing a four-point acceptability ranking scale where 4 = acceptable, 3 = minor reservations, 2 = major reservations, and 1 = unacceptable. Following discussion and refinement of options, members may be asked to do additional rankings of proposed options if requested by a *TAC* member. Members should be prepared to offer specific refinements to address their reservations. Once ranked, options with a 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus recommendations. The *TACs'* consensus recommendations will be submitted to the Commission for consideration.

Following the opportunity provided for questions and answers, public comment, and discussion, the TACs ranked the proposed options for acceptability. All of the options proposed are included in the ranking results. Following are the option(s) ranked that achieved a consensus level of support (≥ 75% in favor):

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers,

brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools
The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

Note: The Swimming Pool TAC vote 5-3 (63%) in favor of the option.
The complete Options Acceptability Ranking Results are included as *"Attachment 2"* of this report.

(See Attachment 2—Ranking Results)

TAC ACTIONS

Following the opportunity provided for questions and answers, public comment and discussion, the TACs took the following actions:

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendations.

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the TACs' package of consensus recommendation.

NEXT STEPS

Following are the next steps for the Swimming Pool Electrical Safety Project:

- The Commission will evaluate the TACs' (Swimming Pool TAC and Electrical TAC) consensus package of recommendations at the October 15, 2015 meeting.
- The Commission will take the lead with ensuring Code amendments are proposed consistent with any recommendations approved by the Commission regarding swimming pool electrical safety requirements.

ADJOURNMENT

After a determination that a quorum was still present the Swimming Pool TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

After a determination that a quorum was still present the Electrical TAC voted unanimously, 8 – 0 in favor, to adjourn the meeting at 3:30 PM on Wednesday, October 14, 2015.

ATTACHMENT 1
OCTOBER 14, 2015 MEETING AGENDAS

FLORIDA BUILDING COMMISSION
SWIMMING POOL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE ELECTRICAL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES

- ➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
- ➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
- ➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
- ➢ To Adopt Consensus Recommendations for Submittal to the Commission
- ➢ To Consider Public Comment
- ✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

FLORIDA BUILDING COMMISSION
ELECTRICAL TECHNICAL ADVISORY COMMITTEE (TAC)
CONCURRENTLY WITH THE SWIMMING POOL TAC
OCTOBER 14, 2015—MEETING II

PLAZA HISTORIC BEACH RESORT AND SPA
600 NORTH ATLANTIC BOULEVARD—DAYTONA BEACH, FLORIDA 33706

MEETING OBJECTIVES
➢ To Approve Regular Procedural Topics (Agenda and Meeting Summary Report)
➢ To Discuss and Approve Phase I Recommendations (Low Voltage Lighting in Residential Pools for New Construction)
➢ To Discuss Phase II Topics (Bonding, Grounding, Retrofitting of Existing Pools, and Education)
➢ To Adopt Consensus Recommendations for Submittal to the Commission
➢ To Consider Public Comment
✓ To Identify Needed Next Steps: Information, Assignments, and Agenda Items for Next Meeting

MEETING AGENDA—WEDNESDAY, OCTOBER 14, 2015		
All Agenda Times—Including Adjournment—Are Approximate and Subject to Change		
10:00 AM	**A.)**	**WELCOME AND INTRODUCTIONS**
	B.)	**AGENDA REVIEW AND APPROVAL (October 14, 2015)**
	C.)	**REVIEW AND APPROVAL OF FACILITATOR'S SUMMARY REPORT (September 28, 2015)**
	D.)	**IDENTIFICATION, DISCUSSION, AND ACCEPTABILITY RANKING OF PHASE I OPTIONS** Requirement for Low Voltage Lighting in Residential Pools for New Construction • Identification, Discussion and Acceptability Ranking of Options In Turn
	E.)	**ADOPTION OF PHASE I CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
12:00 PM	*LUNCH*	
1:00 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN** Identification of Issues and Options, and Acceptability Ranking of Options in Turn • Bonding • Grounding • Retrofitting of Existing Swimming Pools • Education of Contractors and Consumers
3:00 PM	*BREAK*	
3:15 PM	**F.**	**DISCUSSION AND EVALUATION OF PHASE II TOPICS IN TURN CONTINUED**
	G.)	**ADOPTION OF ANY PHASE II CONSENSUS RECOMMENDATIONS FOR SUBMITTAL TO THE COMMISSION**
	H.)	**GENERAL PUBLIC COMMENT**
	I.)	**NEXT STEPS: AGENDA ITEMS, NEEDED INFORMATION, ASSIGNMENTS, DATE AND LOCATION IF NEEDED**
~5:00 PM	*J.)*	*ADJOURN*

ATTACHMENT 2
OPTIONS ACCEPTABILITY RANKING RESULTS

I. PHASE I RECOMMENDATIONS

LOW VOLTAGE LIGHTING IN RESIDENTIAL SWIMMING POOLS FOR NEW CONSTRUCTION

Low Voltage *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements).**				
Swimming Pool TAC (6-3) 67%	5	1	1	2
Electrical TAC (5-4) 56%	4	1	1	3
Option B: **Maintain NEC requirements for new residential pools**				
Swimming Pool TAC (7-2) 78%	6	1	1	1
Swimming Pool TAC (6-3) 67%	5	1	1	2
Revised Ranking *Electrical TAC* (5-4) 56%	4	1	3	1
Option C: **Require low voltage lighting in residential pools for new construction (Miami-Dade requirements) for energy conservation purposes.**				
Swimming Pool TAC (7-2) 78%	5	2	1	1
Swimming Pool TAC (4-5) 44%	2	2	2	3
Revised Ranking *Electrical TAC* (6-3) 67%	2	4	0	3
Revised Ranking *Electrical TAC* (5-4) 56%	3	2	1	3
Option D: **Require LED pool lights with plastic niches or without niches in new construction.**				
Swimming Pool TAC (3-6) 33%	2	1	3	3
Electrical TAC (2-7) 22%	1	1	4	3

Option E: **All residential pools shall meet the requirements of code and shall be require a monitoring device to detect stray currents in the water.**				
Swimming Pool TAC (2-7) 22%	**0**	**2**	**5**	**2**
Electrical TAC (3-6) 33%	**1**	**2**	**6**	**0**

II. PHASE II RECOMMENDATIONS

1. BONDING

No specific options were evaluated for bonding.

2. GROUNDING

Grounding *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).**				
Swimming Pool TAC **(9-0) 100%**	**4**	**5**	**0**	**0**
Electrical TAC **(9-0) 100%**	**5**	**4**	**0**	**0**

3. RETROFITTING OF EXISTING POOLS

Retrofitting *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Require existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.**				
Swimming Pool TAC (5-3) 63%	**2**	**3**	**3**	**0**
Electrical TAC **(6-2) 75%**	**4**	**2**	**2**	**0**

4. EDUCATION INITIATIVES FOR CONTRACTORS AND CONSUMERS

Education *October 14, 2015*	*4=acceptable*	*3= minor reservations*	*2=major reservations*	*1= not acceptable*
Option A: **Initiate a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.**				
Swimming Pool TAC **(9-0) 100%**	**9**	**0**	**0**	**0**
Electrical TAC **(9-0) 100%**	**8**	**0**	**0**	**0**

FLORIDA BUILDING COMMISSION

SWIMMING POOL ELECTRICAL SAFETY PROJECT

CONCURRENT MEETING OF THE SWIMMING POOL TAC AND ELECTRICAL TAC

OCTOBER 14, 2015

RECOMMENDATIONS TO THE FLORIDA BUILDING COMMISSION

MONDAY, OCTOBER 14, 2015

MEETING SUMMARY AND OVERVIEW

On Wednesday, October 14, 2015 the Swimming Pool TAC and Electrical TAC met concurrently in Daytona Beach to develop recommendations regarding pool safety issues focused on the prevention of electrocution in swimming pools. At the initial scoping meeting held on September 28, 2015 the TACs agreed that the project scope was to focus on evaluation of whether to recommend a code amendment requiring low voltage lighting in residential pools for new construction (Phase I). In addition, it was agreed that additional electrical pool safety relevant topical issues including bonding, grounding, retrofitting of existing pools, and education would be considered as a second phase of the project (Phase II). At the October 14, 2015 meeting the TACs proposed and acceptability ranked options for low voltage lighting in residential pools for new construction. In addition, the TACs evaluated proposed options to address the other key topical issues, and ultimately developed a consensus package of recommendations for consideration by the Florida Building Commission. The TACs specific recommendations are as follow:

Grounding

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission charge staff to work with the TAC chairs and in consultation with stakeholders to formulate a code amendment requiring that all electrical circuits feeding equipment that could potentially energize a pool have GFCI protection for new residential and commercial swimming pools (the goal is to fill in any gaps in the current Code).

Education

The Electrical TAC and the Swimming Pool TAC voted unanimously to recommend that the Commission support a comprehensive educational effort to ensure there is a consistent message to enhance pool electrical safety issues for existing and new pools by working with existing resources including educational providers and associations. The effort should include defining the problems, identifying solutions and communicating a consistent message to stakeholders (contractors, consumers, home inspectors, pool maintenance providers, etc.) through training courses, flyers, brochures, websites, etc. Key issues for education messaging include lighting, bonding, grounding, GFCI, maintenance of existing pools, and monitoring devices to detect stray currents in the pool water, etc.

Existing Swimming Pools

The Electrical TAC voted 6-2 in favor (75%), to recommend the Commission charge staff to work with the TAC chair and in consultation with stakeholders to formulate a code amendment requiring existing commercial and residential swimming pools to have GFCI protection for replacement pool pump motors, if not already in place; to provide GFCI protection for the replacement of 120 volt pool lights when they are replaced; and, as part of the close out inspection ensuring that the existing bonding system is complete and terminated properly.

TAC ACTIONS

MOTION—The Swimming Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 2 consensus recommendations from the TAC (grounding and education).

MOTION—The Electrical Pool TAC voted unanimously, 8 - 0 in favor, to recommend the Commission approve the 3 consensus recommendations from the TAC (grounding, education, and existing swimming pools).

E6530 6

Date Submitted	12/7/2015	**Section**	4501.16	**Proponent**	Bryan Holland
Chapter	45	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No **Alternate Language** Yes

Related Modifications

Yes. See Modification #6529 and #6531.

Summary of Modification

This modification adds electrical safety requirements to new swimming pools in response to the Commission's "Swimming Pool Electrical Safety Project" approved recommendations.

Rationale

This modification satisfies the electrical safety recommendation for new private (residential) swimming pools as outlined in the Commission's "Swimming Pool Electrical Safety Project". The new language adds requirements for GFCI protection for outlets supplying electrical equipment at new private (residential) swimming pools.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will have a minimal impact on the local entity relative to code enforcement. GFCI protection is already required for certain swimming pool equipment. This modification expands GFCI protection to all pool equipment branch-circuit outlets.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will increase the cost of compliance with the code to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will have a minimal cost of compliance with the code to industry.

Impact to small business relative to the cost of compliance with code

This proposed modification could have an increase of cost of compliance to small business owners.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification will increase the health, safety, and welfare of the general public by expanding GFCI protection to other circuits supplying swimming pool equipment.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification strengthens the code and improves the electrical safety at new swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version?

YES

The provisions contained in the proposed amendment are addressed in the applicable international code?

NO

The amendment demonstrates by evidence or data that the geographical jurisdiction of Florida exhibits a need to strengthen the foundation code beyond the needs or regional variation addressed by the foundation code and why the proposed amendment applies to the state?

YES

The proposed amendment was submitted or attempted to be included in the foundation codes to avoid resubmission to the Florida Building Code amendment process?
NO

Alternate Language

2nd Comment Period

6530-A1

Proponent Jennifer Hatfield **Submitted** 6/21/2016 **Attachments** Yes

Rationale

The 2014 & 2017 NEC eliminates the 15 and 20 Ampere restriction regarding pool pumps and now requires GFCI protection for personnel on all 120 V and 240 V single phase pool pump motors, regardless of branch circuit current rating, to reduce hazards. Additionally, other proposals addressing pumps require GFCI installation regardless of branch circuit current rating (consistent with requirements in the NEC for new installations). Making the change here brings all sections into consistency with the latest editions. Regarding luminaires and other equipment except pool pump motors, the NEC requires GFCI protection only if the luminaires or other equipment operates over the LVCL and, based on the TAC comments, it appears that is also the intent of these changes. The language was revised to clarify this and eliminate possible confusion. GFCIs do not, and cannot, protect low voltage lights and equipment served through transformers and power supplies because they cannot sense ground faults on the low voltage side of the circuit.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None because FL will be going to either the 2014 or 2017 NEC regardless and this proposal makes the language consistent with these editions.

Impact to building and property owners relative to cost of compliance with code

None because FL will be going to either the 2014 or 2017 NEC regardless and this proposal makes the language consistent with these editions.

Impact to industry relative to the cost of compliance with code

None because FL will be going to either the 2014 or 2017 NEC regardless and this proposal makes the language consistent with these editions.

Impact to Small Business relative to the cost of compliance with code

This proposed modification could have an increase of cost of compliance to small business owners.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes ensures consistency with the latest safety requirements found in the NEC.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, by providing the latest safety requirements found within the NEC.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No it does not.

Does not degrade the effectiveness of the code

No it does not.

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6530-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:
I SUPPORT

1st Comment Period History

E6530-G2

Proponent Vincent Della Croce **Submitted** 2/7/2016 **Attachments** No

Comment:
Support

1st Comment Period History

E6530-G3

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. This proposal is generally consistent with the NEC. In terms of reference regarding prohibition of lights operating at voltages exceeding the LVCL, the NEC Code Panel has continually rejected such proposals. For example, in the 2017 NEC code cycle, NEC Code Panel CMP-17 (jurisdiction over 680) issued a panel statement rejecting Public Input No. 761-NFPA 70-2014 [Section No. 680.23(A)(4)] which proposed to allow only underwater luminaires over 18 Volts ac: “The code already has provisions and protective requirements that provide safe methods when properly installed and maintained, that allow luminaires above the 18 volt requirement desired here.”

2. The voltage needs to be changed to “exceeding the low voltage contact limit” to maintain consistency with the NEC.

R4501.16 Electrical. Electrical equipment wiring and installation, including the bonding and grounding of pool components ~~equipment~~ shall comply with Chapter 27 of the *Florida Building Code*, Building. Outlets supplying pool pump motors connected to single-phase 120-volt through 240-volt branch circuits, whether by receptacle or by direct connection, and outlets supplying other electrical equipment and underwater luminaires operating at voltages greater than the Low Voltage Contact Limit, connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

R4501.16 Electrical. Electrical wiring and equipment shall comply with the *Florida Building Code*. Outlets supplying pool equipment and underwater luminaires connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

TAC: Electrical

Total Mods for **Electrical** in **No Affirmative Recommendation with a Second: 2**

Total Mods for report: 8

Sub Code: Building

E646o 7

Date Submitted	11/6/2015	**Section**	2703	**Proponent**	Bryan Holland
Chapter	35	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation with a Second
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Yes. See Modification #6458

Summary of Modification

This modification expands the requirements for the installation of lightning protection systems to certain commercial occupancies and provides exceptions to the new rule.

Rationale

Please see the attached file. The FBC currently requires lightning protection for three occupancies in Sections 449, 450, and 453. This modification would expand lightning protection requirements to other commercial occupancies where the calculated Risk Assessment determines a lightning protection system is needed. One- and two-family dwellings would be exempt. The attached substantiation clearly shows the need for lightning protection, especially in the state of Florida, to ensure the health, safety, and public welfare of the citizens of Florida.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This modification will have a slightly elevated impact to the local AHJ relative to enforcement of the code. This modification will increase the number of lightning protection system installations, thus resulting in increased permits, plan review, and inspection requirements.

Impact to building and property owners relative to cost of compliance with code

This modification will increase the cost of compliance. The average cost of a complete LPS is approximately 1% to 5% of total construction cost of the building. However, the cost of the LPS can be off-set as much as 80% by insurance deductions and rebates.

Impact to industry relative to the cost of compliance with code

This modification will increase the cost of compliance to the industry but will also increase the purchase of products and services to complete the LPS installation. This includes engineered documents, project materials, certifications, and permitting.

Impact to small business relative to the cost of compliance with code

The negative impact to small business would be cost of compliance to install an LPS. Small LPS and electrical contractors would benefit from this modification. Small business could also benefit from reduced insurance premiums, cost of repairs, and cost of downtime due to lightning.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification significantly enhances the health, safety, and welfare of the public. Florida is the lightning capital of the US and the citizens of this state would most benefit from expanding the current requirements for lightning protection.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification strengthens the code. Compliance with this modification will save persons and property from loses associated with lightning damage. This modification ensures the state of Florida remains a national leader when it comes to lightning safety.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code but rather enhances the effectiveness of the code by expanding current LPS requirements.

Is the proposed code modification part of a prior code version? No

2nd Comment Period

E6460-G4

Proponent Bryan Holland **Submitted** 6/10/2016 **Attachments** Yes

Comment:

The purpose of this general comment is to clarify the requirements of the proposed modification and to provide the information requested by the members of the TAC.

The members of the TAC requested additional information on performing a risk assessment, an installation cost study, and property insurance discounts or credits.

Please see the attached Comment Files.

1st Comment Period History

E6460-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

I SUPPORT

1st Comment Period History

E6460-G2

Proponent Don Whitehead **Submitted** 2/3/2016 **Attachments** No

Comment:

This change would not affect public schools, since it is the same as 453.17.7. It will bring other building types up to public educational facility standards.

1st Comment Period History

E6460-G3

Proponent Vincent Della Croce **Submitted** 2/7/2016 **Attachments** No

Comment:

Support

Section 2703 Lightning Protection

2703.1 Lightning Protection. A lightning protection system shall be provided for all new buildings and additions in accordance with NFPA 780, *Standard for the Installation of Lightning Protection Systems.*

2703.2 Where additions are constructed to existing building, the existing building's lightning protection system, if connected to the new lightning protection system, shall be inspected and brought into compliance with current standards.

2703.3 Surge protection devices shall be installed for all normal and emergency electrical systems in accordance with NFPA 70, *National Electrical Code.*

Exceptions:

1. One- and two-family dwellings

2. Lightning protection shall not be required for any building or addition where shown unnecessary by evaluation using the *Risk Assessment Guide* in NFPA 780, *Standard for the Installation of Lightning Protection Systems* or an alternative method approved by the authority having jurisdiction.

2017 Triennial Second Comment Period – MOD #6460

The purpose of this general comment is to clarify the requirements of the proposed modification and to provide the information requested by the members of the TAC.

Section 2703.1 will require a lightning protection system to be installed on all new buildings and additions in accordance with the NFPA 780. It should be noted the Special Occupancy TAC has recommended the approval of MOD #6460 which will update the NFPA 780-2004 to the current NFPA-2014 edition. The FBC-B currently requires a lightning protection system on hospitals, nursing homes, and educational facilities. Section 2703.2 will require an existing lightning protection system to inspected and brought into compliance with the current standards when connected to a new lightning protection system being installed on an addition to an existing building. Section 2703.3 will require the installation of surge protection devices on normal and emergency electrical systems in accordance with Article 285 of the NEC. Surge protection is a fundamental component of a complete lightning protection system. A similar requirement can be found in Section 449.3.15 and 450.3.27.3 of the FBC-B.

There are two proposed exceptions. Exception #1 will exempt one- and two-family dwellings. Exception #2 to will exempt those buildings where an approved lightning risk assessment indicates a lightning protection system is not recommended or needed.

The members of the TAC requested additional information on performing a risk assessment, an installation cost study, and property insurance discounts or credits.

Risk Assessment: A risk assessment compares the likelihood of a building being struck by lightning verses the potential losses in life and property as a result of the lightning strike. A building's location, size, and height will determine its likelihood of being struck by lightning. A building's construction type, occupancy level, value of contents, and importance to the community or environment will determine the potential losses in life and property as a result of a lightning strike. Annex L of the NFPA 780 provides a simplified and detailed lightning risk assessment outline and worksheet. There are also several online risk assessment programs available to the public at no charge. These include:

- East Coast Lightning Equipment at http://www.ecle.biz/riskcalculator/
- Mr. Lightning at http://mrlightning.com/risk.php
- Maxwell Lightning Protection at http://maxwell-lp.com/riskcalc.php
- Alltec Global at http://alltecglobal.com/resources/lightning-risk-assessment

Installation Cost Study: Attached is a Lightning Protection Installation Cost Study, prepared by Michael Chusid, RA FCSI for East Coast Lightning Equipment, Inc. 2015-July. During the second quarter of 2015, lightning protection installers were asked to submit "bids" for installation of lightning protection on three hypothetical projects. Prices were to include installer's overhead and profit but not a general contractor's mark-up. The projects include a single-family residence, a low-rise building typical of educational, commercial, and industrial occupancies, and a five story building typical of many office buildings, healthcare, and similar occupancies. Responses were received from 21 installers that are

certified for lightning protection work by the Lightning Protection Institute. The distribution of respondent trade territories is shown on map according to US Census Regions. The distribution of respondents is similar to the frequency of lightning strikes; higher in Eastern and Southern states, least in the West.

Property Insurance Discounts / Credits: Attached are documents from three property insurance providers in the state of Florida clearly showing a discount or credit provided to policy holders with property protected by a lightning protection system. The three property insurers are:

- American International Group (AIG)
- Florida Family Insurance (FFI)
- ACE Limited / Chubb Insurance Group

The Insurance Institute for Business and Home Safety (IBHS), Insurance Information Institute (III), and the Federal Alliance For Safe Homes (FLASH) all recommend and support the installation of lightning protection systems.

There are three notable Lightning Protection Industry Associations that can provide guidance, resources, training, and education related to the installation of lightning protection systems. They are the Lightning Protection Institute (LPI), the United Lightning Protection Association (ULPA), and the Lightning Safety Alliance (LSA).

Superior Protection Credits:

- Security protection for the entire external perimeter of the house consisting of any one or more of the following:
  - Closed-circuit TV cameras monitored 24 hours a day
  - Detection system, external to the residence, which is motion activated and monitored 24 hours a day
  - 24 hour, on-site security guard
- Full time caretaker who lives at the residence year round
- 24 hour signal continuity protection for central station or direct fire and burglar alarm systems which activates the alarm when interrupted
- Sprinkler system water flow alarm which activates a central station or direct alarm
- Temperature monitoring system, to protect against freezing, which activates a central station alarm
- Permanently installed, electrical back-up generator
- Perimeter gate where vehicular and pedestrian access is limited to entrances controlled by locked or electronic gates
- Explosive gas leakage detector which activates a central station or direct fire alarm
- Automatic seismic shut-off valve to gas lines
- **Lightning protection system including lightning rods and lightning arrestors protecting the electrical wiring and all electronic devices of the entire house**
- Water leak detection system monitoring all areas containing plumbing devices and outlets
- Wildfire suppression system which is either manually activated, activated through the telephone, or automatically activated by a fire sensor

AIG Offers Credit on Your Homeowner's Insurance

Effective March 4, 2004, AIG Private Client Group will offer a 2% credit off your homeowner insurance policy base rate contingent upon the following:

> Your home has a lightning protection system, with a U.L. Master Label, installed by a certified Lightning Protection Institute installer. The system must include lightning rods and lightning surge arresters to protect the electrical wiring and all electronic devices for the entire residence.

To receive the credit, print out this page, have it completed by a certified Master Installer or Master Installer Designer, in good standing with the Lightning Protection Institute (call the LPI office at 1-800-488-6864 for certified installers), and take it to your AIG agent for processing.

_____
Customer Name on Policy

_____
Address

_____
City, State, Zip Code

_____
AIG Policy Number

I, _____, certify that I am a Master Installer or Master Installer Designer, in good standing with the Lightning Protection Institute, and I installed a lightning protection system on the above residence, which included lightning rods and lightning surge arresters to protect the electrical wiring and electronic devices for the entire residence in accordance with the latest LPI-175, NFPA-780 and UL 96A Standards of Code. Attached is a copy of the U.L. Master Label received on this residence.

_____
Signature Date

Florida Family Insurance offers a number of policy discounts designed to help you lower your insurance cost:

Burglar and Fire Alarm

Provides a discount when the property is protected by burglar and fire alarms. A higher discount applies when the alarm is monitored by an alarm company.

Building Code Effectiveness Grades

Discounts apply if your property is located in a community that participates in the BCEG program, and was constructed after the community joined the program.

Lightning Surge Protection

A discount is available if you have a qualified, certified lightning protection system installed in your property.

Wind Mitigation

Provides credits for properties that have been built or updated to meet stronger building codes, such as the installation of approved storm shutters. A wind mitigation inspection may be required.

Hip Roof

Provides a discount for structures that have a roof shape where the ends and sides of the roof slope down to the wall.

Fire Sprinkler Systems

Provides additional credits if fire sprinklers are installed throughout the property.

Lightning Protection Installation Cost Study

Prepared by Michael Chusid, RA FCSI for East Coast Lightning Equipment, Inc.
2015-July

Background

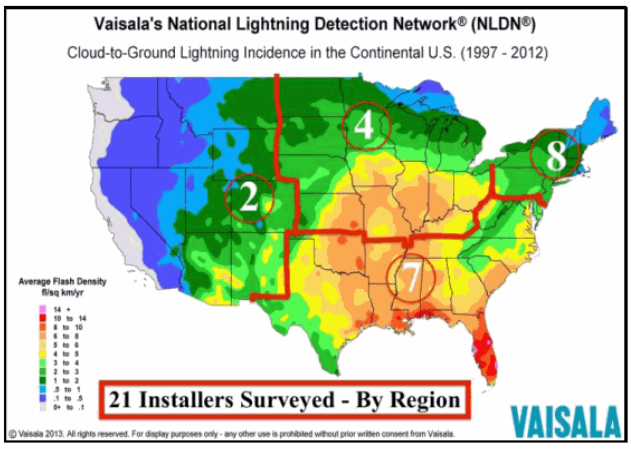
Lightning accounts for about $1 billion a year in homeowner's insurance claims for property damage. Lightning fires in non-residential properties cause an average of over $100 million in direct property damage annually, not including damage due to electrical or equipment malfunctions, non-fire-related structural damage, or consequential damages. Additional risks include injury and death due to lightning strikes.[1]

Fortunately, reliable lightning protection of buildings and structures is available. Data on the cost of installing lightning protection, however, has not been readily available. The purposes of this study, therefore, are 1) to understand the cost of installing lightning protection, and 2) to provide building owners and their architects, engineers, and risk management consultants with cost estimating guidelines for use during the planning and design phases of construction projects.

To prepare this study, East Coast Lightning Equipment, Inc. (www.ecle.biz) collected construction cost data from lightning protection installers throughout the US. The cost data, summarized below, confirms that lightning protection is economical and can be justified on a cost-to-benefit basis in at-risk buildings.

Methodology

During the second quarter of 2015, lightning protection installers were asked to submit "bids" for installation of lightning protection on three hypothetical projects. Prices were to include installer's overhead and profit but not a general contractor's mark-up. The projects include a single-family residence, a low-rise building typical of educational, commercial, and industrial occupancies, and a five story building typical of many office buildings, healthcare, and similar occupancies. See Appendix for survey instrument.



Responses were received from 21 installers that are certified for lightning protection work by the Lightning Protection Institute. The distribution of respondent trade territories is shown on map according to US Census Regions. The distribution of respondents is similar to the frequency of lightning strikes; higher in Eastern and Southern states, least in the West.

The results were tabulated by Michael Chusid, RA, FCSI, an independent construction consultant, www.chusid.com, and are summarized below.

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[1] www.iii.org/fact-statistic/lightning, accessed 2015-06-03.

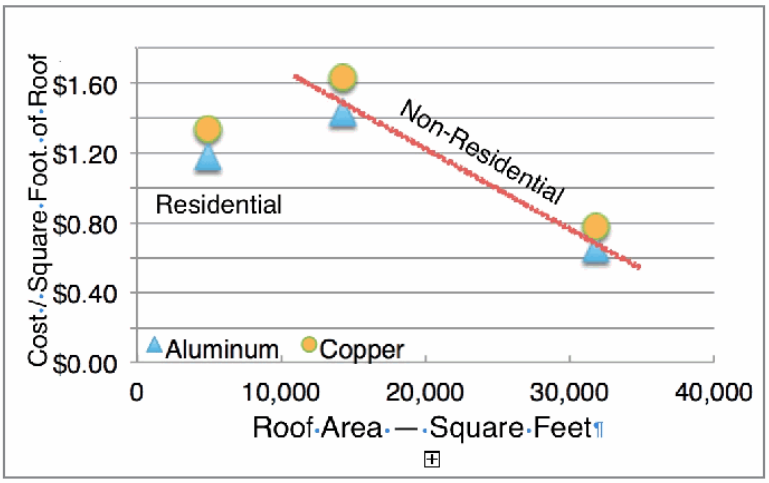
Lightning Protection Installation Cost Study

Key Findings

Lightning Protection Installation Cost Estimates						
	Residential Building		Low-Rise Building		5-story Building	
	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper
Northeast						
$/Sq.Ft. of Roof	$1.56	$1.58	$0.74	$0.89	$1.75	$1.89
$/Sq.Ft. of Floor	$0.94	$0.95	$0.54	$0.65	$0.35	$0.38
South						
$/Sq.Ft. of Roof	$0.98	$1.10	$0.42	$0.50	$1.16	$1.33
$/Sq.Ft. of Floor	$0.59	$0.66	$0.31	$0.37	$0.23	$0.27
Midwest						
$/Sq.Ft. of Roof	$0.88	$1.06	$0.78	$1.02	$1.45	$1.82
$/Sq.Ft. of Floor	$0.53	$0.64	$0.58	$0.75	$0.29	$0.37
West						
$/Sq.Ft. of Roof	$1.60	$1.77	$0.88	$1.04	$1.46	$1.61
$/Sq.Ft. of Floor	$0.96	$1.06	$0.65	$0.76	$0.29	$0.32
National						
$/Sq.Ft. of Roof	$1.18	$1.34	$0.65	$0.78	$1.44	$1.64
$/Sq.Ft. of Floor	$0.71	$0.80	$0.48	$0.58	$0.29	$0.33

Cost of protecting sitework, such as trees, is not included.

Estimated Cost of Lightning Protection per Square Foot of Roof Area, National Averages



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Lightning Protection Installation Cost Study

Analysis

General: Variations between regions are due to regional trade practices, wages and benefits, soil conditions governing the type of ground terminals used, and other factors. Variations within regions can also be significant, especially between urban and rural locations.

Copper lightning protection equipment is generally more expensive than aluminum due to commodity prices. There are also regional biases that favor one material over the other.

Nonresidential Buildings: In nonresidential buildings, roof area is the most significant factor in determining the work required to install lightning protection. Hence, multistory buildings will generally cost less per square foot of interior floor area.

Costs will generally be more in buildings with extensive roof top equipment and demanding architectural considerations; less in building with a modicum of rooftop equipment and a simple configuration.

Buildings over 75 feet in height (Class II) will incur additional expenses. These estimates do not apply to buildings that house explosives and other special occupancies.

Residential Buildings: In most homes with pitched roofs, air terminals need only be installed at the roof ridge, not the perimeter of the roof. This explains why lightning protection costs for the home in our study is below the trend line shown for non-residential construction.

Note, however features such as dormers, chimneys, balconies, skylights, rooftop equipment, and large flat areas can add to the cost.

How to Use

These cost estimates can be used in the early stages of planning or designing a project. Once the overall configuration of a building is determined, consultation with a qualified lightning protection designer or installer will yield a more accurate estimate and identify ways to improve protection while reducing costs.

These cost estimates are subject to change with time and can be adjusted using the *Engineering News Record* Construction Cost Indexes or other databases of historical construction costs. Lightning protection costs are also subject to fluctuations in raw material costs.

For Additional Information

Lightning Safety Alliance, www.LightningSafetyAlliance.org

Lightning Protection Institute, www.lightning.org

East Coast Lightning Equipment, Inc., www.ecle.biz, info@ecle.biz, +1 860-379-2046

Lightning Protection Installation Cost Study

APPENDIX

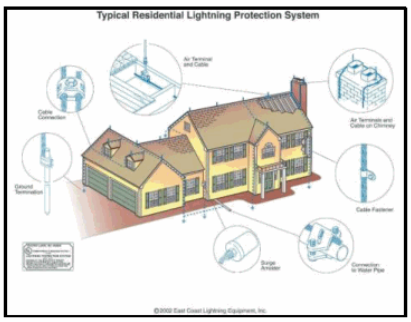
The following survey instrument was sent via e-mail to qualified lightning protection professionals.

ECLE requests your assistance in creating cost estimating guidelines that can be used by architects and engineers. Many designers ask us about the cost of installing lightning protection so they can include lightning protection in their project estimates. Your information will help them make better cost-to-benefit calculations that will, we believe, make it more likely for them to specify lightning protection. Please take a few minutes to look at the three buildings below then send us your price estimate to perform each of the installations.

Your data will be **confidential**. Michael Chusid, RA FCSI, a construction industry consultant, will compile regional and national averages and use the information to write articles for leading construction industry publications. We will send you a copy of his report as our thank you.

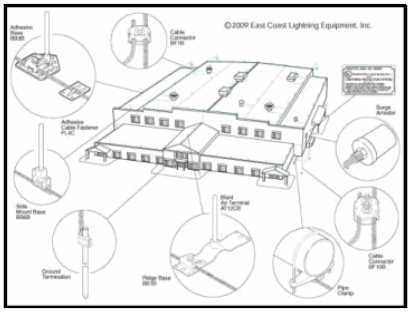
Residential Project

Assume the following:
Normal grounding conditions
Concealed installation - new construction
LPI or UL Certification Required
Please price in copper and aluminum
Price as you would to a GC or EC



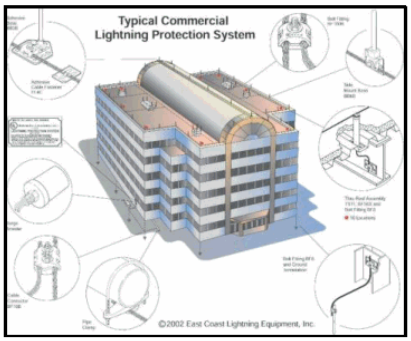
High School Project

Assume the following:
Normal grounding conditions
Exposed installation - existing construction
EPDM Roof
LPI or UL Certification Required
Please price in copper and aluminum
Price as you would to a GC or EC



Government Office Building Project

Assume the following:
Normal grounding conditions
Structural Steel to Ground installation
New construction
Built-Up Roof
LPI or UL Certification Required
Please price in copper and aluminum
Price as you would to a GC or EC
Click to download office dimensions



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2017 FBC – Modification #6460

Substantiation:

1. According to the National Weather Service:
    a. The are an average of 20 Million lightning strikes in the US each year
    b. The average lightning strike delivers between 100 Million and 1 Billion volts of electricity
    c. The average lightning strike delivers between 10,000 and 200,000 amperes of electricity.

2. According to the National Weather Service:
    a. Between 1959 and 1993, 53.1% of all deaths in the state of Florida related to weather were due to lightning. This is more than drowning, tornadoes, hurricanes, wind and, cold combined.
    b. During these same years, a total of 449 persons died in the state of Florida from lightning, another 1788 were injured. In comparison, the average number of deaths during this period nationwide is only 48.
    c. The number of lightning deaths and injuries in the state of Florida outpaces every other state in the nation by 3:1.

3. According to the National Fire Protection Association:
    a. There is an average of 70 to 100 thunderstorm days per year in the state of Florida. (National Weather Services)
    b. There is an average of 8 to 14+ lightning strikes in the state of Florida for every square kilometer per year. (U.S. National Lightning Detection Network)

4. According to the National Lightning Safety Institute:
    a. In 2008 alone, there were 246,200 insurance claims on residential structures in the US. Insured loses on residential properties exceed $1 billion dollars annually. (Insurance Information Institute, NY, press release, 6/22/09)
    b. Lightning is responsible for more than $5 billion dollars in total insurance losses annually. (Hartford Insurance Co. – TMCNet Newsletter, Sept 14, 2006)
    c. During 2002-2004, fire departments responded annually to about 31,000 fires caused by lightning with $213,000,000 in direct property damage. (NFPA Report, January 2008)
    d. Looking specifically at storage and processing facilities, lightning accounts for 61% of the accidents initiated by natural events. 16 out of 20 accidents involving petroleum products storage tanks were due to lightning strikes. (Journal of Hazardous Materials 40 (1995) 43-54
    e. 30% of U.S. businesses suffer damage from lightning storms. (Carnegie Mellon Report, 02/06)

f. 30% of all power outages annually are lightning-related, on average, with a total cost of $1 billion dollars. (Ralph Berstein, EPRI; Diels, et al (1997))

5. According to the National Oceanic and Atmospheric Administration
   a. The average cost of lightning-caused damages in the US is between $5,000 and $50,000. (Storm Data)
   b. Between 1959 and 1994, there were 17 lightning losses of over $5 million dollars. (Storm Data)
   c. During these same years, 92 lightning losses exceed $500,000 dollars.

6. According to the Factory Mutual System:
   a. Lightning related private sector property damage costs for the 1990-1992 period averaged $27 million annually.
   b. Information complied by the nation's fire chiefs indicate structural lightning losses at $138.7 million as average over 1989-1993.
   c. There were 20,000 lightning-caused residential annually during that same period.
   d. During the period of 1973-1982, there were 2,926 lightning claims for a total cost of $385 million dollars. Lost time from an idle workforce was not included therein.

Cost:

1. The average cost of a complete lightning protection system, including deign, materials, installation, and maintenance is approximately 1% to 5% of total construction cost of the building.

2. The average cost to renovate a building with lightning protection after completion of construction is approximately 10 times that of a new building under construction.

3. The cost of the lightning protection system can be off-set as much as 80% by insurance deductions and rebates.

4. Lightning risk assessment calculations are readily available free online and take approximately 15 minutes to complete.

Enforcement:

1. Standard and reference materials are readily available. The NFPA 780 is already a referenced standard in the FBC and mandated by section 449, 450, and 453.

2. Underwriter's Laboratories offers lightning protection education for design professionals, installers, and enforcement officials. Systems installed under the provisions of NFPA 780 must be in compliance with UL96 and 96A.

3. UL has been testing and certifying lightning protection equipment since 1908. UL issues inspection certificates for systems by inspecting system components and checking completed installations. Installations are required to comply with UL's internationally recognized Standards for lightning protection systems.

Sub Code: Existing Building

E6529

8

Date Submitted	12/7/2015	**Section**	302.6	**Proponent**	Bryan Holland
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation with a Second

Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Yes. See Modification #6530 and #6531.

Summary of Modification

This modification adds electrical safety requirements to existing swimming pools in response to the Commission's "Swimming Pool Electrical Safety Project" approved recommendations.

Rationale

This modification satisfies the electrical safety recommendation for existing swimming pools as outlined in the Commission's "Swimming Pool Electrical Safety Project". The new language adds requirements for GFCI protection and equipotential bonding at existing swimming pools undergoing repair, replacement, alterations, or relocation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will increase the number of permits and inspections required for repairs and alterations of existing swimming pools.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will increase the cost of repair and alteration of existing swimming pools by mandating the installation of GFCI devices and requirements for equipotential bonding.

Impact to industry relative to the cost of compliance with code

This proposed modification will not have a negative impact on industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will increase the cost of repair and alteration of existing swimming pools by mandating the installation of GFCI devices and requirements for equipotential bonding.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification will increase the health, safety, and welfare of the general public by mandating the installation of GFCI devices and requirements for equipotential bonding at existing swimming pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification strengthens the current code and improves the electrical safety of existing swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or system of construction.

Does not degrade the effectiveness of the code

This proposed modification does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

Alternate Language

2nd Comment Period

6529-A1

Proponent Bryan Holland **Submitted** 6/9/2016 **Attachments** Yes

Rationale

This alternative language continues to satisfy the electrical safety recommendations for existing swimming pools outlined in the Commission's Swimming Pool Electrical Safety Project. This modification will also harmonize the existing building code with the modification to the building and residential code through MOD #6530 and #6531 which have been recommended for approval by the Electrical TAC. Approval of this one MOD eliminates the need for MOD #6496, #6493, and #6494.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will increase the number of permits and inspections required for repairs and alterations of existing swimming pools.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will increase the cost of repair and alteration of existing swimming pools by mandating the installation of GFCI devices and adding requirements for equipotential bonding.

Impact to industry relative to the cost of compliance with code

This proposed modification will not have a negative impact on industry.

Impact to Small Business relative to the cost of compliance with code

This proposed modification will increase the cost of repair and alteration of existing swimming pools by mandating the installation of GFCI devices and requirements for equipotential bonding.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification will increase the health, safety, and welfare of the general public by mandating the installation of GFCI devices and by adding requirements for equipotential bonding at existing swimming pools.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification strengthens the current code and improves the electrical safety of existing swimming pools.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or system of construction.

Does not degrade the effectiveness of the code

This proposed modification does not degrade the effectiveness of the code.

Is the proposed code modification part of a prior code version? No

1st Comment Period History

E6529-G1

Proponent Thomas Lasprogato **Submitted** 2/3/2016 **Attachments** No

Comment:

I SUPPORT

1st Comment Period History

E6529-G2

Proponent Vincent Della Croce **Submitted** 2/7/2016 **Attachments** No

Comment:

Support

1st Comment Period History

E6529-G3

Proponent Jennifer Hatfield **Submitted** 2/25/2016 **Attachments** No

Comment:

On behalf of the Association of Pool & Spa Professionals' Technical Committee, which includes E.P. Hamilton III, Ph.D., who sits on Panel 17 of the National Electrical Code, the following is submitted:

1. The proposal is vague and does not clarify if relamping is a criterion for retrofit.

2. The NEC does not allow underwater lights greater than 150V, so the 240V reference is inapplicable.

3. This proposal can accomplish what it appears to intend (as to the details) by simply requiring the lamp installation to comply with the NEC edition adopted at the time of the alteration. The detailed text requirements are unnecessary and redundant.

4. The proposal correctly recognizes that low voltage lights are not protected by GFCIs, and therefore GFCI protection for personnel is not required for low voltage lights.

302.6 Swimming Pools. The provisions of Sections 302.6.1 and 302.6.2 apply to all alterations, repairs, additions, and relocation of equipment at existing swimming pools regardless of compliance method.

302.6.1 Ground-Fault Circuit-Interrupter Protection for Personnel. Outlets supplying repaired, replaced, altered, or relocated pool pump motors connected to single-phase, 120-volt through 240-volt branch circuits, whether by receptacle or by direct connection, and outlets supplying all other repaired, replaced, altered, or relocated electrical equipment and underwater luminaires operating at voltages greater than the low voltage contact limit, connected to single-phase, 120-volt through 240-volt branch circuits, rated 15- and 20-amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel.

302.6.2 Equipotential Bonding. Any of the parts specified in 680.26(B)(1) through (B)(7) of the NFPA 70, *National Electrical Code* that are repaired, replaced, altered, or installed new at an existing swimming pool shall be bonded together using solid copper conductors, insulated, covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8 of the NFPA 70, *National Electrical Code*. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes. Where none of the bonded parts is in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm2 (9 in.2) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities, and it shall be bonded in accordance with 680.26(B) of the NFPA 70, *National Electrical Code*.

302.6 Swimming Pools. Outlets supplying repaired, replaced, altered, or relocated pool equipment and underwater luminaires connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit interrupter protection for personnel. Any of the parts specified in 680.26(B)(1) through (B)(7) of the NFPA 70, *National Electrical Code* that are repaired, replaced, altered, or installed new at an existing swimming pool shall be bonded together using solid copper conductors, insulated, covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8 of the NFPA 70, *National Electrical Code.* An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes.Where none of the bonded parts is in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm2 (9 in2) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities, and it shall be bonded in accordance with 680.26(B) of the NFPA 70, *National Electrical Code.*