Public Comment & Recommendation
Residential Pool Pump Measure Revisions

Submitted to
California Energy Commission

In consideration for the 2008 Rulemaking Proceeding on Appliance Efficiency Regulations

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INDEPENDENT POOL & SPA SERVICE ASSOC. INC.

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PURPOSE
This document is a public comment submitted by the Independent Pool and Spa Service Association, Inc. (IPSSA) to be used by the researchers who are evaluating proposed changes to the California Energy Commission's appliance efficiency regulations of Title 20 as it pertains to residential swimming pool pumps and pump replacement motors. The information provided in this document is done so in good faith and will prove to the CEC decision makers that to regulate low horsepower pumps and motors will in fact increase consumer cost, energy usage and provide absolutely no cost to benefit return.

OVERVIEW
This IPSSA comment will illustrate to the evaluators and decision makers there is an absolute need to exempt 1.25 THP pumps and replacement motors from the regulation of Title 20. We will provide a field observation survey with data from 12 swimming pools in the Sacramento area. This survey will prove that operation of a ¾ nameplate HP pump is well below the 1.25 THP limit we recommend. The survey will additionally provide an energy usage comparison of 2 speed pumps and single speed pumps of ¾ nameplate HP, THP 1.25. Results and analysis within this comment were calculated using the PG&E website worksheet provided to their clients to determine energy savings. Included within our comment is an equipment survey of 1012 swimming pools existing throughout California. This survey information was provided by IPSSA Regional Directors and participating Chapter Presidents. The results of this survey do not agree with the Davis Energy Group statistics representing the annual replacement market projected for the next 10 years, reported July 23, 2008. The survey indicates a significant market availability to downsize 1 HP pumps and motors, which would benefit the overall goal of energy savings by the consumer. Additionally provided are several documents illustrating that

nameplate nomenclature of pumps and motors is the language of the industry. These documents prove there was a true and exact basis for the industry's interpretation that when pump or motor HP was indicated during the initial rulemaking process of Title 20 it was defined to mean nameplate HP. Total HP was never used in the initial rulemaking process nor was it initially referred to in the comparisons of energy savings provided by the PG&E. All references both public and that which have been provided to the CEC have been based on nameplate HP and indicated savings based on 1.5 nameplate HP. Based on this premise the industry was confident that there was energy savings to be attained with greater than 1HP 2-speed use and that single speed motors below 1HP were available for the market of downsizing and use on older pools with less than desirable hydraulics needed for low speed operation in an efficient and cost effect manner.

BACKGROUND

IPSSA has met with the CEC staff and has provided public comment since the reopening of Title 20 for clarification. In past comments and rebuttal to some PG&E comments there may have been the misconception that IPSSA was attempting to derail the intent of Title 20. This has not been our objective. We have been able to provide language to the CEC staff that is common to our industry and proposed language changes indicate we were contributory to some extent to the terminology of the proposed language changes. Our common goal is to save energy, lower demand and provide our consumers with adequate information to make their own informed decision in regards to lowering their personal energy cost, without undue regulation.

RESULTS

1. The scope of Title 20 should be amended to exempt ¾ nameplate HP pumps and replacement motors of 1.25 nominal Total HP.

2. The enclosed IPSSA swimming pool equipment survey of 1012 swimming pools in California indicates less than 35% of the pumps or replacement motors will fall into the recommended exemption. By allowing the exemption of nominal 1.25 THP pumps and replacement motors it will provide the industry the option to take advantage of new technology within the lower HP market and the ability to downsize older systems at an economical factor appealing to the consumer, and save a great deal of energy. An increase of 34.6% market share is available for downsizing 1 HP pumps and replacement motors. This potential market has the capability of saving 18 million kWh/yr by downsizing the 39,089 1HP replacement motors available the **first year** in the replacement market that has been reported within the PG&E proposal of July 23, 2008.

3. The IPSSA field observation date provided would demonstrate the **actual average energy savings** of replacing a single speed 1.25 THP with a 2 speed pump or motor is less than $5.00 a month on an annual basis. If the consumer must operate the 2-speed motor more than 2 hours a day there would be no energy savings or reduction in the consumer's utility cost what so ever, in fact consumer energy cost and usage will increase.

It will be literally impossible to market this situation in an ethical manner and guarantee the consumer a reduction in energy usage cost or distribution charges. Our industry works on good faith and repeat business, this situation lends itself to loss in sales and mistrust within our market. We must have, to survive in the market place, the opportunity to downsize pumps and motors and provide our clients with fair and equitable choices to make informed decisions on their personal energy cost savings.

4. Product specification lists from several manufactures will illustrate that the swimming pool industry has used nameplate nomenclature as description for catalogs, order forms, invoicing and customer pricing long before the inception of Title 20. The Title 20 language effective January 1, 2008 appeared clear to the industry until Service Factor became part of the unofficial language of the regulation. We have commented that the language of Title 20 is acceptable and understandable and there is only the need to make definition revisions. In the PG&E proposed language changes definitions were clarified, however the actual language has been amended to include regulation of full rated high performance ¾ HP pumps and replacement motors that normally have a nominal THP of 1.25. The CEC has repeatedly stated there was no regulation of ¾ HP pumps and there would be no regulation of like replacement motors. Returning to the existing language and opting to regulate more than what was previously stated or intended in the regulation will not result in additional energy savings, in fact it will increase energy usage and consumer cost. It is hard to believe that with all the exacting work that PG&E provided in the rulemaking process that they "forgot" to include total horsepower in their template proposals. The industry and the consumer were mislead by the PG&E proposals during the initial rulemaking process if the CEC now regulates nameplate ¾ HP pumps and motors
.
5. The PG&E energy savings calculations are based on a 2-speed pump being operated on high speed for a certain period of time. This time period continues to change in almost every report submitted by the PG&E. The reports have adjusted pool water volume and flow rates to accommodate the savings provided by replacing a 1.5HP (THP 2.21). There is a significant savings at this HP level and there is no doubt the service and repair industry will take advantage of the new technology in energy saving equipment. We have included a worksheet taken from the PG&E website that illustrates to their customers how to calculate energy savings using a two speed pump. This worksheet indicates two hours of high-speed operation, however, the PG&E in their July 23, 2008 proposal state to the CEC that an average of 1.3 hours per day high speed is **assumed**. There appears to be one set of rules for the public and another set for the information the CEC decision makers are provided with.

   A 2-hour period of high speed operation per day with a 2 speed 1.5HP nameplate pump is significantly more energy than a 2 hour period on a ¾ HP single speed; they do not compare and should not be included in a fair comparison of energy usage. Calculations using the PG&E website worksheet will prove there is no

cost to benefit savings comparing a single speed ¾ HP nominal 1.25 THP pump to a 2 speed ¾ HP pump. The results of the worksheet will prove there will be an increase in energy usage when it is calculated with ¾ HP pump performance. Should the consumer need to operate a 2 speed pump more than 2 hours per day the energy cost get even worse.

METHODOLOGY—CALIFORNIA EXISTING EQUIPMENT SURVEY
(Incl #1)

IPSSA conducted an equipment survey asking the IPSSA California Regional Directors and participating Chapter Presidents to provide certain information on existing filtration systems within their individual service routes. Additionally, we asked how many motors and pumps they replaced since January 2008.

We have divided the responses into the regions of California

Northern California	6 responses
Orange County	1
Los Angeles County	2
Riverside County	2
San Diego County	1

From the 12 respondents we collected information on 1012 existing pools.

Worthy of comment is that 34.9% of pumps listed are ¾ HP nameplate or less and an additional 34.6% are 1 HP. The combined 68.8% of 1 HP or less is the energy saving market of replacement motors and pumps of low HP for the next 10 years. This market percentage does not agree with the PG&E proposal of July 23, 2008. That proposal indicates that only 30% of the 113,000 unit replacement market is less than 1 HP. It could be surmised that the energy savings calculated in the PG&E proposal is not what will actually be achieved with the implementation of the existing language of Title 20 and even less energy savings if their proposed language is adopted.

Our calculations will prove there is a significant opportunity to save energy and demand cost within the first year of implementation that will exceed the expectations of the CEC. We will illustrate that downsizing the 1 HP market to ¾ HP single speed operation has the potential to be far more successful in energy and demand savings than using 2 speed pumps and replacement motors on existing installations. If this objective were supported by the utility providers with incentive rebates there would be no other decision the consumer could make other than save energy and reduce demand. After consideration by the CEC staff there could be no other decision than to exempt nameplate ¾ HP, THP 1.25, single speed pumps and replacement motors from the regulation of Title 20.

METHODOLOGY—DOWNSIZING 1 HP THP 1.65 TO ¾ HP THP 1.25

From PG&E proposal July 23, 2008, table 1: Pool Pump Operation

a. Total kWh/ yr of 1.25 THP pump= 2286
b. Total kWh/ yr of 1.65 THP pump= 2753

Savings kWh/yr 467 kWh/yr

PG&E estimates that 113,000 pool pump motors will be replaced each year.
The IPSSA equipment survey shows that 34.6% of these replacements will be 1 HP.
These factors calculate to 39,098 1 HP single speed motors available for downsizing to ¾ HP single speed motors. Savings of 467 kWh/yr per unit.

Therefore, 39,098 units x 467 kWh/yr= 18,258,766 kWh/yr savings in the **first year**. This annual savings will directly impact the consumer and reflect the dollar savings on their utility bill. There is no greater incentive to save energy.

Our comparison of ¾ HP pumps, **Single speed vs. Dual speed**, will show that when operated efficiently the single speed pump will outperform the ¾ HP dual speed pump and save additional energy not summarized in the PG&E proposal of July 23, 2008.

Comparison of ¾ HP 1.25 THP pumps and motors: Single speed vs. Dual speed.

From the PG&E website, we have used the calculation template provided to PG&E clients. We have used the entire information provided for comparison purposes, including the kWh cost factor. The comparison clearly shows that when a ¾ HP pump is used in the calculation there is no savings and in fact there is an increase of energy usage when a two-speed pump is installed. We have used the same 1.25 THP pool volume example as indicated in the July 23 PG&E proposal, even though pool volume in other proposals is differently stated just as it is in the July 23 for the various pump sizes. Hopefully in the future, if need be, we can compare the same pool volume on the same pump unit and obtain a clear comparison of run times and energy usage.

The PG&E proposal uses a 1.3-hour run time on high speed for the dual speed pump. In other comments they have used "a period", "some of the time" and "as necessary". In their energy savings template provided to their consumers they state 2 hours a day on high speed. We have decided to use the 2-hour period in our calculations. Even though our survey indicates that approximately 11% to 22% with a high being 27% of the actual runtime will be on high speed for a longer period due to sand filters, chlorine feeders, pool cleaners or chlorine generating systems. We have not included run time for solar heating requirements; we have only limited and incomplete solar heating data at this time.

A dual speed pump under these conditions will increase demand, usage and further increase the consumer's energy cost on an ever-increasing basis.

We have used max load amps, just as the PG&E worksheet, and simple volt x amp=watts in the calculation template. The Power Factor of the ¾ HP pump used in our summary and observations has been confirmed by A.O. Smith and to be .98, which is not a significant loss of power distribution and has not been applied to any of our field observations or calculations. Nor was it a calculation component of the PG&E consumer worksheet.

COMPARISON: ¾ HP pumps/motors: Single Speed vs. Dual Speed

Dual Speed full rated pump: Pentair

Product	Model	Voltage	Full load Amps	HP	SF	THP
012530	WFDS-3	115	14.6/4.7	¾	1.67	1.25

15,732 gallon pool volume

High-speed head	50ft	
High speed flow	70 gpm	
Low speed head	10ft	
Low speed flow	40 gpm	
High speed operation	2 hrs/dy	8400 gallons
Low speed operation	3.05 hrs/dy	7320 gallons = 15,720 gallons

High speed Amps x volts x runtime/1000= kWh/dy
14.6 x 115 x 2/1000= **3.36 kWh/dy**
Low speed Amps x volts x runtime/1000= kWh/dy
4.7 x 115 x 3.05/1000= **1.64 kWh/dy**

Dual speed total energy usage @ day= 5 kWh
Daily cost to operate 2 speed pump at $0.23 kWh= $1.15 per day

Single speed ¾ HP full rated energy efficient pump—Pentair

Product	Model	Voltage	Full load Amps	HP	SF	THP
011512	WFE-3	115v	11.2	¾	1.67	1.25

Single speed head	50ft
Single speed flow	70 gpm
Single speed runtime	3.75 hrs/dy
11.2 x 115 x 3.75/1000=	**4.83 kWh/dy**

Single speed total energy usage @ day= 4.83 kWh
Daily cost to operate a single speed pump at $0.23 kWh= $1.11 per day

Please keep in mind that full load Amp draw is the worst-case scenario for pump/motor operation and that Service Factor is the max load the motor can operate at for a short period of time. High voltage tends to drive electric motors to their max load factor, and decrease power factor efficiency.

If one were a PG&E customer one might opt to install a single speed pump and take the energy savings at a lower installation cost rather than a 2 speed pump and timer mechanism with higher operation and installation cost.

This calculation provides the CEC staff and decision makers with a clear path of regulation and exemption of the ¾ HP full rated THP 1.25 pump and replacement motor. Additionally, this format will **convince** the consumer that downsizing to a ¾ HP pump is the correct choice for energy savings.

ANALYSIS & SUMMARY

IPSSA FIELD EQUIPMENT SURVEY- Incl #1

In July 2008 IPSSA conducted a field survey of existing pool installations. We contacted California IPSSA Regional Directors asking them for certain information on existing equipment within their individual service routes, a few Chapter Presidents responded as well.
The information compiled within the survey does not agree with the PG&E estimates of the July 23, 2008 proposal. Although it does not agree with the PG&E assumptions it does provide a great deal of information related to the various climate zones in California and the various swimming pool requirements within those zones. The PG&E estimates are based on the ADM survey of 2001. The IPSSA survey indicates that lower HP pumps are predominate throughout the state, with 68.8% being 1 HP or less (using nameplate). When these results are compared to the ADM 2001 survey they indicate that lower HP pumps have been installed as replacement downsizing by the service and repair industry with good results. A continued effort to downsize pump systems is imperative to the industry and energy savings. We have shown that energy savings is significant when a ¾ HP single speed pump is installed rather than a 2 speed pump, and downsizing 1 HP pumps will provide even more than expected energy savings.

FIELD OBSERVATION DATA-Incl #2

Information provided within this observation will show the CEC decision makers that actual field applications are far below the calculated figures provided by the PG&E. We surveyed in the Sacramento area so that should the CEC staff wish to visit these sites they are readily available. Data was collected and collated by committee volunteer members who are trained pool operators and licensed repair contractors. The field observation results completely reaffirm that ¾ HP THP 1.25 pumps can be operated efficiently and surpass the energy savings of a dual speed pump. The IPSSA field observation results offers proof that the consumer along with a trained technician can accomplish energy savings without undue regulation in the low to moderate HP ranges. The field observation additionally points out the different requirements of various pool installations that must be considered by the technician when the primary goal is to protect the consumer's property and provide a healthy and attractive swimming pool. By exempting the ¾ nameplate HP, THP 1.25, pump and replacement motor from Title 20 regulation you

allow the consumer and technician to make an informed choice on energy savings and the health and well being of their families.

PUMP COMPARISON: SINGLE SPEED vs. DUAL SPEED

The pump comparison calculation illustrates to the CEC staff and decision makers that the single speed ¾ HP THP 1.25 full rated energy efficient pump is a viable source of energy savings. The calculations are an undisputable reference for the CEC decision makers and there cannot be any other conclusion than to exempt the ¾ HP pump from the regulation of Title 20.

INCLUSIONS:

1. IPSSA Equipment Survey
2. IPSSA Field Observation Data
3. Pentair Pool Product list by nameplate nomenclature.
4. A.O. Smith product list by nameplate nomenclature
5. Jandy product list by nameplate nomenclature
6. Waterway product list by nameplate nomenclature
7. Sample quotation SCP-Duarte by nameplate nomenclature
8. SCP Product Reference Guide (pg 16/17) product listing nameplate nomenclature
9. Comment: Shajee Siddiqui—Product Safety Concern
10. PG&E consumer energy saving template

The additional inclusions are to reinforce the fact that the industry always has and will continue to refer to pumps and motors with nameplate reference. The original scope of Title 20 made no mention of Service Factor as the regulations described HP reference. Nor did the regulation refer to Total Horsepower as the perceived HP of regulation. To now revisit the regulation and go beyond what was the original scope and intent of the regulation and further burden the consumer with higher energy cost when IPSSA has provided to the CEC a clear explanation to successful energy conservation and consumer satisfaction, would be counter productive.

We have included a comment by Mr. Shajee Siddiqui, Director of Product Safety and Compliance, Jandy Pool Products Inc. In which he clearly defines some of the safety concerns in regulating replacement motors. By exempting ¾ HP pumps and replacement motors the potential market of 35% of the 113,000 annual pump and motor replacements can be safely and efficiently downsized, resulting in energy savings that exceed present PG&E expectations.

IPSSA still has concerns that 3 HP variable speed pumps present an extreme potential for property damage and entrapment. When properly used these pumps may provide energy savings, but that has not been determined in PG&E proposals, they have been referred to be "difficult to determine" in regards to actual energy savings. We feel the technology of variable speed pumps and motors is imperative to energy savings. Low to moderate variable speed pumps and replacement motors have the potential to provide a "tool" to the service industry that can safely and economically provide additional energy savings on an on going basis for years to come.

IPSSA will continue to research and comment on this subject in the future with questions such as:

1. Default settings equal to ¾ HP pump performance or less.
2. PIN numbers required to change the settings.
3. Cavitation automatic shut off.
4. Amp load exceeding system capabilities. Heat rise shutoff.

RECOMMENDATION;

Make the following changes in section 1605.3(g)(5) to better accommodate industry terminology and clearly define the parameter of regulation on new pump installation and replacement motor requirements.

(i) **Pump Motor.** *To read:*

Inground swimming pool pump motors offered for sale in California with a capacity of greater than 1.25 nominal total HP which are manufactured on or after January 1, 2008, including but not limited to those installed on existing residential pool pumps as replacement pool pump motors, shall have the capability of operating at two or more speeds. The lowest speed of a two-speed motor having a rotation rate that is no more than one-half the motor's maximum rotation rate.

In closing, IPSSA would like to thank the CEC staff for their patience and thoughtful assistance during the language change process. The straightforward conversations we have had with the staff members were rewarding and educational for all of our committee members. We look forward to a final decision on the proposed language so that we may assist with increasing energy conservation, educating our membership and continue to be the service industry leaders.

Respectfully Submitted,
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