

PACKERCHRONICLE 6

# John Swallow and the Super Light Bulb

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August 5, 2013 First of Two Parts



**A graphic conception of the super light bulb that never was.**

Embattled Utah Attorney General John E. Swallow not only pursued careers in law and politics. For a ten year stretch that overlapped his election to Utah's top law enforcement post Swallow was an entrepreneur, seeking a pot of gold at the end of the rainbow. In 2002 Swallow, 51, partnered with fellow Utahn Brad Pelo, 50, to develop a super light bulb, one that would triple even quintuple the output of conventional, already energy-efficient LED bulbs that are replacing lights with glowing filaments.

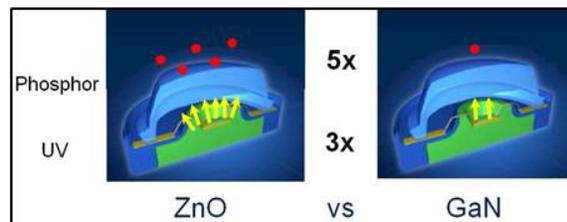


**Brad Pelo, Utah entrepreneur extraordinaire and On International co-founder with John Swallow.**

They named their company On International, Inc. and incorporated in Delaware. Swallow's job as vice president for business development was to provide a little legal work and to raise a lot of money. Whether he ever misled anyone who, collectively, invested hundreds of thousands of dollars lies buried within the complexity of the On Inc. story.

Swallow and Pelo wanted to commercialize new "ZnO" LED technology to compete with "GaN" LEDs that were coming on strong after the turn of the century. (LEDs—light emitting diodes-- do not use heated filaments to produce light but are illuminated by the movement of electrons in semiconductor material usually made musing gallium-nitride—GaN.. The On Int. concept, however, instead deploys zinc oxide— ZnO.)

On Inc.'s vice president of R&D, Richard Mackerell, calls the potential of ZnO bulbs as significant as the Wright Brothers first flight at Kitty Hawk. Success could have netted investors billions of dollars. Their super light bulb would have competed against conventional LED light globes, such as for a room lamp, as well as the now-ubiquitous LED diodes in auto head lights, tail lights and inside television screens. The success of LED lighting has been spurred by federal regulations that today ban the production of



**On International illustration shows its ZnO concept producing 3-5 times more light than conventional LEDs.**

100 and 75-watt incandescent household bulbs with 60 and 40-watt lights on the chopping block next year.

As scientists worked away at On Inc.'s lab on Winchester Street in Murray Swallow was tasked with rainmaking, with raising money to keep them paid and keep their lab stocked with technical equipment. Swallow succeeded in raising more than \$2 million. One of the largest investments came from Utah county millionaire Richard Ferguson. Ferguson first met Swallow when contributing to Swallow's congressional campaign. "I was not looking for influence," he said. After that Swallow did some legal work for Ferguson's company, Neighborhood Grants Network. Before it was over Ferguson would sink close to half a million dollars into On Inc.

But after four years of developing, testing and tinkering, after several patents were issued, a commercialized product failed to emerge and the project fizzled. Finger-pointing ensued. Some blamed the Great Recession but that began two years after On Inc.'s tent was folded.

Two of the scientists interviewed for this report blame Pelo and Swallow for continuing to push development of light bulbs using zinc oxide for illumination when other uses were possible. "Swallow could not do the job, one said, "Brad could barely do the job." He said they tried to push their product into production long before it was ready.

Pelo said he walked away from On Inc. because perfecting the zinc oxide concept was being outpaced by the development of the competing and already commercialized gallium nitride lamps. He said his team of scientists were able to get the concept working in the lab but were never able to commercialize it.

How close were they to marketing a super light bulb?

Investor Frank Madsen was led to believe it was fairly close. Madsen, 82, was Utah Senator Orrin Hatch's Washington Chief of Staff. He helped Swallow with one of his congressional campaigns after retiring and returning to Utah.

Madsen invested \$102,000. "It's really high risk but if we can get this thing going it could be worth a lot of money," Madsen was told by Swallow. "I felt he's been straight up with me, honest and never colored it," Madsen said. Madsen said when the inventors would make breakthroughs Swallow would call and suggest he visit the lab.

On one visit what he saw there was astounding. Madsen said he saw a light bulb "with much the appearance of an incandescent globe." He

said it put out the equivalent of 40 watts while consuming a hundredth of the power of an incandescent light—less than half a watt.

Madsen was told that the On Inc. bulb was more than three times more efficient than conventional gallium nitride LED already on the market. Madsen asked why they didn't take that to market. He was told that companies they were talking to wanted even more luminance.

Another On Inc. investor who also sunk about \$100,000 into the project said Madsen could not have seen a prototype that well developed. That investor had been to the lab and "never saw anything emitting light." "I don't



Frank Madsen, On International investor and former Chief of Staff for Senator Orrin Hatch.



A conventional LED bulb may contain dozens of diodes. The On International bulb purportedly only needed one and is three to five times more efficient.

know if Frank was misled or just doesn't understand what he was looking at or was told.” “I had many disagreements with ON management so I am not their friend, the investor said. “ However, I find the idea that Madsen was shown a 40 watt bulb with the implication that it was based on ZnO technology to be so outrageous that I choose to discount it.”

The investor had seen an email from shareholder Richard Ferguson who, at least, saw a faint light on the work bench. In August, 2005, three years into the development, Ferguson had written, “The main thing they wanted to show is that they now have light. A very faint light. They constructed their first LED.”

The source said he suspects investors were not told everything before putting in money. The principals would say they planned to eventually tell investors but they wanted to “get them hooked first,” he said.

The investor, who has a science degree, who was very unhappy with the way Pelo and Swallow ran On Inc., said he investigated whether what the inventors claimed was feasible. In early 2005 he sent an email to Swallow and others expressing his skepticism in very technical terms:

**I think the ~3x efficiency improvement estimate is questionable if it comes from the exciton bonding energy ratio of ZnO to GaN ( i.e. 60/20). It seems to me ZnO's advantage could be >10x compared to some current products on the market. On the other hand, ZnO cannot achieve greater than 100% efficiency and efficiency using other methods/materials is constantly increasing. Thus if alternative methods/materials also achieve high efficiency then ZnO's advantage will be eliminated.**

In layman’s terms the investor believed the company was making a marketing pitch without a proper scientific foundation.” I think they exercised poor judgment in continuing to make that claim,” he said. “To the best of my knowledge ON continued to project the 3x efficiency advantage to the VC community without the necessary qualifications.”

The claim was being made in a PowerPoint presentation created in 2005 titled “The Case for ZnO.” It is labeled “confidential and proprietary.” An internal email said it was being used by John Swallow to “to attract investment.”

The slideshow predicted that by 2008 the LED market would hit almost \$7 billion. It touted the three to five times advantage over conventional LED technology, the claim the dissident investor said was not proven.

The slideshow also predicted that with adequate funding—\$10-15 million—On Inc. could have a commercial ZnO LED light to market it 2007. It concluded that “On is ready to move from prototyping into product development.”

Former chief scientist and co-holder of its patents Gary Rendlund said that statement, that On was ready to move from prototype to commercialized product was not true. He said that not even a prototype was ever developed.

Rendlund, who previously worked as a senior research scientist for General Electric, said they were not even able to make an actual zinc oxide LED, “not a real one, not one commercially viable.” He said all one would have seen in the lab is a tiny amount of light at the edge of an experimental substance, “less than a microwatt.”

The \$100,000 investor who was skeptical of Swallow’s 3x efficient claim says that after he informed the management team that their claims had no scientific (or laboratory) foundation

they should have ceased making them. “After I informed them, they made a conscious decision to continue making the claim without reservation,” he said.

Ferguson, however, said Swallow was not “some sort of huckster trying to sell blue sky.” He said they all understood the risks except for one investor who had sour grapes. Ferguson said there were some “strategic mistakes made by Brad and John.” And he said all of them listened to the scientists who sounded convincing. Their technology was supposed to be three times more efficient than conventional LED he said. “We all drank the Kool Aid.”

*Next, Super Light Bulb part II: On Inc. principals attempt to clarify; Frank Madsen retracts some of his story. Do they fill the hole or dig it deeper?*