MINUTES OF THE
SENATE COMMITTEE ON COMMERCE AND LABOR

Seventy-fourth Session
March 22, 2007

The Senate Committee on Commerce and Labor was called to order by Chair Randolph J. Townsend at 8:06 a.m. on Thursday, March 22, 2007, in Room 2135 of the Legislative Building, Carson City, Nevada. The meeting was videoconferenced to the Grant Sawyer State Office Building, Room 4412E, 555 East Washington Avenue, Las Vegas, Nevada. Exhibit A is the Agenda. Exhibit B is the Attendance Roster. All exhibits are available and on file in the Research Library of the Legislative Counsel Bureau.

COMMITTEE MEMBERS PRESENT:

Senator Randolph J. Townsend, Chair
Senator Warren B. Hardy II, Vice Chair
Senator Joseph J. Heck
Senator Michael A. Schneider
Senator Maggie Carlton

STAFF MEMBERS PRESENT:

Wil Keane, Committee Counsel
Jeanine Wittenberg, Committee Secretary
Scott Young, Committee Policy Analyst
Lori Johnson, Committee Secretary

OTHERS PRESENT:

Robert Boehm, Ph.D., University of Nevada, Las Vegas
Fred Schmidt, PowerLight Corporation
Gary Wayne, Vice President, Strategic Projects, PowerLight Corporation
Greg Ferraro, Solargenix Energy, Incorporated
Donald A. Points, Chief Financial Officer, Acciona Solar Power
Lisa Shevenell, Ph.D., Director, Great Basin Center for Geothermal Energy, University of Nevada, Reno
Robert E. Dickens, Ph.D., Director, Office of Government Relations, University of Nevada, Reno
Paul A. Thomsen, Public Policy Manager, ORMAT Technologies, Incorporated
Victor Buron, President, Solar Seeker

CHAIR TOWNSEND:
Dr. Robert Boehm is the Director of the Renewable Energy Center and Distinguished Professor of Mechanical Engineering. His specialties are in the area of thermal system design and power systems, with particular emphasis on renewable-energy concepts. He is a Fellow of the American Society of Mechanical Engineers and a Registered Professional Engineer.

DR. ROBERT BOEHM, Ph.D. (University of Nevada, Las Vegas):
I would like to tell you about what we have been doing in our Center for Energy Research and in our Renewable Energy Center that has been funded by the National Renewable Energy Laboratory (NERL). Our primary focus is on solar-energy applications and building applications, which has great relevance to our desert southwest. This Center is evolving with interaction of community leaders, energy advocates and outside experts, to bring a focus to this particular subject and in this geographical area. We have developed a strategic plan as shown in our handout (Exhibit C, original is on file in the Research Library).

For our Renewable Energy Center, we have a steering committee that has given us general guidance as to what this Center should look like. We have visited a variety of model laboratories and have an idea of things that we would like to replicate. These laboratories were located in Seattle, Washington, Florida and in North Carolina. We formed two focus groups, one in solar applications and one in solar building applications, and some of the people involved are utility representatives and businesspeople.

We have a virtual site in operation but we have not been able to find any space at the University of Nevada, Las Vegas (UNLV) to actually launch the Center. The area we are in currently is slated to be demolished to build a UNLV hotel complex. We employ a lot of students so we need to be near campus so they will have access to this facility. The focus of this technology is to bring together a number of different people within UNLV. We would like to have involvement from students of architecture, environmental studies and business economics. Ideally, we would be able to house students and professional people in joint research.

We are also in need of State funding. We have some soft funding but with a large amount of people on the payroll, I have no continuing funds which would be helpful, even in a small amount.

Our biggest concern and critical need, is space for our facilities. We have people spread all over that need to be located in one central area. The current possible location is the Paradise School near Swenson Street and Tropicana Avenue, which was the old law-school library and is not really amenable to a laboratory setup. We also need to establish exterior locations in the El Dorado Valley adjacent to the Solargenix facilities. We are working with the City of Boulder City to reestablish a long-term lease of property that we had previously leased.

Among our projects that have important potential to Nevada is the Amonix/Nevada Power project for concentrating photovoltaic (PV) research as referenced in Exhibit C. Amonix is a California company, which we are trying to entice to come to Nevada for some of their manufacturing. Four of their units are now installed and we are involved in all four of those units in terms of maintenance operations and the testing of new approaches to improve performance.

DR. BOEHM:
Another project that has been successful and is a model for what we hope to stimulate in the future is the Zero Energy House (ZEH), funded by NERL and built by Pinnacle Builders. We have also have had some conversations with different home builders in the Las Vegas area that are interested in building energy-efficient homes, such as ours. They may not go with the total scheme of ZEH, but at least build a more energy-efficient system than most homes currently being built in the area.

I would like to emphasize that we have been focusing our projects for involvement and interaction with industrial concerns, and we are quite proud of that. We are trying to assist the industry in developing these technologies in the marketplace.

We are talking with a number of manufacturing companies who may be willing to move to this area, nothing is solid yet, but we have some great leads. Solargenix has already relocated from North Carolina to Henderson.

In closing, we have the best solar resource in the world to meet a growing need for solar power that is environmentally friendly. Nevada has a lot of generally inexpensive land available, with the exception of federal land, which clouds the issue. There still are a lot of grid locations available. I must emphasize we cannot stress the help that the utilities' incentives have given us, but as

Renewable Portfolio Standard (RPS) slows down, they do seem less eager. We stand ready and willing to help anyone in the development of solar power.

CHAIR TOWNSEND:
We are very fortunate in this State to have a committed energy partnership that involves this body, the federal government, the university system and the private sector.

FRED SCHMIDT (PowerLight):
I am representing PowerLight, a subsidiary of SunPower and Nevada Solar Star/ Nellis Air Force Base (NAFB); I also have an additional client, ORMAT Technologies, Incorporated, who will be appearing in the geothermal sector of this presentation. With me today is Gary Wayne, Vice President of Strategic Projects for PowerLight. Mr. Wayne will be presenting an overview of PowerLight, including their very successful commercial PV solar-power projects. They are currently selling power to Nevada Power Company.

GARY WAYNE (Vice President, Strategic Projects, PowerLight Solar Electric Systems):
Solar PV technology is significantly more expensive than conventional technologies, although we expect prices to be coming down significantly in the near future. In my slide presentation (Exhibit D), Nevada is the leading state in renewable-energy and solar policy. An award was given jointly to Senator Townsend and former Governor Guinn representing Nevada's contribution to the growth of the industry. The United States represents only about 10 percent of the world's PV market, but with Nevada's leadership we are fueling the growth of the market, which is critical because it is driving price parity.

A lot of PV activity is in Germany and Japan, yet the major U.S. corporations such as FedEx, Microsoft and Toyota have embraced the technology. It is also being used widely by municipal and state governments. Some of the slides, Exhibit D, show the application of PV panels to cover parking lots that also capture solar power at the same time. This is the type of project that works very well in hot areas such as Las Vegas.

CHAIR TOWNSEND:
Covered parking spaces, while providing cooler areas and at the same time producing solar energy, is so simple. We need to realize the potential for this type of application that is also a fabulous opportunity for southern Nevada.

MR. WAYNE:
The most interesting part of this type of application is that you can actually monetize the value of shade. If you are leasing a building in an area of Las Vegas, you can charge an additional $2 for each shaded space of parking and that will offset your cost of a PV system. The reason why market growth is so critical to solar PV is that the systems are driven by economies of scale. In the last 25 years, the yearly price of solar has been on a downward trajectory, which, given the current rate of growth, will actually hit grid parity by 2012, to 2015. Growth has been at 40 percent for the last 5 years. We expect that growth to continue, which is phenomenal growth by any standard. By 2012 we actually believe that solar power will be cheaper than most electricity.

CHAIR TOWNSEND:
I want to bring everyone's attention to the slide labeled, "market growth drives price decreases" as shown on page 2, Exhibit D. Price parity is what the public is looking for. It is important to illustrate when the price for solar becomes cost-effective for me, as a consumer. It would be great for everyone to become aware of the great potential in solar power.

MR. WAYNE:
There is a technical term called the "experience curve" which the Boston Consulting Group invented in the 1960s from a study of almost all manufactured goods which showed that if cumulative production is doubled, you drop the price by a fixed fraction. In the case of the solar industry, we have 30 years on an 82-percent experience curve which is to say every time we double production, prices go down by 18 percent.

The argument the big oil companies make is that we are a subsidized business, rather than market driven. It should be pointed out that residential electricity historically, using year 2000 dollars, was $3.20 a kilowatt-hour in 1920. I imagine in 1920 the guys using whale oil probably thought "why are you messing around with electricity." Our goal is to be subsidy free.

Another project is the Ronzone Reservoir in the Las Vegas Valley, which is a perfect application for solar. Because of Nevada's climate, we have a highly predictable resource and it is "peak coincident." That means that, at the very time when the power company's load is suffering peaking, the solar power is also peaking.

Power companies' peak load normally occurs at midday in the summer, which is also the time the sun is the strongest and is powering the solar source. Summer peak load and solar resource are highly correlated. We have been given money to do a study, along with Nevada Power, on how utilities can use solar to offset peak loads. This solar-resource, peak-load coincident is true of not only PV solar but also concentrating technology such as what Solargenix uses.

CHAIR TOWNSEND:
Southern Nevada uses 2,500 megawatts of base load; at peak usage this year, we need approximately 6,000 megawatts. Nevada's sun intensity converted to solar power is one of the best opportunities to make up that difference. When people worry about the cost of power bills and whether they can afford to have the air-conditioning on in the summer in Las Vegas, this is the technology that can help us resolve those issues. When we talk about energy independence, the source must be measurable, reliable and provable in the value versus the cost. The more we understand the value of each type of renewable-energy, whether it is geothermal, wind or biomass, the more opportunity there is for us to turn southern Nevada into the world's leader in solar power.

MR. WAYNE:
PowerLights' Ronzone project has been a three-way partnership. The Las Vegas Valley Water District made a commitment with the facility, location and money for equipment. Nevada Power allowed the facility to use the electric power from the water district power supply for downtimes, and bought energy credits from PowerLight, which helped make the project cost feasible. This type of partnership is now being utilized in the NAFB project.

CHAIR TOWNSEND:
I think we should be reminded of some facts, in light of people who say that the casinos and residential clients are consuming most of the electricity. In southern Nevada, the largest consumer of electricity is the Southern Nevada Water Authority. The second largest user is the Clark County School District.

MR. WAYNE:
The sixth site is the Las Vegas Springs Preserve, which will be opening on May 30. The solar facility will be ready at the same time. This is a water-district project and they estimate one million to two million visitors a year. It will be a showcase of renewable-energy technology, and the first thing visitors will experience, will be to park in the shade under solar canopies.

The largest PV solar project in the United States, possibly in the world, is our NAFB project; for which we will be appearing before the Public Utilities Commission of Nevada (PUCN) this morning for final approval. It is on 140 acres on the NAFB, in the northeast corner, some of which is a landfill. This project will produce 15 megawatts of solar power and will displace 30 percent of the energy usage at the base, which would be comparable to a city of 14,000 people. The U.S. Department of Defense (DOD) has become critically aware of energy security issues. We financed this project using a third party. No U.S. tax dollars are spent on this project. Because we were so successful in getting this approved through the military's own bureaucracy, we were asked in January to appear before a committee including Admiral Woolsey at the Pentagon to tell them how we managed to get this project through approval as fast as we did. Al-Qaeda and other terrorist organizations have made explicit threats against energy installations, both here in the United States and in the Middle East. This is fact, not speculation. Robert Gates, the current DOD chief is doing everything he can to try to safeguard these installations' ability to operate, in case the power grid goes down.

The next phase of this solar movement is electric vehicles, which I believe to be the most important project, not just to Nevada but the world. The U.S. electric grid is the largest machine in the world; it is also a strategic asset of the United States and is unbelievably underutilized. Only 40 percent of the potential output is used because of peak versus base load. The U.S. Department of Energy has just done a study that shows if we used electric cars, we could power the majority of U.S. light-vehicle fleet with the existing infrastructure of our power grid. Without a single new investment in generation or transmission, there is enough off-peak capacity in our power grid, as noted in the slide marked V2G, Exhibit D. That reduction amounts to $400 million a day of imported oil that we would not use. The real energy shortage is our dependence on liquid fuel for cars. If we could use the electric grid to power cars, we could increase the power company's economics. There would be significantly less urban pollution. Although we would be trading urban tailpipe pollution for

remote smokestack pollution, there would ultimately be a net decline and lower carbon dioxide (CO_2). There are a lot of winners in this paradigm shift but there are two big losers, the oil companies and the car companies.

SENATOR CARLTON:
Are we going to have to generate more electricity to charge these electric cars, or will we be charging our cars in the evening and using the grid to more of its potential?

MR. WAYNE:
I believe the electric car is going to happen regardless of the opposition from the oil companies and the big-six automobile manufacturers. It is such a smart way to go, looking at the success of Toyota with the Prius. The newest hybrids will be a plug-in that will get 100 miles a gallon. Toyota has the hybrid Prius that they are already building as an alternate plug-in; General Motors has one called the Volt. Now there is breakthrough technology for lithium-ion batteries somewhat like the lithium batteries your laptop uses. Not surprisingly, this innovative technology is coming out of Silicon Valley; we will never get an electric car out of Detroit because they rely on a combustion engine. Car manufacturers rely on car dealers who then depend on parts and maintenance. Having electric cars that can go 100,000 miles with no maintenance will be the death of most car dealers and in turn to the major car manufacturers. This new Tesla car goes faster from zero-to-60 miles an hour than a Ferrari, and gets 135 miles a gallon or 250 miles on one electric charge. The sports car Tesla has been testing is a market-entry strategy. They already have lower-cost cars on the drawing board.

Renewable-energy technologies did not have any natural allies when we came up through the ranks because we were pitted against the normal utilities. In the electric car market, our best allies are the utilities. We have proposed that the NAFB site be a national test center for development of electric cars. The Defense Department is interested in this market because those electric vehicles can be used in a base power outage. Each vehicle has 50 kilowatt-hours of battery power. In an emergency, the cars could be sent to any load on the base to run it. They are not fixed sources like generators. If there was an electrical outage in Las Vegas and the base had a contingent of electric cars, those cars could be dispatched to a hospital or senior center to provide power. We believe that the DOD will pay a premium to engage this market. PowerLight applied for a DOD grant which was approved partly because of U. S. Senator Reid's clout.

Tesla Motors, Incorporated, one of our partners in this venture, has started an assembly plant for their next-generation cars in New Mexico. I tried to get Nevada into the running to locate the plant here, but I was too late into the process. Tesla also wants to get into battery manufacturing and some of the best lithium-ion technology battery companies are located here in Nevada. Those companies, Alto Nano, Valence Technology and Peak Power are state-of-the-art battery companies.

SENATOR SCHNEIDER:
What kind of recharge time do these cars need?

MR. WAYNE:
A completely depleted battery would take four hours. A 30-minute commute could be recharged on your lunch hour.

SENATOR SCHNEIDER:
Possibly, we should try to get the Tesla people before our committee. We may need to look at setting some of our corporate average fuel-economy standards. Maybe we could get former Vice President Gore here to help us with that issue. Perhaps, we could add an amendment to the renewable-energy bill to add a requirement of having so many electric cars as test vehicles added to our State fleet.

SENATOR HARDY:
I think we should conduct some research with regard to registering electric cars in Nevada so we are on top of this. We want to be ahead in the process with the possibility of electric cars in Nevada.

CHAIR TOWNSEND:
We need to visit San Jose to see the Tesla operation. We should also speak with them about the Las Vegas Speedway. The Las Vegas Speedway is not just a racetrack, it is primarily a test facility that is also used for four major races. The Speedway is used everyday by tire manufacturers, spark-plug companies and automobile magazines. I would hope that in the future, Tesla would look at building a facility which is next to a test facility like what we have in our State.

GREG FERRARO (Solargenix Energy Incorporated):
I would like to introduce my client and good friend, Donald Points, Chief Financial Officer, Acciona Solar Power, known to most of you, formerly, as

Solargenix, located in the El Dorado Valley in Clark County. Mr. Points is going to talk briefly about Nevada Solar One program and Acciona Solar Power.

DONALD A. POINTS (Chief Financial Officer, Acciona Solar Power):
Our grand opening will be in May. Former Vice President Gore has asked to be included, so in answer to Senator Schneider, he will most likely be in Nevada at that time.

We appreciate the opportunity to speak about our program. Most of you know us as Solargenix. We started a partnership three years ago with Acciona, a company based in Spain, which is the largest renewable-energy developer in the world. In November, we formalized our relationship and in August 2006, we took on the name of Acciona.

Nevada Solar One project has been a long time in the making. Our power purchase agreement with Nevada Power began early in 2003 when it was approved by the PUCN. Soon thereafter, we encountered financial challenges which we solved by the final adoption of the temporary renewable-energy program. Groundbreaking was Feb 11, 2006, and we expect to be in commercial production by April 30 of this year. In my presentation (Exhibit E), you will see pictures of the progress we have made.

Nevada has the best solar resource available, sunshine 365 days a year. All we have to do is capture that power and put it to use. A solar project 39 miles square located in the Southwest could generate as much power as was used in the United States in 1999. That could offset the entire usage of natural gas.

One question people continue to ask about solar, both thermal and PV, is what happens at night, the sun does not shine 24 hours a day? Solar will never completely replace all forms of energy, but geothermal and wind will most likely pick up that slack. The ability to store PV in batteries and the technology on batteries is continuing to improve, so the ability to store for later use is being developed. We are working with UNLV on a storage technology which uses molten salt to store the heat. During the day we collect extra heat, more than we need to run our turbine, then the extra heat goes into a giant hot water heater filled with salt which is then used at night to continue to run the turbine.

CHAIR TOWNSEND:
I just want to clarify that PV technology is normally used for smaller projects such as parking spaces. Thermal is for larger industrial and commercial projects.

MR. POINTS:
We do have a solar-roof technology but it is not used to produce power. We use the solar-roof technology to collect heat, which is then used to drive absorption chillers, thus providing air-conditioning driven by the sun. This same technology is used in industrial applications, where the heat is needed to fire natural gas boilers. Our plant in Boulder City will produce 64 megawatts and it will be the largest solar power plant developed in the last 15 years. There are two larger plants located in California, one of which is located in Kramer Junction near Barstow. That plant is producing 80 megawatts.

MR. FERRARO:
We would like to thank Senator Hardy for his leadership in his district and his work with City of Boulder City to help us bring this to market.

MR. POINTS:
I would encourage you to look through our presentation. We would be more than happy to conduct a tour of the facility. In closing, we are working to bring down the cost of this technology. We are working with Washington, D.C., to try to extend the investment tax credit by an additional eight years. If anyone here can help with that effort, it would certainly be appreciated. Two of the single-source components we use in our production are only made in Germany, so we are trying to convince these companies that they need a plant in the Southwest, preferably in Nevada. By developing our storage capability, we will be able to provide thermal-solar power even though the sun has set. Nevada Power still has a peak load after the sun goes down, consequently they still need more power. If we can store, we can provide four more hours of power after sundown. It is not economical to store solar for more than four hours.

CHAIR TOWNSEND:
I would like to introduce Dr. Lisa Shevenell from the University of Nevada, Reno (UNR). Dr. Shevenell has over 22 years of experience in geothermal exploration and research. She is currently the Director of the Great Basin Center for Geothermal Energy at UNR. Her areas of expertise include groundwater hydrology, geothermal systems, isotope hydrology and aqueous geochemistry. Dr. Shevenell has held research positions at Los Alamos National Laboratory,

the Desert Research Institute, Oak Ridge National Laboratory and our own Nevada Bureau of Mines and Geology. It is an honor to speak to you.

DR. LISA SHEVENELL PH.D. (Director, Great Basin Center for Geothermal Energy, University of Nevada, Reno):
I was asked to give a general overview of what geothermal is and what our center is doing (Exhibit F). Geothermal is any area where energy can be tapped from high-temperature waters in the near surface of the earth's crust. Most sites are located within an area of hot springs although hot springs are not always present at these geothermal sites.

The graph shows the different temperatures that provide different uses, such as soil warming and cooking at lower temperatures. At the higher temperatures you can start to produce power. At 200 degrees, binary power is produced, which is the technology ORMAT uses that Paul Thomsen will talk about in a later presentation. At even higher temperatures you can use the hot water directly, to flash to steam, which then turns turbines.

To use geothermal systems you drill wells, both production and injection wells. You then pump water out of the system to turn the turbines and the used water is then injected back into the system to keep the pressure and temperature in the underground even so that the resource is not depleted. Most of these systems operate 24 hours a day, 7 days a week.

Reykjavik, Iceland, as the slide shows very dramatically, used to be powered and heated exclusively by fossil fuels in the 1930s. Today, Reykjavik has 100-percent power and heat from geothermal and it is now obviously cleaner with much less pollution.

Besides the normal outreach training and education component, we have been funding graduate students who are moving into the workforce. We are working on an undergraduate degree and training a variety of professionals, including international requests for training from Ethiopians and Chileans who would like to learn this technology for their own countries. We make our studies available on the Web so that the industry can obtain this information at any time. The Great Basin Center is developing an international reputation. Essentially our mission is to work in partnership with industry to establish geothermal technology as a sustainable environmentally sound and competitive contributor to the energy supply in the United States.

Nevada has a large geothermal resource base and UNR has a core group of qualified people who conduct this research and contribute to educating the next generation of the workforce.

Geothermal is a relatively small industry that is growing rapidly but aging so we need to get a workforce developed quickly. Our industry partners are listed within Exhibit F. I was asked to address obstacles and barriers to power plant development. Our biggest barrier to progress is the Bureau of Land Management land permitting for access. They stopped issuing permits in 2005 so this has overshadowed everything else. They are bringing out new rules in the next couple of months and a lease sale is supposed to be scheduled, so that may help.

We are developing a college minor in renewable energy. Additionally, we are collaborating with the colleges of business, engineering and science. In this way students will be aware of the general issues associated with geothermal-energy production.

CHAIR TOWNSEND:
Do we need to look at developing broader curricula at the university level for our future needs with regard to the renewable energy spectrum?

ROBERT E DICKENS (Ph.D., Director, Office of Government Relations, University of Nevada, Reno):
It is very clear to me that renewable-energy appropriations should be given to research universities, north and south. This should be of high priority. There seems to be an appropriate division of labor between both of our universities, with solar taking precedent in the south and earth resources in the north. We need to build on the existing institutional strengths.

CHAIR TOWNSEND:
Could you ask the appropriate individual at system level to have them appear before the Committee over the next week to walk us through what they are teaching and what they are researching on each campus, and how we can better support these ventures? The Committee needs to understand the totality of what is being done at each facility.

DR. SHEVENELL:
We have funded some graduate students and ORMAT has hired some of our first graduates. We are hoping to develop workshops and short courses to help in the international arena as well.

PAUL A. THOMSEN (Public Policy Manager, ORMAT Technologies, Incorporated):
I have a presentation that will highlight the exciting development in geothermal technology (Exhibit G, original in on file in the Research Library). ORMAT is a vertically integrated company that designs and manufacturers their own geothermal equipment. We also own and operate power plants in North America that sold energy worth $289 million in 2006.

I would like to acknowledge that RPS has been the pivot point for bringing in the newest projects for Nevada. ORMAT is producing 100 megawatts of geothermal power annually in Nevada. This production displaces 220 million tons of oil and 750 million tons of CO_2.

At ORMAT, we are committed to using emerging technologies for innovation, and we are looking forward to bringing additional projects of binary technology online. We strongly urge the Legislature to protect and not water down the RPS. It is essential to future opportunities for renewable electricity development in Nevada.

CHAIR TOWNSEND:
The key to understanding this whole issue of energy is keeping in mind the base load component. Visualize how much geothermal and all of the other types of renewable-energy can help us keep up with Nevada's growing need for energy.

VICTOR BURON (President, Solar Seeker):
I represent a small company here in northern Nevada called Solar Seeker and I would like to tell you about our venture. My choice of renewable energy is PV because I think that it is going to be the easiest access in which to participate for the everyday man. We started this to make mobile units to track solar energy. We would like to develop new architecture for home building. Eighty percent of existing homes do not face in the proper position for PV energy. We could use some help since there is no investment money available for the lower level, small company. We have a prototype unit and received our patent in less than 12 months. We would like to license out our product. I have

talked with a lot of people including Dr. Boehm. I would just like to say that we are eager to be part of the future of energy in Nevada.

CHAIR TOWNSEND:
This committee believes strongly in working together for the common good. This area of solar energy is going to be a big component of Nevada's future. If there is no further testimony we will adjourn the Senate Committee on Commerce and Labor at 10:21 a.m.

RESPECTFULLY SUBMITTED:

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Lori Johnson,
Committee Secretary

APPROVED BY:

_____
Senator Randolph J. Townsend, Chair

DATE:_____