BEFORE THE ARIZONA POWER PLANT

AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES, SECTIONS 40-360, et seq., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING CONSTRUCTION OF A 230 kV DOUBLE-CIRCUIT TRANSMISSION LINE ORIGINATING AT THE PLANNED AND PERMITTED ABEL SUBSTATION, NEAR JUDD AND ATTAWAY ROADS IN PINAL COUNTY, TO THE PLANNED AND PERMITTED RS-17 SUBSTATION, ADJACENT TO THE EXISTING MOODY SUBSTATION, LOCATED NEAR PECOS AND RECKER ROADS, IN THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA, AND INCLUDING A NEW 230/69 kV SUBSTATION NEAR THE INTERSECTION OF COMBS AND MERIDIAN ROADS, IN OR ADJACENT TO THE TOWN OF QUEEN CREEK, ARIZONA.

Docket No. L-00000B-09-0311-00148

Case No. 148

NOTICE OF FILING DIRECT TESITMONY OF CHUCK RUSSELL

NOTICE IS HEREBY GIVEN that the Applicant, Salt River Project Agricultural Improvement & Power District is filing the Direct Testimony of Chuck Russell regarding the need and purpose of the project.

DATED this 29th day of July, 2009.

JENNINGS, STROUSS & SALMON, P.L.C.

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All parties of record

By:_____

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DIRECT TESTIMONY OF CHUCK RUSSELL

ON BEHALF OF

SALT RIVER PROJECT AGRICULTURAL

IMPROVEMENT AND POWER DISTRICT

Q. Please state your name and your affiliation with Salt River Project.

A. My name is Chuck Russell. I am a Principal Planning Engineer in SRP's Transmission Planning Department.

Q. What is your role with respect to the Abel Moody transmission project?

A. The Transmission Planning Department is responsible for determining the timing and scope of needed system upgrades. It is my department that has established the need for this project, as I will discuss later in my testimony. I worked with the Project Manager, Tom Novy, to help him communicate the purpose of this project and how the project integrates into SRP's system and future plans.

Q. Mr. Russell, Exhibit SRP-002 is a resume of your experience. Please describe your experience.

A. I've been with SRP for thirty years. Approximately 27 of those years, I've been in involved in the planning of SRP's transmission system. For the last eighteen or so years, I've either supported, participated in, or directed the work necessary to make applications and receive Certificates of Environmental Compatibility for transmission projects for the Salt River Project.

Q. Mr. Russell, before I ask you to introduce the Abel Moody project, can you briefly introduce the applicant, referencing SRP-003 as needed?

A. Salt River Project has a rich history in the Valley. It was formed by the landowners in the Salt River Valley at the turn of the last century to "reclaim" the arid desert land that was Phoenix. SRP has grown with Central Arizona.

From its beginnings SRP has been a major force in the development of Central Arizona, bringing reliable and low cost water and power to homes and businesses.

Today SRP serves over 930,000 electric customers over its 2,900 square mile service territory. SRP's service territory is shown in SRP-004. SRP is one of the largest municipal (which means publically owned) electricity utilities in the nation. It is SRP's mission to anticipate and meet the needs of its customers, and this Abel to Moody Transmission project is an example of SRP's proactive planning.

Q. Mr. Russell, we have marked as Exhibits SRP-137 and SRP-138 two maps, which are reproduced on the front and the back of the placemats that have been provided to each Committee member. Of course we will get into detail later, but can you identify these maps?

A. Yes, these maps show the facilities and alternative routes that are the subject of this application. Exhibit SRP-137 is a route map which highlights the jurisdictions within the study area. Exhibit SRP-138 is a route map that is overlaid on an aerial photo of the area.

Q. Mr. Russell, as background to the discussion of the Able Moody Transmission Project, would you please generally describe the general operation of a transmission system.

A. Yes, SRP-005 is a simplified depiction of the transmission system, but it is good to generally illustrate how it works. The general purpose of electrical transmission systems is to get the power and energy generated by generating stations to the customers. This graphic depicts the system by showing the generator connected to a 500kV line. In the west, a great number of the

generators were developed remotely from the load the generators serve. 500kV lines (as well as a few 345kV lines) bring the output of those remote stations to the load pockets or utility's service territory. The 500kV lines connect to stations that transform the voltage from 500kV to 230kV. Then 230kV lines leave the stations to deliver that power to more local stations that are called "receiving stations" on this graphic. At those stations the voltage is transformed to 69kV and delivered over the 69kV system or as it is shown on the graphic, the subtransmission system, to our neighborhood distribution substations. At the distribution substations, the voltage is transformed to 12kV and is brought to a smaller transformer either on a pole in your alley, or the box in your or your neighbor's front yard. It is transformed to 240 volts or 120 volts and brought to your meter for your use.

Q. Can you relate this discussion specifically to SRP, using Exhibit SRP-006 as a guide?

A. If you would refer to Exhibit SRP-006, I'll explain in more detail SRP's existing system. I'm showing a map of the state of Arizona. The map depicts some of the extra high voltage transmission lines that serve Arizona. There are 500kV lines and 345kV lines. Some of these lines are owned by SRP, or SRP has an interest in the lines to bring power and energy from remote resources into SRP's load service territory. I'm pointing to the northern edge of Arizona where the Navajo Generating Station is located outside of Page, Arizona. I'm now pointing at the eastern edge of Arizona where the Coronado Generating Station is located near Saint John's, Arizona. I'm now pointing at the Four Corners area where the San Juan Generating Station and the Four Corners Generating Station are located. There are others, but those are representative of remote generating sites. The lines you see on the graphic show the

transmission system that was developed to bring the power from those stations to the valley, or to the load service territories of the other owners. The map now depicts SRP's load service territory which encompasses most of the Valley. The next elements shown are the 230kV stations that I mentioned earlier in the simplified diagram.

Q. Please focus on the SRP electric service area, using Exhibit SRP-007.

A. SRP-007 is a blow up of the portion of the map showing SRP's load service territory. On this graphic, you are able to see the 230kV system that connects the stations shown on the previous graphic. I'm also showing what SRP calls "receiving station areas" on this map. SRP has a defined service territory, and we have created a "master plan" of these receiving station areas. Some areas have stations built and operating and some have stations planned and sites acquired, but not developed. Finally some areas are areas for which we have plans, but haven't completed the work to identity the stations sites. We have been building to this master plan, and the RS24 area is a part of that plan.

Q. Please now focus your discussion on the Queen Creek area, using Exhibit SRP-008.

A. SRP-008 is a blow up depicting the area around the RS24 receiving station area. What I wish to point out here is the location of the receiving station area, into which we wish to build the station. And the points into the system we wish to connect with this project. The area shown on this graphic is currently being served by existing facilities to the west and north. As the load grows, the capacity of that system is being used by the load development near that system and we have to build additional facilities to provide for the existing and developing load in the RS24 area.

Q. Using SRP-008, please introduce the Abel Moody Transmission project to the Committee.

A. As I have discussed SRP has divided its service area into areas that will be served by a central 230/69kv substation. Most of these areas already have a 230/69kV substation. The area around Queen Creek, which we call RS24, does not yet have its own substation. Currently, it is served by long 69kV lines coming from other substations. As growth occurs it is appropriate to build out the substation for the area.

The Abel Moody transmission project will site a new RS24 substation near the center of the load area. It will connect RS17, a permitted but not constructed substation with the Abel Substation which has also been permitted but not built. The RS24 Substation will be served through the 230kV transmission system, and will step voltages down to 69kV, where they can be distributed locally. The 230kV link will be provided from two directions, the Able Substation to the Southeast, and the Schrader and Santan 230kV line from the Northwest. The project will also accommodate 69kV circuits on the same structures, where appropriate and needed.

Q. Mr. Russell, the project is called Abel Moody, but you did not mention a Moody substation, can you explain why?

A. The Moody substation is a small neighborhood 69kV substation. We used Moody in the project description because it is the likely geographical point of the Santan Schrader interconnection and eventually RS17 substation will be built adjacent to the Moody substation.

Q. Mr. Russell, SRP is here proposing an expensive project. We will hear cost estimates from $50 to $60 million. Can you explain why, in these economic times, SRP is seeking to permit and proposing to build this project?

A. SRP is faced with two potentially conflicting objectives. The first is that SRP does not want to burden customers with expenses for facilities that are not needed, yet. This is a very important concept. SRP cannot and will not take lightly any capital expenditure, but particularly one of this magnitude. But, SRP has an equally compelling objective to provide reliable electric service to its customers. We all know that growth has significantly slowed since the time SRP initiated the sting process. But, growth still occurs, though perhaps on a longer time line. SRP needs to plan for and be prepared for this inevitable growth. In the next part of my testimony I will discuss the three drivers for this project. I emphasize that we will be requesting flexibility on the timing from this Committee

Q. Mr. Russell, please summarize the purposes of the Abel Moody Transmission Project.

A. This project has three purposes. They are: number one, delivery of power to customers; number two, increase reliability of the electric system and number three, to provide access to renewables and other generation resources.

Q. Mr. Russell, I want to discuss each of these three purposes in more detail. Let's start with the first one, delivery of power to customers. Using Exhibit SRP-009, please describe how the Queen Creek area is served now.

A. As I had mentioned earlier, this area is being served by SRP today. The power

comes to this area by 69kV lines that bring power from 230kV stations in other receiving station areas. Please refer to SRP-009 on the screen. I'm pointing at the Santan station, the Schrader station, and the Dinosaur station. Now I'm pointing at the Browning station, and the site of the future Abel station. Currently 69kV lines from these stations run into the RS24 service area, connecting to 69/12kV substations to provide service to the RS24 area.

Q. Why do you propose to change this?

There are three reasons for this. The first has to do with the length of the lines. Longer lines have greater exposures to outages. By terminating these lines into a station situated closer to the load being served, you reduce the exposure to outages caused by weather, vehicles, and Mylar balloons.

The second is to reduce electrical losses in the system and bolster voltages at the customer's meter. Losses are a function of the length of the line and the level of current through the line. Long 69kV lines are less reliable, but they are the most effective way to serve areas with light load (lower current levels). As the load increases, losses increase and there comes a "tipping point", where it becomes technically and economically reasonable to add a new 230/69kV station to the system and terminate the long 69kV lines into that new station. As you shorten the 69kV lines from the source (the station) to the sink (the customer) you lessen the losses associated with that delivery. Shorter lines also result in more stable voltages. Voltages drop (or lessen) the farther you get from the source. By keeping the lines short, you can keep the voltages within an acceptable operating range.

The third reason is to accommodate load growth by increasing transformer capacity. As the load grows, and the capacity of those stations nears their limits, new capacity has to be developed to serve the load in the immediate

area. This project is to develop that new station for service to this immediate area, and the 230kV transmission lines to connect that 230kV station with the existing system.

Q. Can you show the changes in serving local load by constructing this project, and use Exhibit SRP-010?

A. If you would refer to Exhibit SRP-010, you will see how the station circled in green will integrate into the existing system, "breaking" the lines by bringing them into the station. This station feed by the 230kV system not shown on this map shortens the lines from the source to the sink, and it connects those areas served by long lines to a much nearer source.

Q. What is the "tipping point"?

A. I will answer this question with the proviso that there are three drivers of this project, not just serving local load. Exhibit SRP-011 shows projections of load growth in the Queen Creek area. We show two projections. One was the projection before the economic slowdown, and the other is the current forecast. As you can see, while growth has slowed, there is still growth, and that growth drives the need for this project. While not exact engineering, we feel that the "tipping point" for the need of a local 230kV station will occur around the 2016 time frame. This could of course accelerate or slow, depending on economic conditions and usage patterns.

Q. Mr. Russell, please discuss the second purpose, reliability.

A. My prior answer focused on the Queen Creek area. But growth is occurring throughout the system. So, for example as load grows more stress is placed on the lines and existing substations in the larger area. So, a second purpose of this project is to relieve the stress on the system generally.

As you can see on SRP-012, the existing, or soon to be existing, system is a single line from the Abel station up through Browning into SRP's existing system. If you add this project as seen by the line coming onto the map, you create a loop from the from the Abel station into SRP's system. With the addition of this line, you can remove any section of line, or open breakers in the stations connected by these lines without having to remove customers from service. The result is that we relieve the stress on existing lines and substations, and provide greater reliability through redundant paths as you can see by this graphic.

Q. Mr. Russell, what is the third purpose?

A. The third purpose relates to regional transmission planning and the ability to bring new resources to load.

Q. Can you describe regional transmission planning?

A. Transmission planning of facilities is not done in a vacuum. The study of transmission additions to the system whether local or regional is done at several levels and is subject to certain standards. SRP is a member of several subregional planning groups as well as Western Electricity Coordinating Council (WECC). These groups and WECC coordinate development of base cases that review the impacts of transmission line additions and the subsequent loss of any of those elements, and in some cases multiple

elements. The results of these simulations must adhere to minimum reliability standards or the utility responsible for that part of the system is subject to sanctions.

In recent cases, the committee has heard reference to the Central Arizona Transmission System Extra High Voltage (CATS HV) subcommittee and SouthWest Area Transmission Study Group (SWAT). These are two of the entities in which SRP participates, as well as WestConnect and the WECC. This project has been included in the base cases these groups have used to study the system. Inclusion of this project results in benefits to the local system as well as demonstration there are no adverse impacts on other parts of the overall interconnected system.

Q. Mr. Russell, you mentioned bringing new resources to the load. What types of new resources will this system accommodate?

A. Well a robust system will support all types of generation. But, our planners recognize that much of the new generation will come from renewable sources, which may be placed in geographically diverse locations. The graphic that you see on the screen now is SRP-013. It shows the southern half of Arizona and some of the transmission system there. Also on the map is Palo Verde or what we describe as the Palo Verde hub. There are a number of transmission lines that connect Palo Verde to the Valley, as well as to points west such as southern California and the Yuma area. Because of these strong system ties, the Palo Verde hub has been identified by a number of energy developers as a good location for renewable energy projects. Some are proposed to connect to the switchyards, and many are proposed to connect to the lines out of the switchyard, but the upshot is that there are plans for a considerable amount of solar generation in the preliminary stages of development at the Palo Verde

area. With the development of the Southeast Valley Project, SRP may access this energy for delivery to this proposed project for delivery to our customers. There is also a depiction of the SunZia Southwest Transmission project. This is a transmission project being developed by a number of parties to access renewable energy projects proposed for central and southwestern New Mexico, as well as southeastern Arizona. One proposed termination of the SunZia project is into the Southeast Valley Project which connects to the Abel station, potentially connecting SRP's customers to more renewable generation.

Q. How do these proposed new generation sources relate to this Abel Moody project?

A. Abel/Moody provides a subdistribution link to facilitate increased import from the Southern Arizona system, which I have described.

Q. Mr. Russell, please discuss the sequencing of construction and the expected time frame.

A. SRP-014 through SRP-018 Please direct your attention to the screen where exhibit SRP-014 is showing. This graphic is a close up of the existing system near the Moody distribution substation. The current configuration of the 230kV lines out of Santan to the Schrader substation is a double circuit 230kV transmission line with the two circuits connected by jumpers. This creates a single circuit. SRP does this when we know we will need the capacity of two lines in the future, but only require a single line for the interim. We only have to have a single termination in the stations to connect the transmission lines. When we need the capacity, we open the jumpers, and add a new termination to the two stations at either end of the transmission line.

SRP's plans call for the first of the two circuits by 2012. SRP-015 shows what

we plan to do with the first circuit. We will remove the jumpers on the existing Santan to Schrader 230kV line, and connect the new Abel 230kV circuit to one of those. This will create a new Abel to Schrader 230kV line, as well as retain a Santan to Schrader 230kV line.

SRP-016 shows the configuration in this area when we install the second 230kV circuit on the structures in 2014. In 2012, we left a portion of a circuit that went from Santan to a point on a structure outside of the Moody distribution substation. The second 230kV circuit from Abel will connect to that "abandoned" portion. This will create an Abel to Santan 230kV circuit. So now we have an Abel to Schrader 230kV circuit and an Abel to Santan 230kV circuit on this project's structures.

The dog leg shown on the graphic in SRP-016 begs the question of why? SRP-017 and SRP-018 show the reason for that. The future 230kV station that will be built next to the Moody distribution substation will require 230kV connections. This dog leg will allow SRP to terminate both the Santan to Schrader and the Abel to Santan lines into the future station providing connection to strong sources for that station in the future. SRP doesn't have an estimated date for the construction of this station, but as the area grows, and additional capacity is needed to handle the growth at Gateway airport and the development envisioned at the old GM proving grounds, this station will move into our construction window.

This plan calls for the RS24 station to be constructed for an in service date of 2016. Both lines will ultimately be terminated in the new station. If you'll direct your attention to the screen, I'll ask for SRP-019 to be shown. This is a schematic of the RS24 station and what we plan on having in the station in its initial development.

The next exhibit, SRP-020 shows what we envision being the ultimate

development, or build out, of the RS24 station. We are thinking there may be two additional 230kV lines beyond what we are requesting with this application. If those materialize, we will more than likely be before this committee again asking for authority to construct those two.

This diagram also shows the 69kV lines that we plan to connect to this station. If you will recall the simplified diagram showing the electric system I showed earlier (SRP-010), these lines connect RS24 to the neighborhood stations that eventually tie to homes and businesses.

I also have a photograph of another 230/69kV substation. Please show SRP-023. RS24 will be similar in design to this station.

Q. Mr. Russell, how much time is SRP requesting to build this project?

A. SRP is requesting 12 years. Our current plans are to finish the project before this time, but load growth is quite difficult to project in the current environment, and it is possible that the construction may extend out further. We do not want to build facilities too far in advance of need, as these are costs that must be then paid by our customers.

Q. Please describe the transmission structures that SRP proposes.

A. If you will direct your attention to the screen again, I'll ask SRP-021 be placed on the screen. This is a double circuit 230kV pole. It is taken from the application and shows one of the proposed pole types for the transmission line. Another example can be seen on SRP-022 which is a depiction of a 230kV double circuit pole with a 69kV underbuild. These are what will be used generally on this project. Typical double circuit 230kV lines are 115 feet tall. Double circuit 230kV lines with 69kV underbuild are typically 135 feet tall. Typical right of way width to accommodate both National Electric Safety Code

and SRP's maintenance standards are approximately 100 feet wide. Where we are forced into narrower rights of way, we can use a different type of pole and reduce the requirement to 85 feet, at the cost of less flexibility in maintenance of the transmission line and structure. Typically spans, or the distances between towers range from 600 to 1,200 feet, depending on the type of structure and the height of the structure.

There are places where these types will be modified in height or span for particular reasons. Mr. Novy will address those in his testimony.

Q. I have no further questions.

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