EXHIBIT I
NOISE EMISSIONS AND COMMUNICATION INTERFERENCE

The following addresses the requirements of Arizona Administrative Code R14-3-219, which states:

> *Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.*

Background and Existing Conditions

Corona discharge from electrical transmission lines generates audible noise, and radio and television interference. Corona is a luminous discharge that emanates from an energized conductor due to ionization of the surrounding air and is caused by a voltage gradient, which exceeds the breakdown strength of air. Corona is a function of the voltage gradient at the conductor surface. This voltage gradient is controlled by engineering design and is a function of voltage, phase spacing, conductor diameter, conductor bundle, height of conductors above ground, line geometry, and meteorological conditions. In particular, irregularities on the surface of the conductor such as nicks, scratches, contamination, insects, and water droplets increase the amount of corona discharge. Consequently, during periods of rain and foul weather, corona discharge increases. This corona activity contributes to a small increase in power loss and is the source of transmission line audible noise and radio and television interference. For the various transmission line designs considered for the Southeast Power Link (SPL) Project (Project), the maximum calculated voltage gradient at the conductor surface is lower than corona inception and extinction levels. Successful operation of 230 kilovolt (kV) transmission lines with similar gradients indicates that the Project would only create modest corona effects.

Noise

Noise is defined as unwanted sound. Sound travels in waves from a specific source and exerts a sound pressure level (referred to as sound level), which is measured in decibels (dB). Zero dB corresponds roughly to the threshold of average human hearing and 120 to 140 dB corresponds to the threshold of pain. Human response to noise is subjective and can vary from person to person. Factors that can influence individual response include intensity, frequency, and time pattern of the noise; the amount of background noise prior to the intruding noise; and the nature of work or human activity that is exposed to the noise. **Table I-1** depicts average decibel levels for everyday sounds.

Table I-1. Common Noise Levels		
Type	**Description**	**Decibel Level**
Painful	Firearms, air raid siren, jet engine	140 dB
	Jet take-off, amplified rock music at 4-6 feet, car stereo, band practice	120 dB
Extremely Loud	Snowmobile, chain saw, pneumatic drill	100 dB
	Lawnmower, shop tools, truck traffic, subway	90 dB
Very Loud	Alarm clock, busy street	80 dB
	Conversation, dishwasher	60 dB
Moderate	Moderate rainfall	50 dB
	Quiet room	40 dB
Faint	Whisper, quiet library	30 dB
Source: American Speech-Language-Hearing Association 2007		

Audible noise associated with transmission lines as a result of corona discharge is a function of line voltage. The amount of audible noise is directly related to the level of corona activity, which in turn is affected by the conductors' physical condition, contamination and meteorological conditions, most notably rain. Transmission line audible noise is characterized by crackling, frying, sputtering, and low frequency tones, which are best described as humming sounds. Audible noise from transmission lines primarily occurs during foul weather conditions. Audible noise increases with rain or during dust storms, although it is generally masked by the background noise of rain and wind. In dry or fair weather conditions, the conductors operate below the corona-inception level and noise is typically only slightly audible at the edge of the transmission line right-of-way (ROW).

For the new RS-31 substation, transformers are expected to be the major source of audible noise. The predominant noise from a transformer is a hum, comprised of sound in the frequency range of 75 hertz (Hz) to 1200 Hz, within the frequency range of the human ear. The transformer sound level is specified at the time of purchase and the specified sound level is controlled by the design and manufacturing of the transformer. The specifications for a transformer require a design that is in compliance with the sound level limits specified by industry standards, governing regulations, or local ordinances. Disconnect switches and circuit breaker operations create momentary, but very infrequent noise.

Environmental noise is usually measured in A-weighted decibels (dBA). Environmental noise typically varies over time, and different types of noise descriptors are used to account for this variability. The noise descriptor most commonly used to establish noise exposure guidelines for specific land uses is the day/night average noise level, commonly referred to as DNL. The noise level experienced at a particular site or area depends on the distance between the source and a specific receptor (humans, wildlife, etc.), presence or absence of noise barriers and other shielding features, and the amount of noise reduction provided by the intervening terrain. Some land uses

are considered more sensitive to noise levels than others due to the amount of noise exposure and the types of activities typically involved.

Sources of noise along the Proposed Alignment primarily relate to air and highway transportation sources and would include nearby Loop 202, Phoenix-Mesa Gateway Airport, State Route (SR)-24, Crismon Road, and local access traffic. Agricultural, Commercial, and Industrial noise would also contribute to noise levels near the Project Study Area (PSA). Baseline ambient noise levels were estimated using the relationship between population density and noise levels.

The PSA can be categorized as being largely vacant, with some industrial, agricultural, and commercial lands. In the area around the new RS-31 substation the land use is vacant and near the Loop 202. Typical ambient noise levels for these densities range from 50 to 60 dBA depending on where the substation is related to the Loop 202 and traffic noise.

There is an In-Home Day Care facility near the Proposed Alignment and the RS-31 Substation Siting Area along the Loop 202. Additionally, a school is being constructed near the Proposed Alignment along the north side of the future SR-24. The existing traffic and airport noise would typically be more than a new transmission line. There are no other sensitive noise receptors including assisted living facilities, neighborhood parks or aquatic centers located within 1,000 feet of the Project. There are no other schools, hospitals or churches located directly within or immediately adjacent to the Project.

Noise impacts of the Project would result from construction, operation, and maintenance activities. During construction, equipment used for clearing and grading (substation, access roads, and structure sites), assembly and erection of structures, wire pulling and splicing, and rehabilitation activities would generate noise. This heavy equipment would include backhoes, trucks, and tractor graders. **Table I-2** identifies typical construction equipment noise levels.

Table I-2. Typical Construction Equipment Noise Levels

Equipment Type	Noise Level at 50 Feet
Backhoe	85 dB
Front-end loader	85 dB
Concrete truck/mixer	85 dB
Water truck	81 dB
Tractor grader	80 dB
Flat-bed trucks	84 dB
Source: US EPA 1971	

Noise from construction activities may be audible, particularly to the closest residents in the subdivisions north of the Proposed Alignment along Loop 202. This construction noise, however, would not be considered to be a major impact, because construction would occur during daytime

hours when tolerance to noise is higher and likely to be considered only a nuisance. In addition, the freeway noise may be at a higher decibel level than construction.

During high-voltage transmission line operation, generated noise from transmission lines can best be described as a crackling or hissing sound. Generally, noise is not noticeable on a 230kV transmission line, but may occur during wet-weather conditions such as rain, and possibly during the summer for brief periods after wind storms deposit dust on the line conductors. During maintenance activities, noise could be generated from a vehicle driving along the access roads for structure and line inspection, or equipment and crew conducting maintenance or repairs. Noise from the operation of the new RS-31 substation would generally be described as a low hum and also would increase in hot-weather conditions when transformer cooling fans and pumps are more likely to be in operation.

Noise generated by the construction of the Project would be consistent with other residential, commercial, and industrial development that exists in the PSA. Night-time construction would be limited to comply with noise ordinances in the City of Mesa, Town of Queen Creek, and Maricopa County.

Due to the predominately vacant, industrial, agricultural, and commercial nature of the area adjacent to the Project, operational noise impacts to employment centers, residents and visitors will be minimal.

Communication interference

High voltage transmission line radio frequency noise is not expected to be noticeable outside the immediate vicinity of the transmission lines. Radio interference is most likely to affect the amplitude modulation (AM) broadcast band; frequency modulation (FM) radio is rarely affected by transmission lines. Only AM receivers located immediately adjacent to the transmission line have the potential to be affected by radio interference, and the effect may only be significant during rainy weather.

The radiated noise field intensity diminishes with increasing frequency. At frequencies above 30 megahertz, the radiated noise field intensity is so low it is difficult to detect. Therefore, FM radio reception and cellular telephone communication are above the frequency range where radio interference has been experienced with previous projects, and no objectionable interference is expected with any of the Project components. At the frequency range of FM radio or above, any rare instance of interference would generally be due to microsparks, which can be identified and corrected.

Salt River Project Agricultural Improvement and Power District (SRP) utilizes field intensity instrumentation capable of measuring radiated noise and interference from 150 kilohertz up to 1 gigahertz. These instruments are used for investigating reports of unusual relatively high transmission line noise, as well as for compiling ambient noise level data.

Radio interference is expected to be minimal, due to predominately industrial, commercial, office and suburban character of the area along the Proposed Alignment and the proposed ROW widths for the Project. Furthermore, SRP is ready to address radio interference resulting from construction and operation of the proposed transmission line with corrective measures such as smoothing nicks on the conductor surface or tightening hardware, which can be implemented to eliminate radio interference complaints. In addition to any transmission repairs, relevant corrective actions may include adjusting or modifying receivers; adjusting, repairing, replacing or adding antennas; antenna signal amplifiers; filters or lead-in cables; or other corrective actions. Based on the design parameters and physical configuration of the proposed facilities for the Project, no objectionable noise and interference with radio signals is anticipated.

FAA Review

Given the proximity of the Proposed Alignment to the Phoenix-Mesa Gateway Airport, SRP retained Federal Airspaces and Airways (FA&A), an independent aviation consulting firm, to perform a preliminary review and analysis of any aviation issues related to the SPL project, to assist in the preparation and filing of any application that needs to be submitted to the Federal Aviation Administration (FAA), and to address any questions the line siting committee may have relating to this subject. The FAA review will include an assessment of whether the proposed transmission lines and poles will create interference issues with the airport's radar system. FA&A's analysis concludes that the proposed lines and poles would have minimal impact on the airport's radar system.

References

American Speech-Language-Hearing Association, Noise, 2017, accessed 5/12/2017. [Online] Located at: http://www.asha.org/uploadedFiles/AIS-Noise.pdf

U.S. Environmental Protection Agency, December 1971, Noise from Typical Construction Equipment and Operations, Building Equipment, and Home Appliances, accessed 5/12/2017. [Online] Located at: https://nepis.epa.gov/Exe/tiff2png.cgi/9101NN3J.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C70THRU75%5CTIFF%5C00003321%5C9101NN3J.TIF

U.S. Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Section 4, Identified Levels of Environmental Noise In Defined Areas. March 1974.