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Sevier County
Economic Development Department

Lighting Impact Analysis for Proposed
Sevier Power Plant

BEAR WEST

1584 South 500 East, Suite 201, Woods Cross, UT 84010 (801) 397-5600

Lighting Impacts Analysis for the Proposed Sevier Power Plant

1.0 Introduction

Introduction

This Light Analysis is conceptual because no specific lighting plan was available for the proposed Sevier Power Plant (SPP). Therefore, it presents some general lighting impact discussion and general lighting impact recommendations. No specific lighting measurements were taken at the site because the baseline would not have been useful given the lack of understanding of the proposed facility lighting details.

Much of the information used in this analysis was taken from the following sources:

- The National Parks Service: Nature and Science. Outdoor Lighting. <http://www2.nature.nps.gov/air/lightscapes/lighting.cfm>.
- International Dark-Sky Association (IDA). www.darksky.org.

This document is organized in the following sections:

- 1.0: Introduction
- 2.0: General Lighting Impacts
- 3.0: Conclusions and Recommendations

2.0 General Lighting Impacts

All lighting, especially industrial lighting, can have an impact on nighttime visual conditions. Where daytime conditions allow the use of coloring to camouflage a large structure, lighting a large structure at night has the opposite effect. If the structure is brightly colored and highly illuminated, it will be clearly visible for many miles on clear nights.

It is assumed that the SPP structure would have to be reasonably well-lit to ensure site security. It is also assumed that the tower will be required to have a flashing beacon for aviation safety purposes. The specifics of this facility's lighting plan are unknown at the present time. However, it can be anticipated that the facility's proximity to the freeway will create the appearance of a brightly-lit beacon from the foreground view. It will be very noticeable, even visually dominant, to motorists passing by on the Interstate and SR-118.

Further, light reflected from the structure will likely affect visibility and brighten the atmosphere between the ground and night sky, making the sky less visible. This kind of an effect is primarily cumulative, but each significant new brightly-lit structure affects night sky visibility. These nighttime visual impacts are possible during both the construction and operational phases. Dwellings and businesses in the area, as well as visitors, recreationists, and passers-by, could be affected by lighting from the proposed SPP.

Light Pollution

Starry night skies and natural darkness are important scenic resources nationwide. While many rural areas still offer pristine nighttime lightscapes, many night lightscapes are becoming marginalized by the glow of artificial light. It is estimated that two thirds of Americans cannot see the Milky Way from their backyard.

The primary cause of diminished night lightscapes is light pollution. According to the International Dark-Sky Association (IDA), light pollution is any adverse effect of artificial light including:

- sky glow
- glare
- light trespass
- light clutter
- decreased visibility at night
- energy waste

The effects of light pollution can easily be seen in Figure 2.1. As previously mentioned, this kind of an effect is primarily cumulative, but each significant new brightly-lit structure affects night sky visibility.



<http://www2.nature.nps.gov/air/lightscapes/images/earthlights.jp>

Figure 2.1: The cumulative effect of light pollution can easily be seen from space, as in this composite satellite view. C. Mayhew & R. Simmon (NASA/GSFC), NOAA/NGDC, DMSP Digital Archive

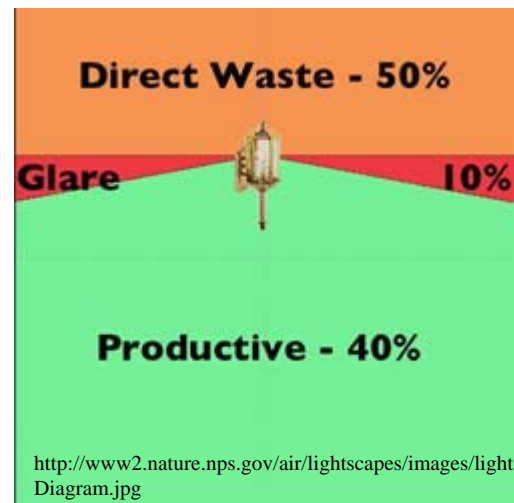
Outdoor Lighting

A primary cause of light pollution is unshielded outdoor illumination fixtures, as seen in Figure 2.2. These fixtures produce large amounts of upward and horizontal spill. Light that shines upward is a direct waste and is the primary cause of light pollution. Horizontal light produces glare and decreases visibility at night. Figure 2.3 illustrates how light disseminates from a typical unshielded fixture.



<http://www2.nature.nps.gov/air/lightscapes/images/badLight2>

Figure 2.2: This type of light fixture produces too much glare, is inefficient, and lights up the sky unnecessarily.



<http://www2.nature.nps.gov/air/lightscapes/images/lightDiagram.jpg>

Figure 2.3: Unshielded light fixture will produce 60% of unproductive light, resulting in large amounts of light pollution and increase costs.

SECTION 2: General Lighting Impacts

A shielded or “Full Cut-off” light fixture, as seen in Figure 2.4, provides all the basic needs of lighting (safety, security, visibility, comfort) while directing the light where it is needed. These fixtures are available for homes, businesses, and municipalities that will protect the night sky, allow a much smaller wattage bulb to be used, and save energy and costs.



<http://www2.nature.nps.gov/air/lightscapes/images/shilededLight.jpgs>, direct all light downward.

Figure 2.4: Shielded or “Full Cut-off” fixtures, such as this, protect the night sky and are more efficient and cost effective.

3.0 Conclusions and Recommendations

Conclusions

1. Anticipated Impacts
 - a. Night lighting may affect the visual conditions locally, and will probably make the SPP a dominant visual feature after dark through the valley. The specific magnitude of the change is not presently known, but depends on factors such as the facility lighting plan and the color of the SPP.

Recommendations

1. Lighting: These impacts can be minimized through various means. Using cut-off type luminaries that focus the beam downward can provide the necessary lighting without creating unnecessary light pollution. The height of the light pole determines how broadly the light is dispensed. If the lights are mounted at an appropriate height, they will provide maximum illumination while minimizing light pollution into the surrounding area. Doing the majority of construction work in daytime hours will minimize impacts to the night sky during the first phase of the proposed SPP. When the final design is being considered for construction approval, we recommend a specific review to ensure that the ideal lighting program has been implemented into the design. Such a design would integrate low poles, low wattage bulbs, cut-off luminaries, and would direct light away from large, flat, reflective surfaces.
2. As practicable, follow the Principles of Night Sky Friendly Lighting developed by the National Park Service
 - Use outdoor lights only where they are needed
 - Direct all light downward by using shielded lights and aiming them down
 - Use motion sensors and timers to insure lights are on only when needed
 - Use the right amount of light, not too much, not too little
 - In darker areas, use less light to prevent disrupting night vision