



Best Practices for Lighting on APO Facilities
Cliff Kaplan, Program Director, HCA
Secretary, TRAM
March 28, 2023




hill country alliance



Photo: Rob Greebon

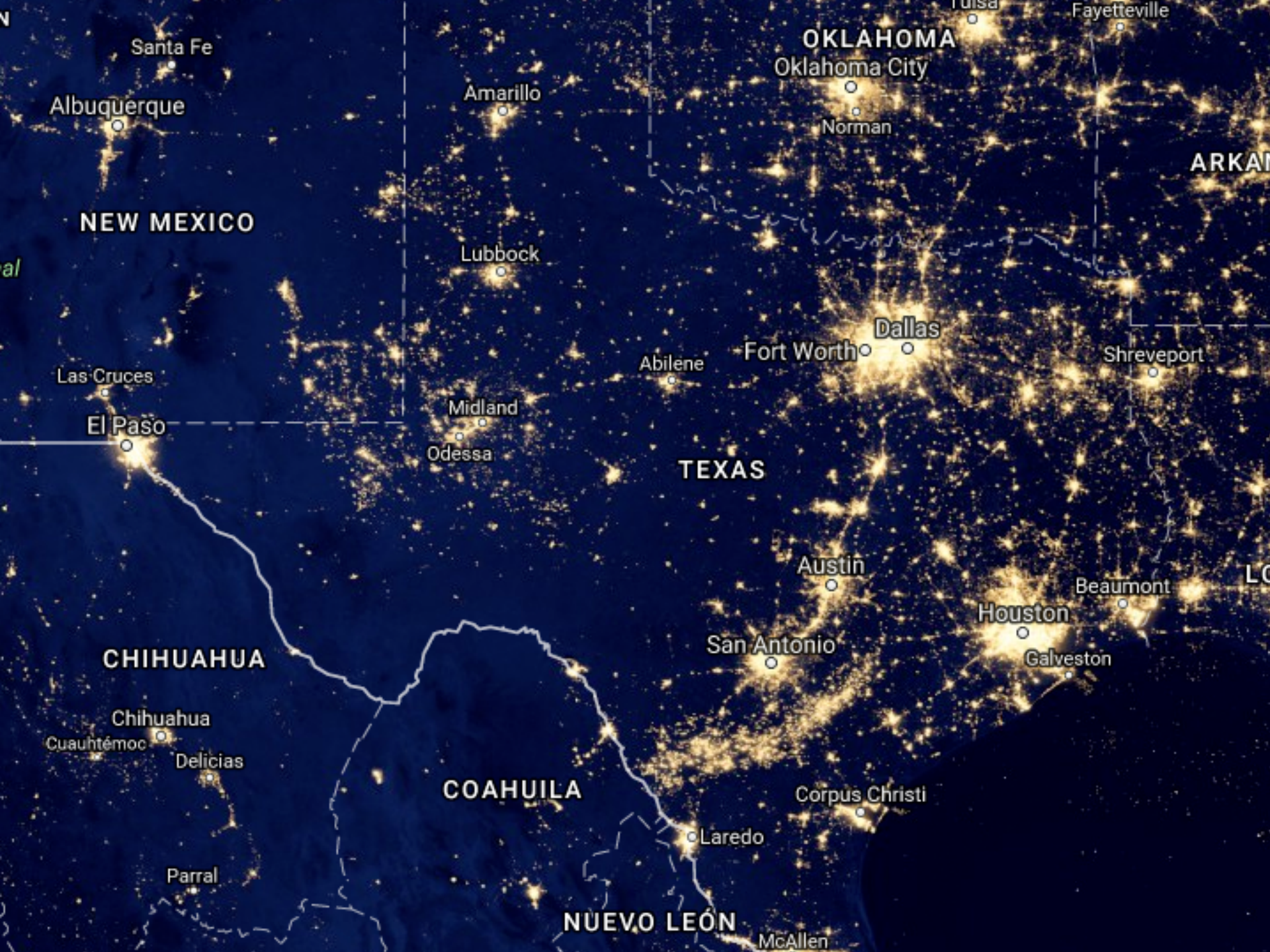


Photo: Rob Greebon



Four out of five North Americans have lost the view of the Milky Way where they live.

The New World Atlas of artificial night sky brightness, *Science Advances*, 10 June 2016: Vol.2, no. 6



Santa Fe

Albuquerque

NEW MEXICO

Las Cruces

El Paso

CHIHUAHUA

Chihuahua

Cuahtémoc

Delicias

Parral

Amarillo

Lubbock

Midland

Odessa

COAHUILA

NUEVO LEÓN

TEXAS

Abilene

San Antonio

Laredo

Fort Worth

Austin

Corpus Christi

OKLAHOMA

Oklahoma City

Norman

Dallas

McAllen

Fayetteville

ARKAN

Shreveport

Houston

Beaumont

Galveston

LO

Why does light pollution matter?

- Night Sky: Heritage, culture, wonder
- Finance: Wasted electricity, lost tourism opportunity
- Wildlife: Insects, birds, mammals, ecosystems
- Human Health: Sleep disorders, metabolism, cancer
- Crime: Leads criminals to targets, decreases visibility
- Traffic: Decreases visibility



vs.



What is light pollution?

Light Trespass



Overlighting

Light Clutter



Glare

What is light pollution?

Sky Glow



What is light pollution?

A photograph of a two-story house at night. The house has light-colored siding and a dark roof. The interior lights are on, and the light is visible through the windows and a balcony railing. The house is surrounded by dark foliage and trees. The sky is dark with some stars visible.

Light Trespass

What is light pollution?

Glare







What is light pollution?

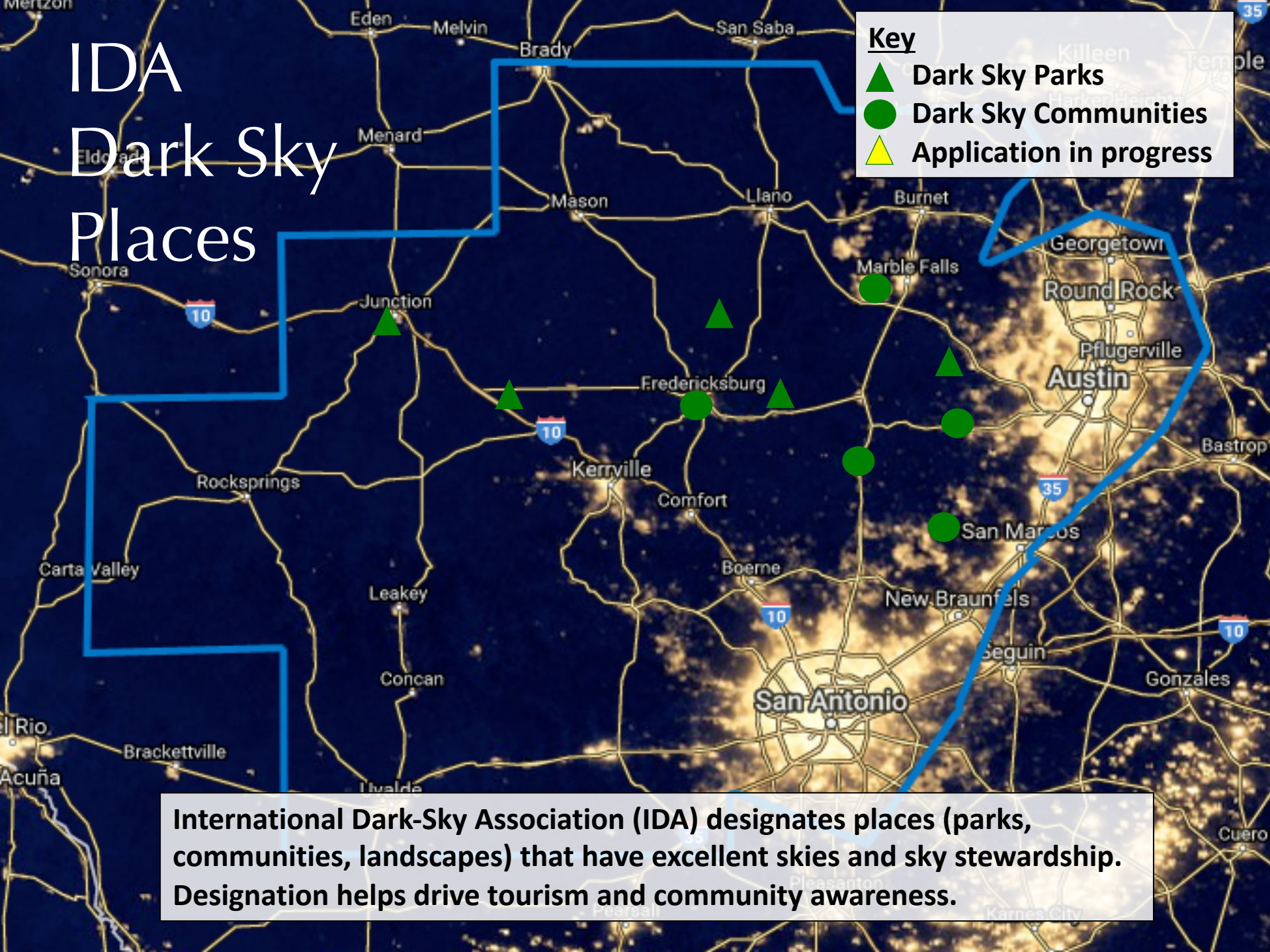
Light Clutter



IDA Dark Sky Places

Key

- ▲ Dark Sky Parks
- Dark Sky Communities
- ▲ Application in progress



International Dark-Sky Association (IDA) designates places (parks, communities, landscapes) that have excellent skies and sky stewardship. Designation helps drive tourism and community awareness.

What is good lighting?

- Only on when needed: use switches, sensors, and timers



What is good lighting?

- Only on when needed: use switches and sensors
- Not more than is needed for a specific task



What is good lighting?

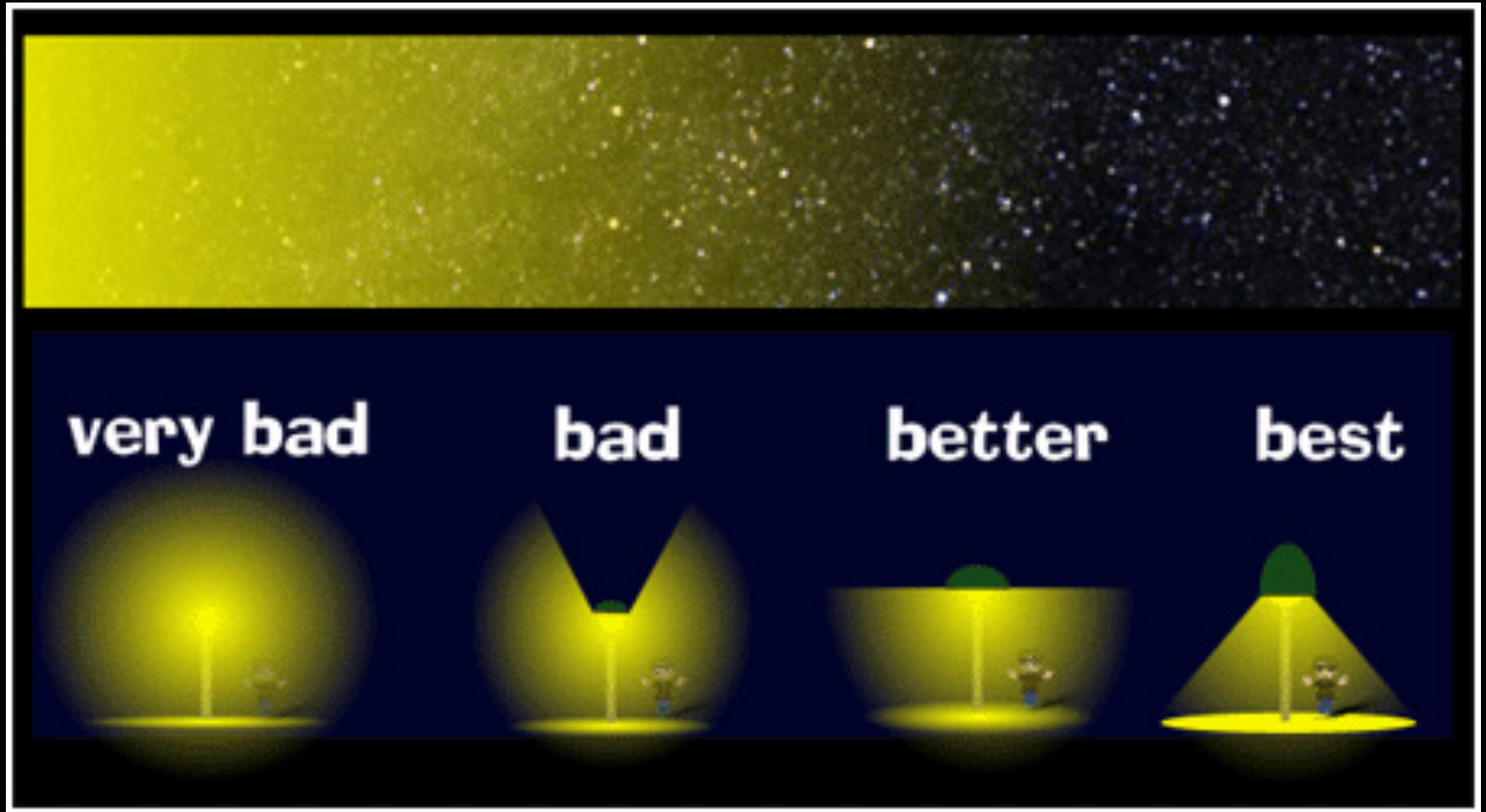
Warm White 2700K-3500K Natural White 4000K-4500K Day White 5000K-5500K Cool White 6000K-7000K



Outdoor lights should be rated **3000K** or below

Lighting Facts <small>Per Bulb</small>	
Brightness	820 lumens
Estimated Yearly Energy Cost	\$7.23
<small>Based on 3 hrs/day, 11¢/kWh Cost depends on rates and use</small>	
Life	1.4 years
<small>Based on 3 hrs/day</small>	
Light Appearance	
<small>Warm ————— Cool</small>	
<small>▲ 2700 K</small>	
Energy Used	60 watts

What is good lighting?



What is good lighting?

- Only on when needed: use switches and sensors
- Not more than is needed for a specific task
- Warmer colors always preferred: Below 3000K Correlated Color Temperature (CCT)
- Fully Shielded: No sky glow, glare, or light trespass

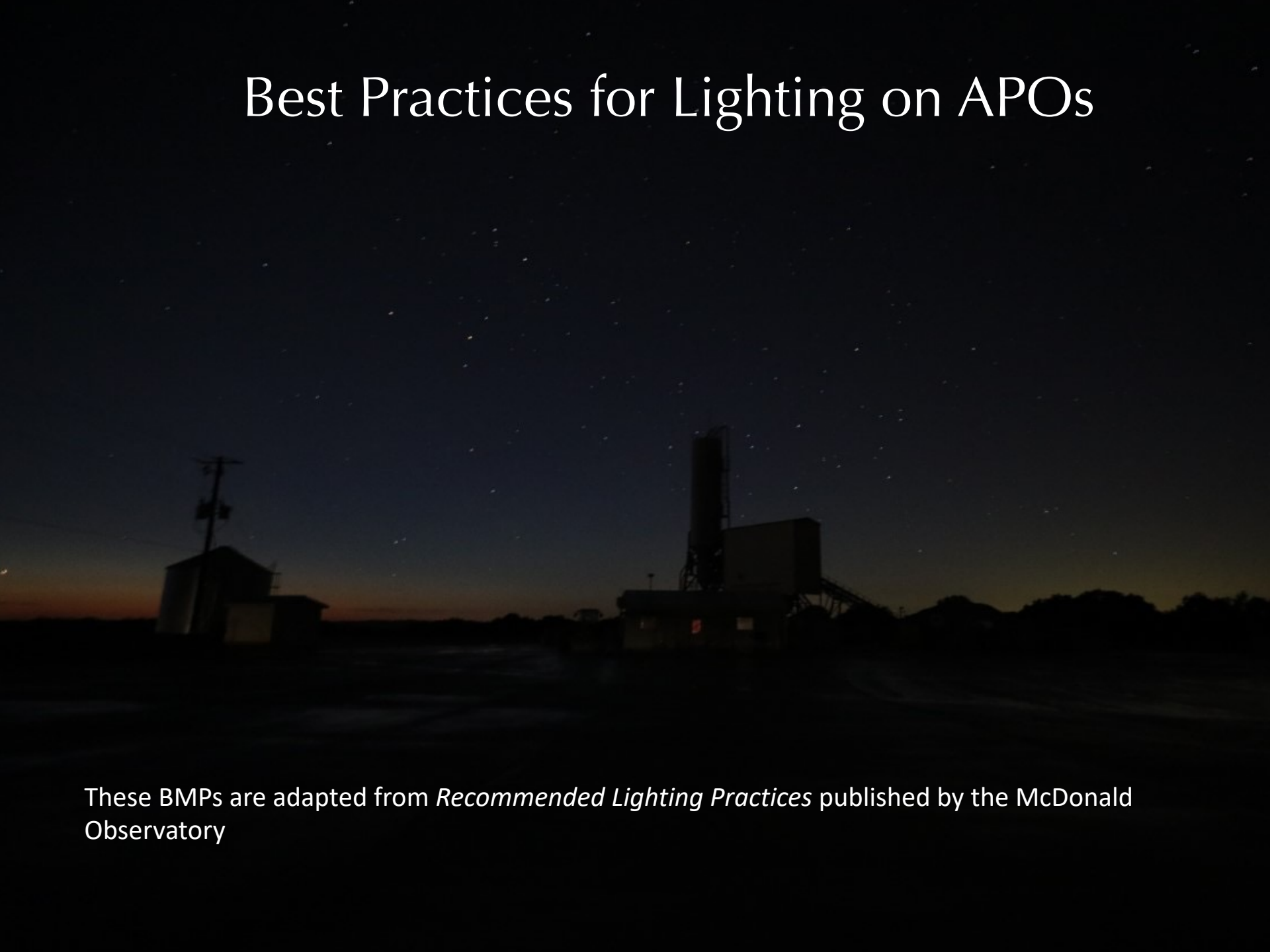


What is good lighting?

- Only on when needed: use switches and sensors
- Not more than is needed for a specific task
- Warmer colors always preferred: Below 3000K
Correlated Color Temperature (CCT)
- Fully Shielded: No sky glow, glare, or light trespass



Best Practices for Lighting on APOs

The background of the slide is a dark, starry night sky. In the lower portion, the silhouettes of an astronomical observatory are visible against a faint horizon glow. On the left, there is a small, rectangular building. In the center, a tall, slender telescope structure rises, supported by a complex metal framework. To the right, another building is partially visible. The overall scene is dark and atmospheric, emphasizing the theme of astronomy and light pollution control.

These BMPs are adapted from *Recommended Lighting Practices* published by the McDonald Observatory

Best Practices for Lighting on APOs

Partners



Mike Sommers
American Petroleum
Institute
President and CEO

Bill Wren
McDonald Observatory
Special Assistant to the
Superintendent

Ben Shepperd
Permian Basin Petroleum
Association
President

Joni Carswell
Texan by Nature
CEO and President

Ed Longanecker
Texas Independent
Producers and Royalty
Owners Association
President

Todd Staples
Texas Oil & Gas
Association
President

Mark Houser
University Lands
CEO

These BMPs are adapted from *Recommended Lighting Practices* published by the McDonald Observatory

Best Practices for Lighting on APOs



RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

NOTICE TO OPERATORS

“The solutions can be simple and cost effective and can actually improve nighttime visibility and increase worker safety.”

at: http://mcdonaldobservatory.org/sites/default/files/oilfield_lighting_can_coexist.pdf
More general information about the McDonald Observatory's Dark Skies Initiative is available at: <http://mcdonaldobservatory.org/darkskies>.

You are encouraged to consult these resources and consider ways to reduce stray light. The solutions can be simple and cost effective and can actually improve nighttime visibility and increase worker safety.

PLEASE FORWARD TO THE APPROPRIATE SECTION OF YOUR
COMPANY

Austin, Texas
February, 2016

Best Practices for Lighting on APOs

1. Make a lighting plan

1. **Number of lights and lumen output of each**

Minimum number of lights and the lowest luminosity consistent with safe and secure operation of the facility;

2. **Alternatives to lighting**

Retro-reflective or luminescent markers in lieu of permanent lighting where feasible;

3. **Fixture design**

Lights of the proper design, shielded to eliminate up-light, placed and directed to eliminate light spill and trespass to offsite locations;

4. **Lamp color temperature**

Lights of the proper color to minimize night-sky impacts;

5. **Standard operating procedures**

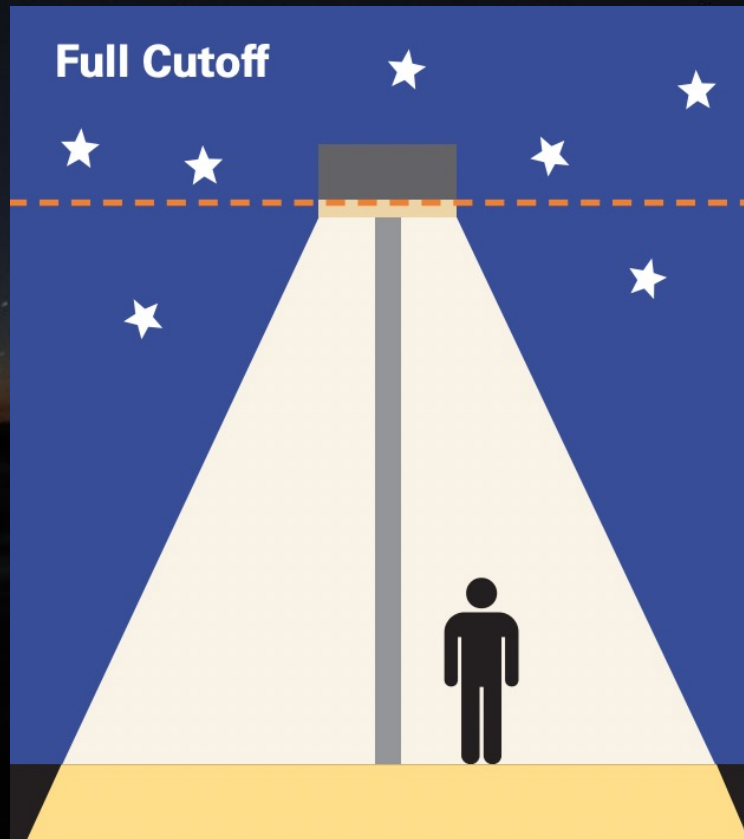
Minimization of unnecessary lighting use through alternatives to permanent lighting, such as restricting lighting usage to certain time periods;

6. **Any activities that may be restricted to avoid night-sky impacts;**

7. **A process for promptly addressing and mitigating complaints about potential lighting impacts.**

Best Practices for Lighting on APOs

1. Make a lighting plan
2. Use fully shielded luminaires



Best Practices for Lighting on APOs

1. Make a lighting plan
2. Use fully shielded luminaires
3. Direct light properly and use perimeter barriers to eliminate sky glow, light trespass, and glare



Best Practices for Lighting on APOs



te

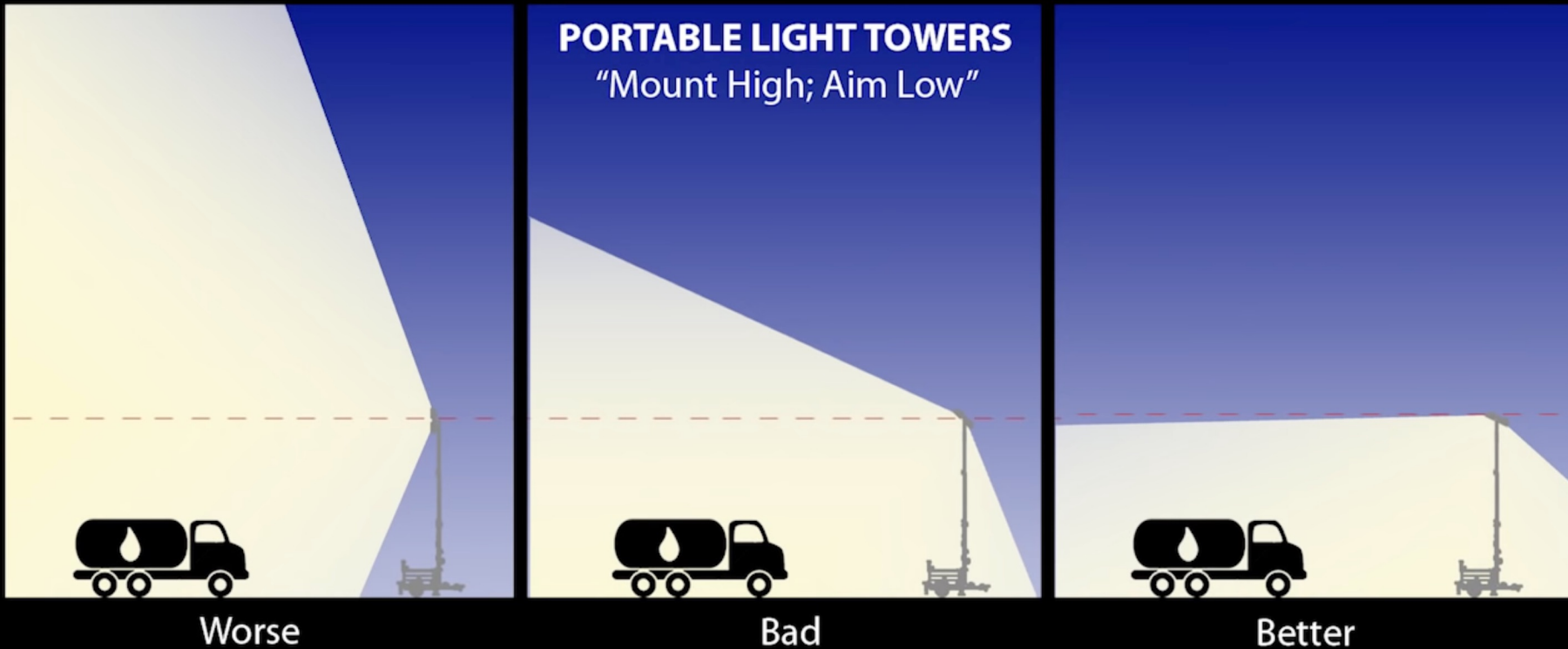
Best Practices for Lighting on APOs



Best Practices for Lighting on APOs

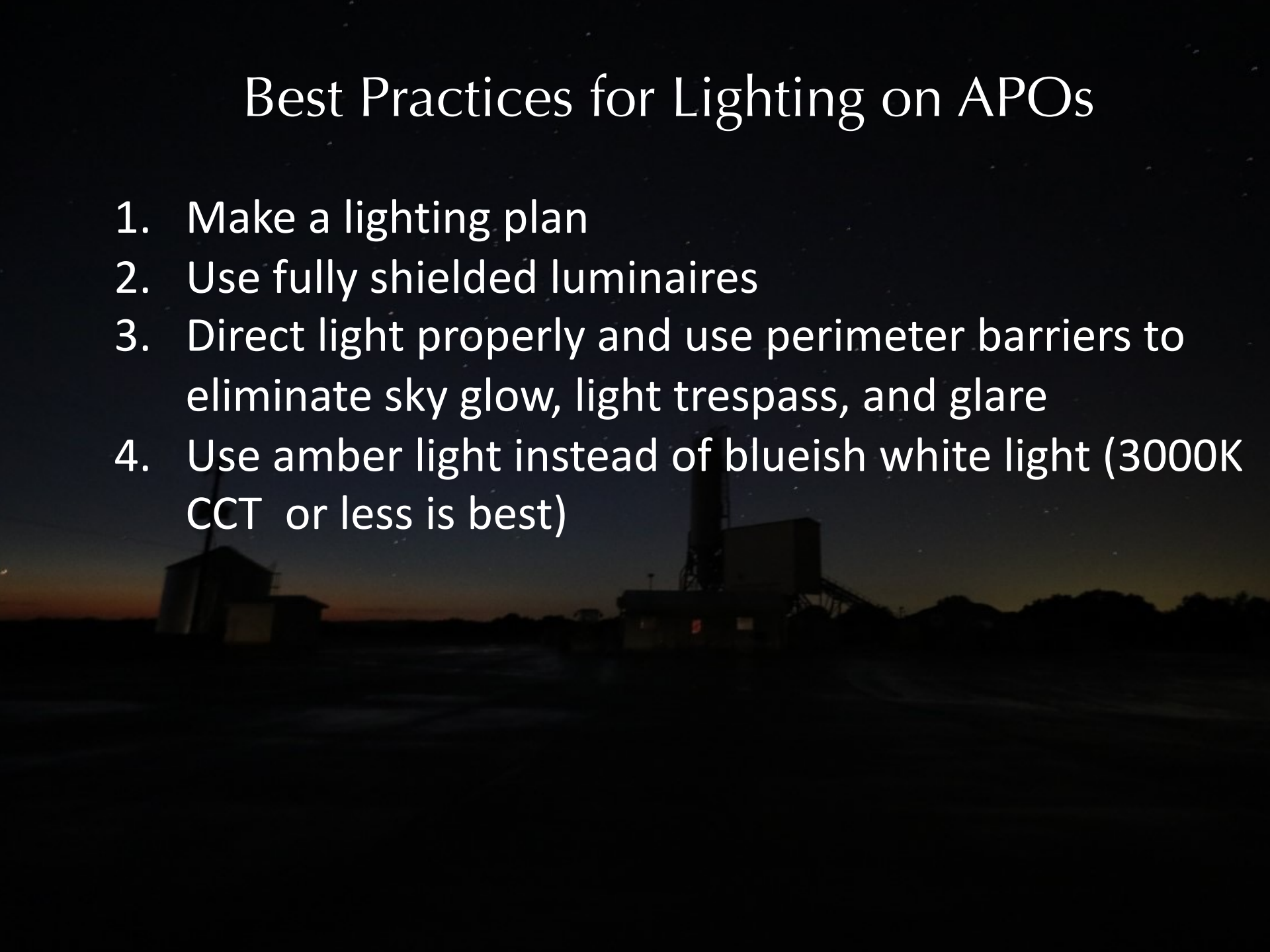


Best Practices for Lighting on APOs



Best Practices for Lighting on APOs

1. Make a lighting plan
2. Use fully shielded luminaires
3. Direct light properly and use perimeter barriers to eliminate sky glow, light trespass, and glare
4. Use amber light instead of blueish white light (3000K CCT or less is best)



Best Practices for Lighting on APOs



Cool White
6000K - 7000K



Day White
5000K - 5500K



Natural White
4000K - 4500K



Warm White
2700K - 3500K



Best Practices for Lighting on APOs

1. Make a lighting plan
2. Use fully shielded luminaires
3. Direct light properly and use perimeter barriers to eliminate sky glow, light trespass, and glare
4. Use amber light instead of blueish white light (3000K CCT or less is best)
5. Minimize duration and amount of light used during construction, operations, and non-operating periods

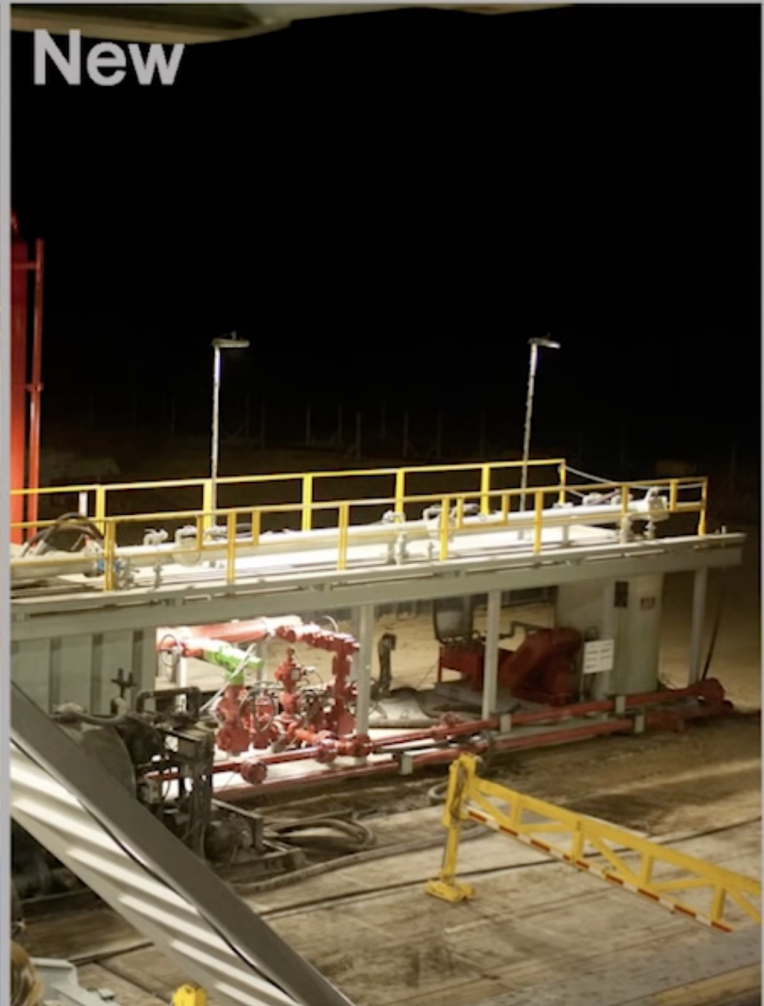
Mud tank lighting

Old



Locke/Wren

New



Pioneer Energy Services/McDonald Observatory

Best Practices for Lighting on APOs



Apache Corporation Tank Battery with dark skies friendly lighting installed – all shining down, amber in color. Bill Wren/McDonald Observatory

Best Practices for Lighting on APOs



APACHE OPERATED NABORS RIG

Alpine High Play

Best Practices for Lighting on APOs

Before: More glare



After: More visibility



Best Practices for Lighting on APOs



Optimal configuration. Staggered (not stacked) pointed down at no more than 20-degree angle.



Sub-Optimal configuration. Stacked fixtures create glare off housing

Lauren Concrete, Dripping Springs

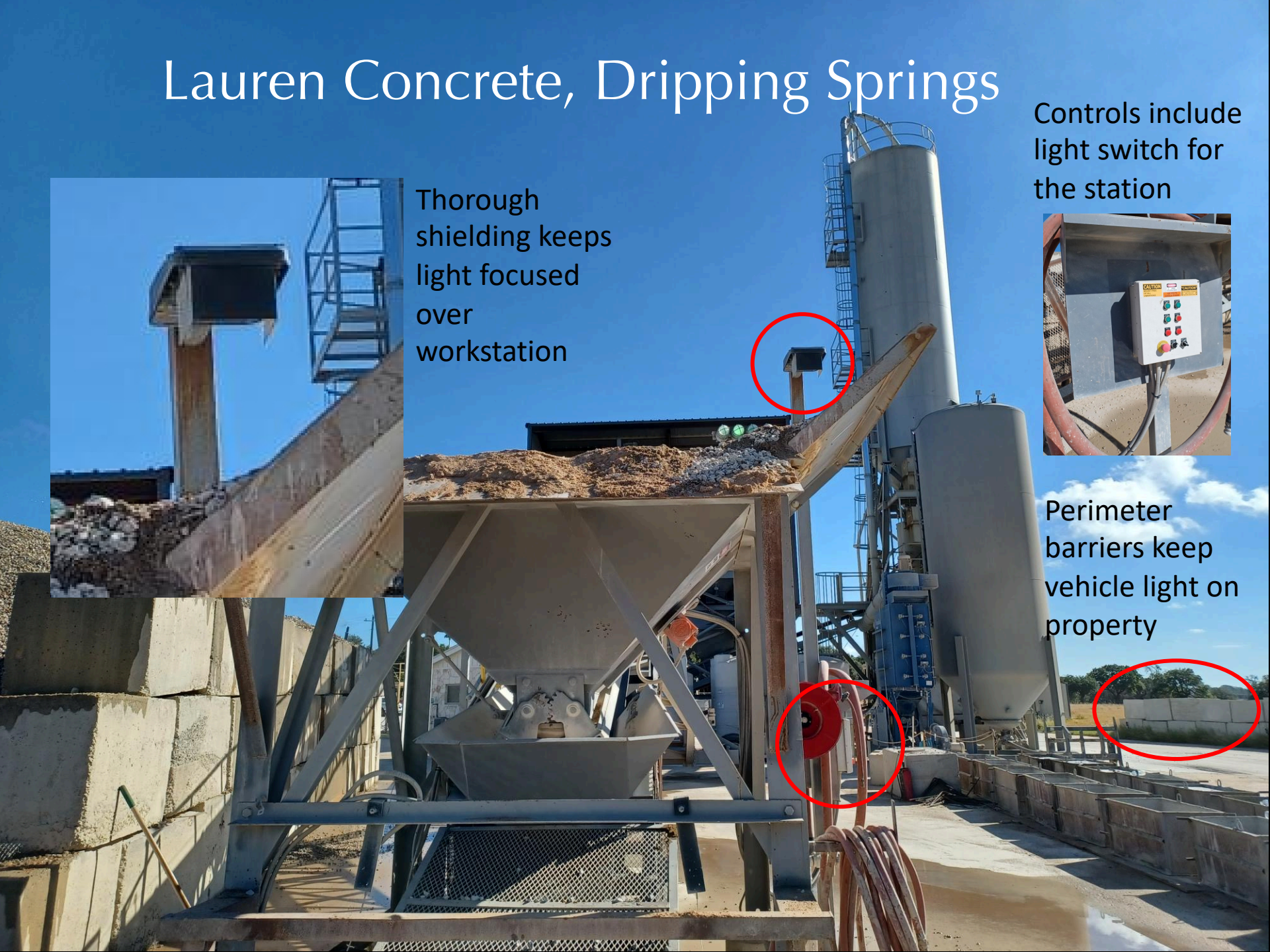
Thorough shielding keeps light focused over workstation



Controls include light switch for the station



Perimeter barriers keep vehicle light on property



Thorough
shielding keeps
light focused
over
workstation



Workers switch
light on,
automatic turn
off after approx.
4 min.



All lights at the plant are fully shielded



Fully illuminated, no light shines directly into sky or far from the plant itself.





Fully illuminated, no light shines directly into sky or far from the plant itself.





When not operating, the plant is completely dark.

2020-01-26 20:02:56
P22-SLUMP-STAND-CAN



LIVE STREAM



Night vision cameras keep the plant safe and secure.

Best Practices for Lighting on APOs

1. Make a lighting plan
2. Use fully shielded luminaires
3. Direct light properly and use perimeter barriers to eliminate sky glow, light trespass, and glare
4. Use amber light instead of blueish white light (3000K CCT or less is best)
5. Minimize duration and amount of light used during construction, operations, and non-operating periods



Cliff Kaplan, Program Director, HCA
Secretary, TRAM

512-387-3097

Cliff@hillcountryalliance.org

Thank you!



hill country alliance