



HURRICANE CITY UTAH

Mayor
Nanette Billings

City Manager
Kaden C. DeMille

Power Board
Mac J. Hall, Chair
Jerry Brisk
Pam Humphries
Dave Imlay
Joseph Prete
Charles Reeve

Power Board Meeting Agenda

8/2/2023

3:00 PM

Power Department Meeting Room – 526 W 600 N

Notice is hereby given that the Power Board will hold a Regular Meeting in the Power Department Meeting room located at 526 W 600 N, Hurricane, UT. A silent roll call will be taken, along with the Pledge of Allegiance and prayer by invitation.

AGENDA

1. Pledge of Allegiance
2. Prayer
3. Approval of minutes from July 2023 and July 2023 Special Meeting

STAFF REPORTS

Scott Hughes/Power Director
Brian Anderson/Transmission & Distribution Superintendent
Mike Ramirez/Service Superintendent
Jared Ross/Substation & Generation Superintendent

BUDGET

1. Budget

OLD BUSINESS

1. Capacity Update
2. Power Department Standards and Specifications Possible Recommendation of Approval

NEW BUSINESS

1. Discussion of Generator #5 Failure
2. UAMPS Updates
3. **Closed meeting** held pursuant to Utah Code section 52-4-205 to conduct a strategy session to discuss the purchase, exchange, or lease of real property

ADJOURNMENT

The above notice was posted to the Hurricane City website, the Utah State Public Notice Website, and at the following locations:

1. Hurricane City Office – 147 North 870 West, Hurricane, UT
2. US Post Office – 1075 West 100 North, Hurricane, UT
3. Washington County Library (Hurricane Branch) – 36 South 300 West, Hurricane, UT





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Joseph Prete
Charles Reeve

- 1 The Hurricane City Power Board met on July 7, 2023, at 3:15 p.m. at the Clifton Wilson Substation on 526 W
2 600 N.
3
4 In attendance were Mac Hall, Pam Humphries, Charles Reeve, Jerry Brisk, Joseph Prete, Scott Hughes, Michael
5 Ramirez, Jared Ross, Fred Resch, Dayton Hall, and Crystal Wright.
6
7 Mac Hall welcomed everyone to the meeting; Pam Humphries led the Pledge of Allegiance and Mac Hall
8 offered the prayer. After a couple minor fixes, Pam Humphries motioned to approve minutes from the June
9 2023 meeting. Charles Reeve seconded the motion. Motion passed unanimously.
10
11 **Scott Hughes:** Scott Hughes reported that our employees have been working hard and are doing a great job.
12 Jerry Brisk asked how the new employees are working out. Scott Hughes replied we've been pleased with
13 them so far. Each new employee starts with a 6-month probationary status and after that point we will make
14 decisions on whether to offer apprenticeships.
15
16 **Brian Anderson:** Brian Anderson stated that we have energized the Cordero line. Cordero is still waiting for
17 one easement, but they had achieved a lease for that property, so we agreed to energize it. 600 N Phase 3A is
18 completely done for our portion. The communications lines still need to be transferred from the old wood
19 poles over to the new steel poles. The communications companies have been notified that needs to be done.
20 Provided an update on 1150 W reconductoring project. There's a lot of reconfiguring to get that section of line
21 dead to begin the work on it. Most of the time this previous month the line crew has been assisting the service
22 crew to get some of their projects caught up. A lot of projects were able to be caught up. He reported on the
23 inventory count. Crystal Wright added information about the inventory audit and the count being adjusted to
24 start fresh for the new fiscal year.
25
26 **Mike Ramirez:** Mike Ramirez reported that he has nothing new to report beyond his normal tasks.
27
28 **Jared Ross:** Jared Ross reported on the Three Falls Substation project. All the steel structures are standing. The
29 ground grid just has a few things left and it will be done. They're starting to put in boxes and finish conduits so
30 they can begin running wires. The building is close to being complete. Most of the equipment is here, the items
31 remaining will be here this month or not until December. The stuff that isn't scheduled to arrive until
32 December will be borrowed from another substation project.
33
34 **Budget:** Scott Hughes presented the regular monthly graphs and numbers. Numbers look a lot better this
35 month. So far, the power market looks more favorable. We are keeping a close eye on the market to evaluate
36 whether a power rate increase will be necessary or if we can escape without having to raise rates again.
37



Capacity Update: Scott Hughes reported that this discussion is about the southern part of the city. We still need the easement through a subdivision and will need to collect money from developers for their portion of the capacity. The development agreement has been finished and is ready to provide to developers. We are waiting for the easement to be secured before moving forward with development agreements.

EV Charging Rates Discussion and Possible Recommendation: Mike Ramirez reported that they had another meeting with the DER subcommittee and discussed various scenarios of consumption rates vs demand rates. They came up with a number from their general view. They suggested a moderate base rate, higher demand rate to incentivize them to install battery banks with their chargers to limit the peak demands on our system, and a decent consumption rate. The staff recommendation is for a higher base rate, high demand rate and higher consumption rate. Discussion regarding potential issues including unknown loads varying during high peak times, concern with residents having to subsidize losses that occur through rates, and that the businesses will charge more than what we're charging and will be covered while we take the risk with a volatile power market and a requirement to secure the power resource. Pam Humphries suggested the policy and rate need to come together. Either one coming later than the other can cause problems. Mac Hall asked for the reasoning behind the subcommittee recommendations. Mike Ramirez stated they suggested a moderate base rate because they felt like the maintenance service needed would be minimal for the site, high demand was the biggest concern to infrastructure, and higher consumption rate to mitigate risk from pricing volatility. Joseph Prete suggested considering how being too aggressive with pricing could affect commerce and tax revenues of the city. Charles Reeve felt we need to build a rate that covers expenses. He doesn't feel like it is the Power Department's responsibility alone to subsidize the creation of a robust downtown commercial zone. Long discussion about the differences between the three classes of chargers and the possibility of the city ever providing chargers to help support a downtown commercial zone. This is not something we're currently considering and can be a discussion for a future time. Mac Hall stated his only concern with the staff recommendation is he feels like the kWh rate of \$.18 may be high. He asked the board for a recommendation. Jerry Brisk made a motion to go with the staff recommendation, except to raise the kWh rate to \$.20. Motion failed for lack of second. Charles Reeve made a motion to go with the staff recommendation of \$320 base rate, \$13 demand rate, and \$.18 kWh rate. Pam Humphries seconded the motion. Mac Hall, Pam Humphries, Charles Reeve, and Joseph Prete approved the motion. Jerry Brisk opposed. We need to be prepared to submit information by next Tuesday for the City Council agenda.

Impact Fee Study Update: Scott Hughes stated we received a bid back to complete the Impact Fee Study. We have received an approved purchase order from the City Office to move forward with the completion of that study. The company that will be completing it is ICPE.

Power Department Standards and Specifications Update: Mike Ramirez has been working on getting these updated and is hopeful to be completed with these revisions by the next Power Board Meeting for an action item.

UAMPS Updates: Scott Hughes reported that the information was included in the packet, so unless there are questions, he will not review it further. He did want to provide an update regarding CFPP. Thus far, there have been no new subscriptions added. Hunter is still stockpiling coal for August usage but has been running the past week during super peak hours.

Power Board adjourned at 4:15 p.m. The next Power Board Meeting is scheduled for August 2, 2023, at 3:00 p.m.



HURRICANE CITY

UTAH

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Kaden C. DeMille

Power Board
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Jerry Brisk
Pam Humphries
Dave Imlay
Joseph Prete
Charles Reeve

1 The Hurricane City Power Board met for a Special Meeting on July 19, 2023, at 7:00 p.m. at the Clifton Wilson
2 Substation on 526 W 600 N.

3
4 In attendance were Mac Hall, Pam Humphries, Charles Reeve (by phone), Dave Imlay (by phone), Jerry Brisk,
5 Joseph Prete, Scott Hughes, Michael Ramirez, Jared Ross, and Dayton Hall.

6
7 Mac Hall welcomed everyone to the meeting.

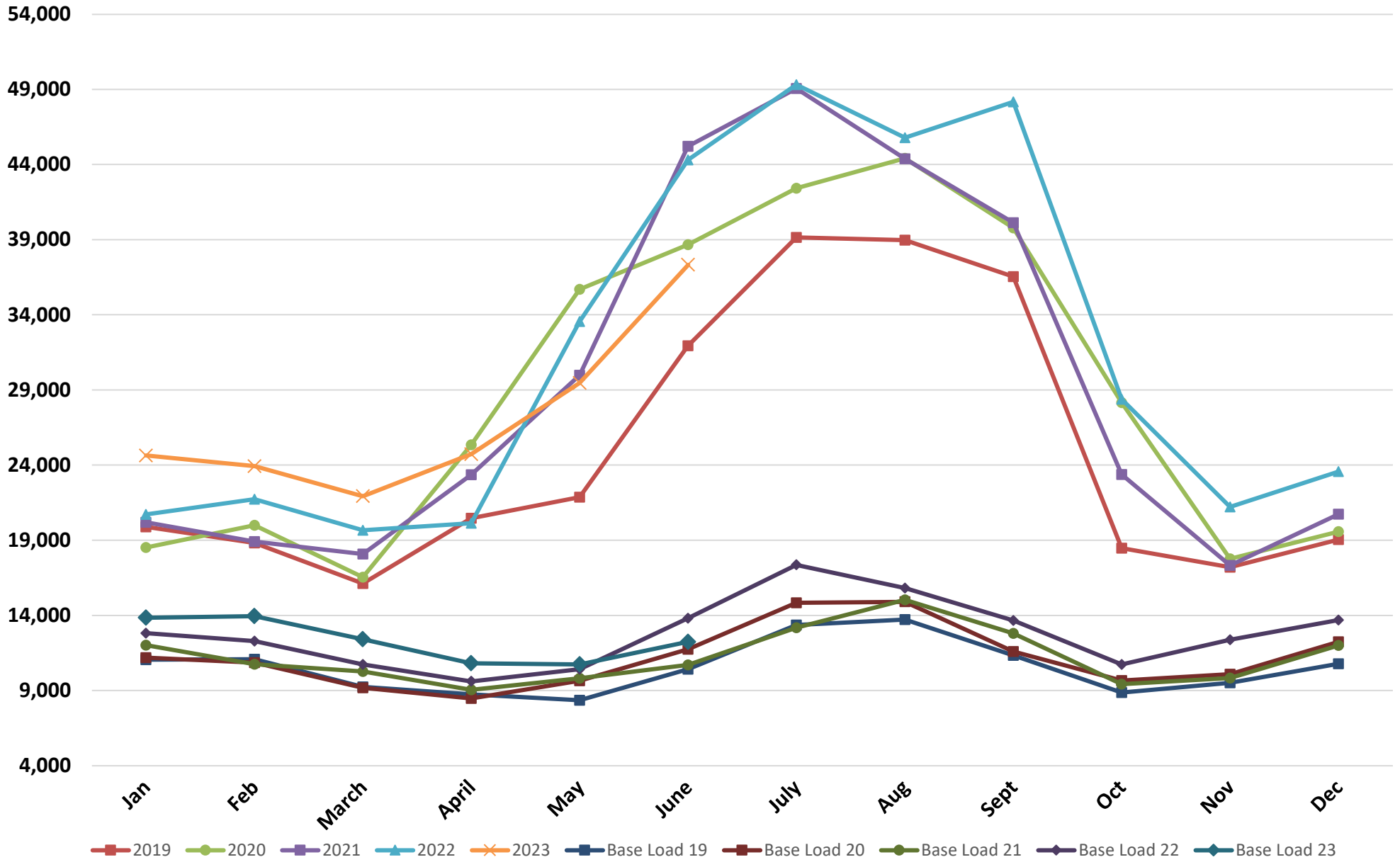
8
9 **Discussion and possible recommendation of Commercial Electric Vehicle Charger Policy:** Mac Hall asked if
10 there is anything in the policy that anyone has questions on. Pam Humphries stated she is unfamiliar with how
11 a charging pedestal is set up. The policy states there will be inspections. She wants to know who does the
12 inspections and if they must be qualified. Scott Hughes stated the Building Department will be inspecting the
13 wiring and electrical like they do currently, and we will be inspecting beyond the meter like we do currently.
14 We are unsure currently how we will handle inspections after installation at this point. Joseph Prete wanted to
15 make sure there was an indemnification clause included in the policy toward the city. Dayton Hall stated there
16 is language included for that. Joseph Prete asked about any insurance requirements. Discussion regarding the
17 indemnification clause covering that risk. Joseph Prete suggested beefing up the language in the
18 indemnification section to include they assume all risk. Scott Hughes stated we are only responsible for
19 anything up to and including the meter. Anything beyond a meter is always outside the responsibility of the
20 city. Joseph Prete asked if we are opening the door for questions by stating we will inspect their system and
21 asked if that infers we are inspecting beyond the meter. Dave Imlay stated that if there's an interconnection to
22 the city then we must be allowed to inspect the generating facility i.e. battery bank. He asked if we anticipate
23 any battery storage coming back to the grid. Scott Hughes stated we don't anticipate them doing that as they
24 will be using their battery power to reduce their demand charges, but it is possible. Dave Imlay suggested
25 language that it is the customer's sole responsibility to maintain and protect their individual facility. Dayton
26 Hall stated the Utah Governmental Immunity Act in the Utah State Code provides a lot of protection for
27 municipalities. He feels like we are covered in that aspect with this policy. Dayton Hall summarized he has five
28 potential modifications to include: Non-assignability including a change of ownership need to reapply, beef up
29 indemnification section, obligation on applicant to protect its own system and infrastructure, City Council can
30 make changes to policy with applicant bearing cost to update to comply with new policy, and requirement to
31 maintain and upkeep to Federal, State, and local standards and bear cost of compliance. Dayton Hall will work
32 on those modifications to get the updated, amended copy to the City Council prior to the meeting tomorrow.
33 Charles Reeve recommended approval of the existing policy with the inclusion of the modifications that
34 Dayton Hall listed. Pam Humphries seconded the motion. Motion passed unanimously.

35
36 The Power Board Special Meeting adjourned at 7:35 p.m.

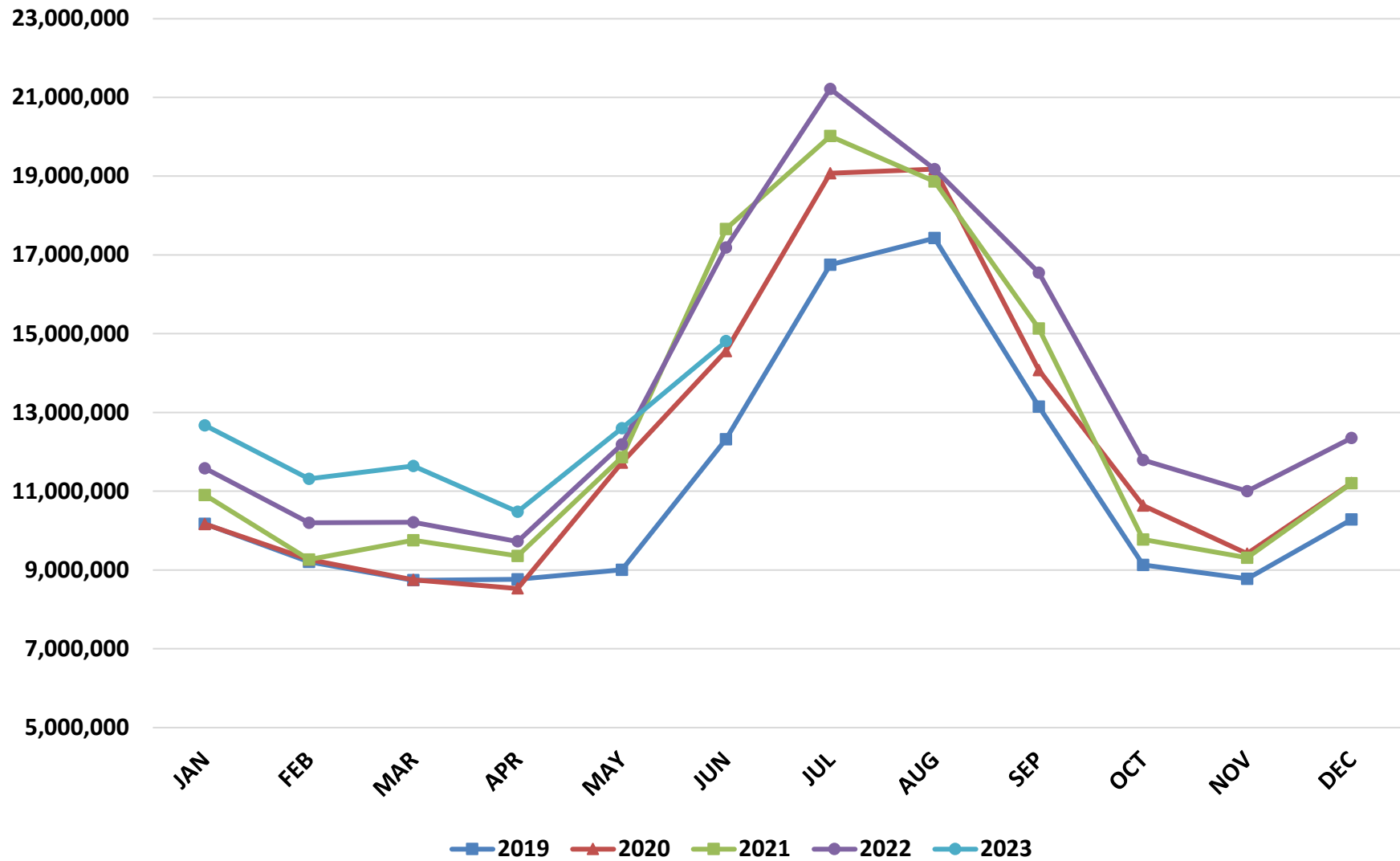


BUDGET

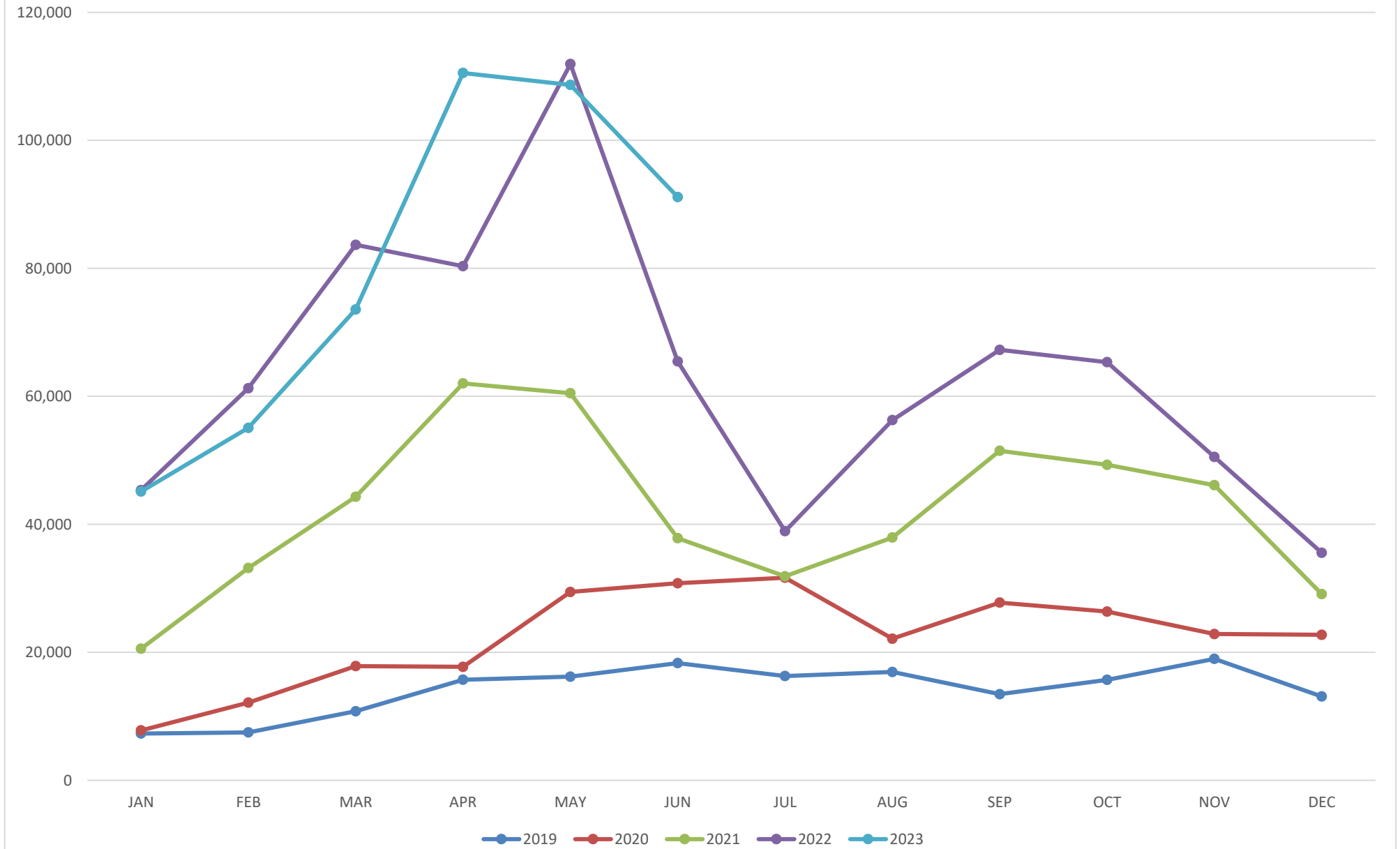
2019 - 2023 KW LOAD



2019 - 2023 KWH LOAD



Solar Kwh



AVERAGE YEARLY POWER PRICES

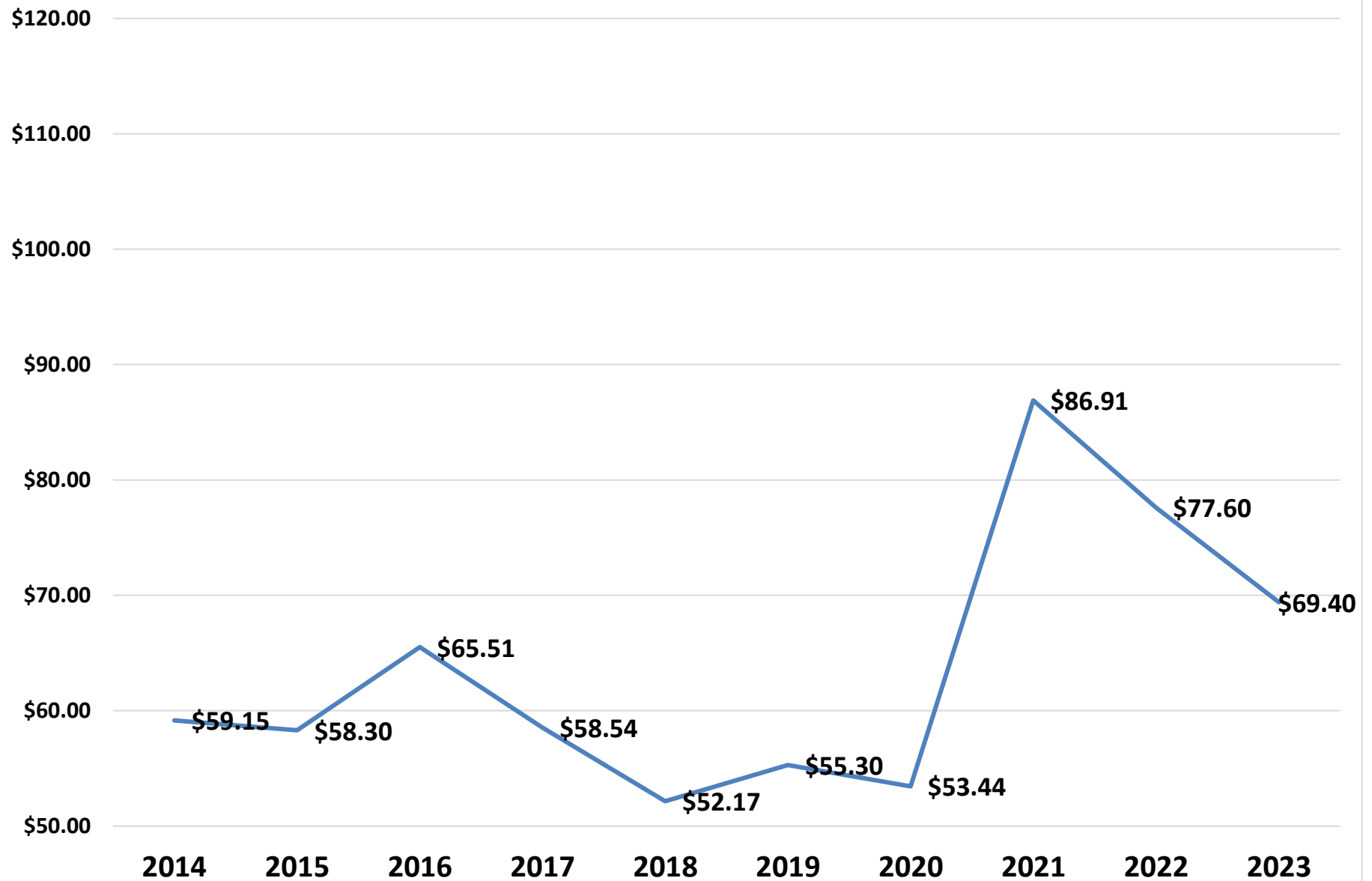
22-23 bdgt amount (as of June) **\$99.86**
 BDGT Year to Date **\$96.69**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
<i>Jan</i>	\$56.66	\$60.76	\$58.36	\$59.86	\$57.87	\$59.07	\$60.62	\$59.75	\$57.76	\$60.14	\$68.25	\$132.00
<i>Feb</i>	\$59.78	\$58.15	\$64.45	\$65.94	\$62.38	\$63.04	\$60.96	\$67.00	\$60.67	\$63.19	\$70.88	\$85.08
<i>Mar</i>	\$57.28	\$63.50	\$60.83	\$62.03	\$61.77	\$60.99	\$60.09	\$65.17	\$64.67	\$63.64	\$67.28	\$81.89
<i>Apr</i>	\$55.43	\$63.77	\$63.75	\$61.88	\$59.71	\$59.49	\$55.02	\$55.44	\$55.92	\$61.86	\$82.63	\$71.74
<i>May</i>	\$53.31	\$60.28	\$61.64	\$64.71	\$65.51	\$60.32	\$58.86	\$58.55	\$58.55	\$59.69	\$72.66	\$67.01
<i>June</i>	\$50.09	\$56.05	\$59.15	\$58.30	\$65.51	\$58.54	\$52.17	\$55.30	\$53.44	\$86.91	\$77.60	\$69.40
<i>Jul</i>	\$51.16	\$55.62	\$56.85	\$56.91	\$56.95	\$58.29	\$67.87	\$54.29	\$55.98	\$81.04	\$85.31	
<i>Aug</i>	\$51.57	\$55.49	\$56.84	\$55.27	\$57.67	\$59.00	\$66.55	\$54.58	\$78.40	\$72.03	\$96.60	
<i>Sep</i>	\$54.79	\$58.80	\$59.46	\$56.06	\$56.97	\$62.36	\$55.00	\$54.34	\$64.93	\$82.38	\$127.29	
<i>Oct</i>	\$62.68	\$60.35	\$61.42	\$56.97	\$59.23	\$59.79	\$59.36	\$59.70	\$62.82	\$75.92	\$83.45	
<i>Nov</i>	\$63.37	\$61.65	\$63.03	\$59.68	\$64.18	\$62.14	\$64.60	\$63.80	\$63.60	\$70.47	\$96.34	
<i>Dec</i>	\$56.02	\$58.37	\$60.91	\$57.90	\$61.51	\$58.80	\$61.61	\$58.55	\$60.33	\$70.07	\$161.27	
<i>Yr Avg</i>	\$56.01	\$59.40	\$60.56	\$59.63	\$60.64	\$60.15	\$60.23	\$58.87	\$61.42	\$70.61	\$90.80	\$84.52
<i>Weighted Avg</i>	\$55.22	\$58.80	\$60.34	\$58.99	\$59.55	\$59.90	\$60.56	\$58.11	\$61.98	\$72.46	\$92.09	\$84.45

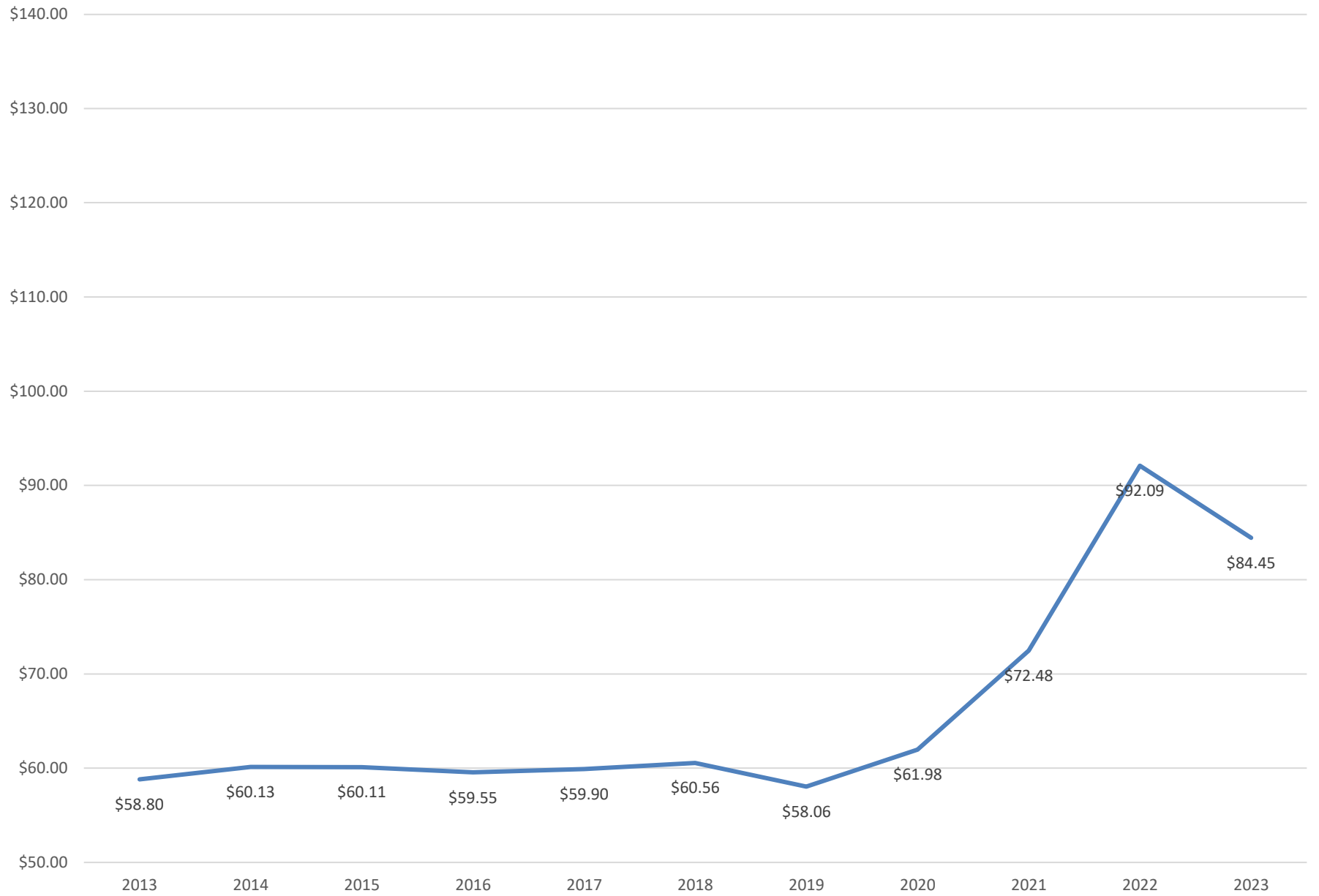
**Cy to
Date**

These figures capture the total cost of power to the power department. The power department uses costs only associated with the purchasing and generation of power and includes debt payments and interest associated with power resources.

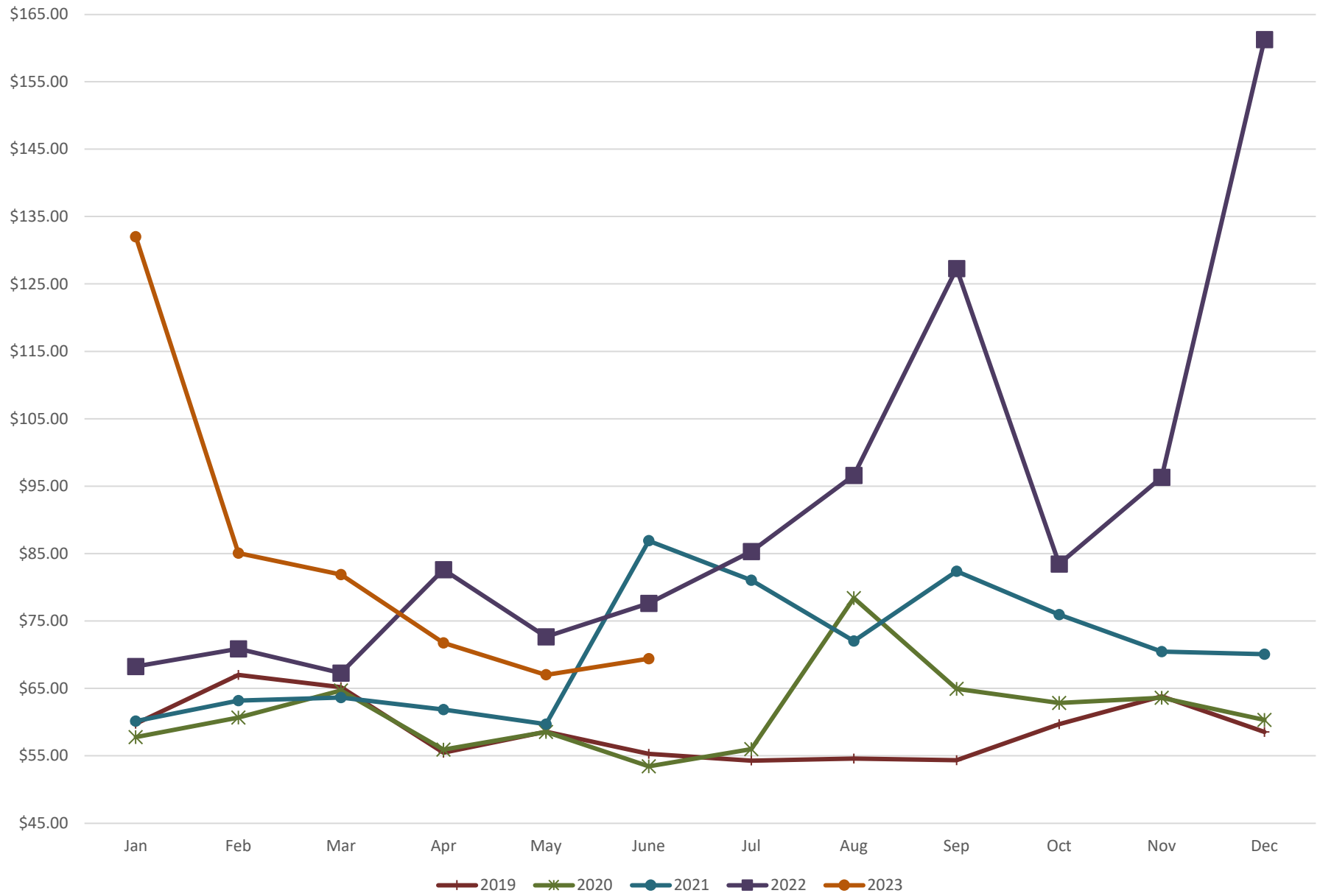
June



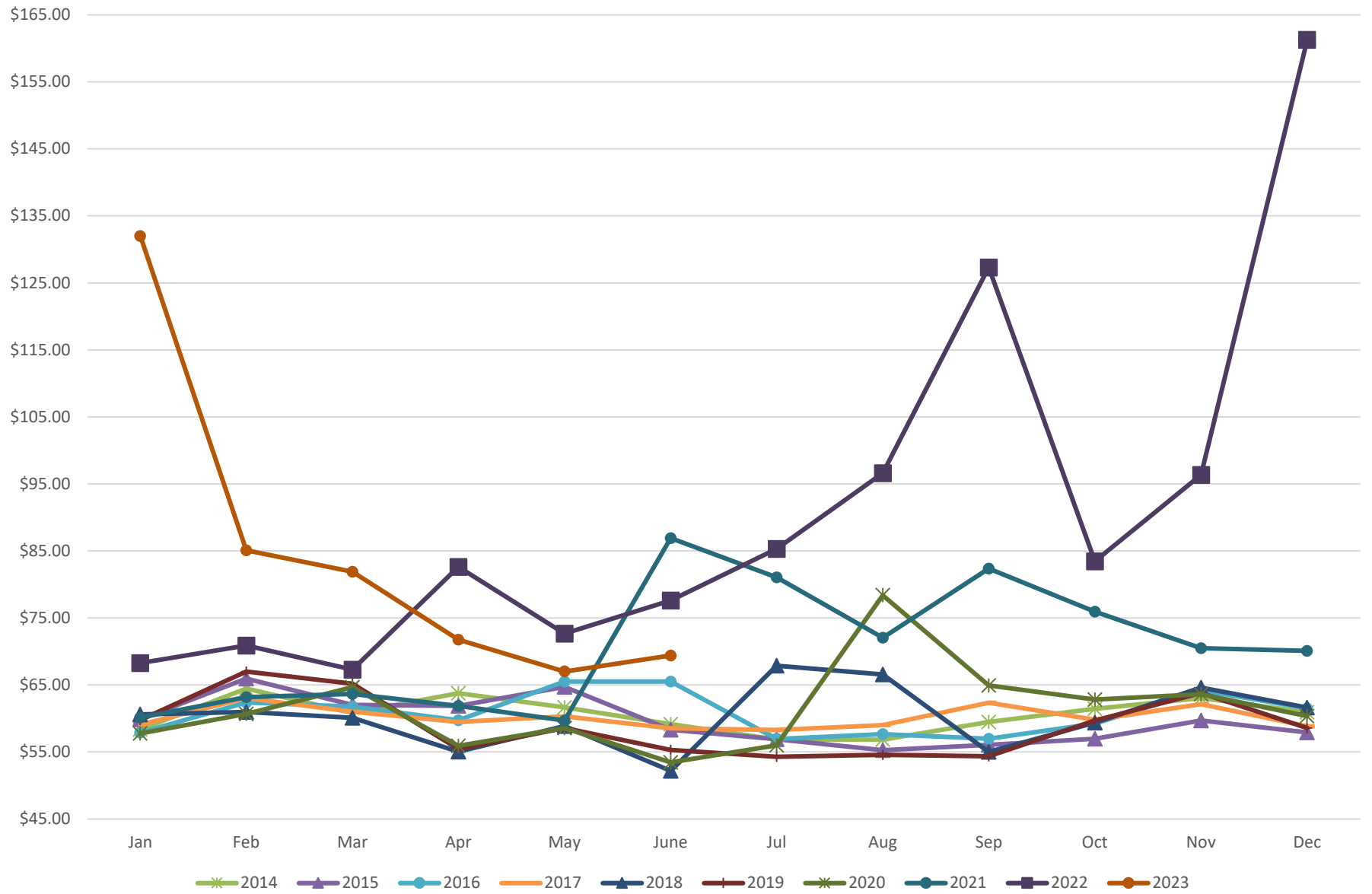
Weighted Average



Avg Monthly Price (5 Yrs)



Avg Monthly Price



STANDARDS AND SPECIFICATIONS

HURRICANE CITY

DESIGN AND INSTALLATION OF UNDERGROUND POWER DISTRIBUTION SYSTEMS

BOOK NO. _____

**ADOPTED BY HURRICANE CITY COUNCIL
JUNE 06, 1996**

Updated – December 01, 1996

Updated– July 14, 1999

Updated – September 28, 1999

Updated – January 6, 2000

Updated – January 25, 2006

Updated - March 20, 2008

Updated- December 5, 2013

Updated- April 10, 2014

Updated- May 30, 2014

Updated- January 4, 2016

Updated- June 28, 2017

Updated- January 15, 2022

HURRICANE CITY
Underground Power Distribution System

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HURRICANE CITY
Underground Power Distribution Systems

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HURRICANE POWER STANDARD DRAWINGS

The Hurricane Power Standard Drawings as posted on the City website, as may be amended from time to time by The Hurricane City Power Department (“HCP”), are incorporated herein by reference.

SECTION I

HURRICANE CITY Underground Power Distribution Systems

GENERAL PREFACE

Hurricane City has prepared and approved this set of standards and specifications for the purpose of maintaining a safe, consistent, and reliable underground power distribution system. These standards are required to be used by anyone who is involved with design and/or installation of underground power distribution systems within Hurricane City limits.

HCP will do all primary terminations.

If a Contractor needs to have the HCP provide access to electrical facilities, they are required to set up an appointment to have HCP meet them at the job site.

All costs for underground power distribution systems are the responsibility of the Contractor/Developer unless otherwise stated in these Standards and Specifications.

If a Contractor/Developer re-plats or otherwise changes the underground power distribution system within a development, it will be the Contractor/Developer's responsibility to make sure the system meets the requirements of these standards and specifications. All costs for the changes to the underground power distribution system will be the responsibility of the Contractor/Developer.

If these standards conflict with federal, state, or local codes, the more stringent requirement is to be followed.

In consultation with the Hurricane City Power Board, HCP may make minor adjustments to these standards at any time to address unique or unusual circumstances or to align with updated industry standards.

SECTION

II

HURRICANE CITY Joint Utility Design and Construction Standards

These Design and Construction Standards are to be followed at all times. In unusual or unique circumstances, HCP may authorize deviations to these standards in consultation with the Hurricane City Power Board

- A proximity detail and street locations will be required on all utility drawings.
- For joint utilities trench details, see Drawing DR-18
- For placement and layout of utilities, see Drawings DR-21 and DR-22
- For burial depths, see Drawing DR-18
- Licensed Professional Engineers will be required to submit sealed (drawings that are stamped by a professional engineer) utility drawings as per the standards contained herein. All utilities (i.e., gas, cable, phone, power, sewer, and water) will be shown on the appropriate drawings. The utility drawings are subject to approval by the City Staff. All drawings are to be submitted in AutoCAD or PDF. Plans must include a full utility layout page and an electrical only page.
- Power infrastructure will generally be located on the north and west side of roadways. In new developments with sidewalks, the power infrastructure will be located at the back of the sidewalk where possible. In developments without sidewalks, the power infrastructure will be at least five feet (5') back of curb. Locations must be approved by City Staff.
- It is at the sole discretion of HCP to install or allow developers to install overhead power lines in place of underground buried power lines at any location considered a main roadway, temporary power source, or main gut line.
- Cable and phone boxes will be installed and located in accordance with Drawing DR-21, DR-22.
- For commercial projects, building layout, square footage, panel size in amps, number of meters/breaker sizes, voltage needed, and load calculations will be required.
- For high density projects, the number of units per lot and building, panel size in amps, number meters/breaker sizes and voltage needed will be required.

HURRICANE CITY
Joint Utility
Design and Construction Standards

- Qualified Contractors must have a valid Hurricane City Underground High Voltage Certificate to install electrical facilities in the Hurricane City Power System
- Only a Hurricane City Power approved contractor or Journeymen Electrician may install secondary service lines from Hurricane City Power's designated connection point to the customers meter base. This includes all conduit and wire installation.
- Qualified Electrical Contractors will be responsible to install the joint trench as described and shown on Drawing DR-18.

SECTION III

HURRICANE CITY Underground Construction Standard Cable Installation

I. SCOPE

This standard outlines installation details for primary and secondary cable used in underground distribution.

II. DEFINITIONS

A. SECONDARY CABLES

All cables with voltage ratings of 600 volts or less including grounding conductors.

B. PRIMARY CABLES

All cables with voltage ratings greater than 600 volts. The thickness of conductor insulation shall be 220 mils.

C. BURIAL DEPTH

Vertical distance from the surface under which cables are installed to the center of the conduit nearest the surface. Drawing DR-18

III. INSTALLATION

A. CABLE INSTALLATION METHODS

1. Conduit Sizes. See Drawings DR-18

2. Loading Guidelines.

Loadings on the City of Hurricane's system are limited to the values listed below. These limitations are set to allow the city to maintain three-phase balanced loads on the system's main overhead circuits.

a) Primary Conductor Loading.

i) A maximum of 400 kVA connected is allowed for single phase.

ii) A 1/0 AWG aluminum conductor is required where the connected single-phase and/or three-phase load is less than 400 kVA connected per cable/phase or total 1,200 kVA connected for three-phase cable.

HURRICANE CITY
Underground Construction Standard
Cable Installation

- 3) When the connected single-phase and three phase loads exceed 400 kVA per cable a backbone-feeder system shall be used. It is required that a 4/0 AWG aluminum conductor be used for the backbone when the total connected kVA is less than 3,600 kVA. When the total kVA connected exceeds 3,600 KVA an aluminum conductor of 750kcmil is required. The size of the conductor shall be approved by the City of Hurricane Power Department. The connected load shall be divided so that it can be fed by 1/0 AWG aluminum conductor feeders.
- 4) If 750kcmil aluminum conductor is required for the backbone feeder, switchgear must be installed.
- 5) All areas or subdivisions with potential development beyond their property may be required to extend power to the far side of the property.
- 6) All main 750mcm trunk lines will be designed and installed to accommodate current or future back feed.

3. Cables in Conduit.

a) Miscellaneous Installation Instruction.

- 1) Cables shall be pulled so that all conduit and bends will be installed and backfilled before any wire is pulled. This will result in minimum tension on the cables.
- 2) Any pull over 950 feet must be approved by HCP.
- 3) In highly congested manholes or where cables must be bent sharply to permit pulling, a feed-in tube shall be used for pulling cables. This will reduce pulling tensions and prevent damage to the cables being pulled and to other adjacent cables.
- 4) Single-phase conductor cables must be installed one cable per conduit and conduit must be nonmetallic as per requirements.
- 5) Three-phase conductor cable must be installed three cables per conduit and conduit must be nonmetallic as per requirements.
- 6) Before making a pull, conduits shall be cleared and free of dirt, rocks, etc.

HURRICANE CITY
Underground Standard
Cable Installation

- 8) Cable pulling compounds (Bentonite clay in a water slurry or pulling compound) shall be used to facilitate pulling of primary and secondary cables. Compounds shall be compatible for use with high voltage cable(s) shield(s).
- 9) When two or more cables (secondary) and/or bare conductors are pulled into one conduit, they shall be pulled at the same time.
- 10) Primary cables shall not be installed in the same conduit as secondary or communication cables.
- 11) Primary or secondary cables shall not be pulled into plastic conduit until all conduit joints made using plastic conduit cement have been allowed to dry for at least one-half (1/2) hour.
- 12) Sufficient excess cable shall be pulled into all duct runs to allow at least five (5') of cable to be removed from each end of the installed cable yet providing adequate cable for termination or splicing. Removal of the five feet (5') of cable will eliminate cable damaged by pulling grips from the system.

b) Maximum Pulling Line Tensions.

When pulling cable(s) into conduit, the pulling line used shall have a safe working load rating (minimum) equal to the manufacturer's specification maximum allowable pulling line tensions. An approved hydraulic pressure cable tension monitoring system or dynamometer will be used on all pulls where the cable(s) cannot be pulled by hand.

c) Pulling Eyes and Grips.

Cables shall be pulled into conduit with a pulling eye attached to the cable's conductor or a pulling grip placed over the cable sheath, insulation, or jacket.

d) Pulls with Bends and/or Sweeps.

Extreme care must be exercised when pulling cable into runs containing sweeps or bends. There are two concerns; 1) the cable manufacturer's maximum recommended pulling tension must not be exceeded, and 2) the cable manufacturer's maximum sidewall bearing pressure is not to be exceeded. Different manufacturers of cable have differing requirements as

HURRICANE CITY

Underground Construction Standard

Cable Installation

to the maximum pulling tension depending on the type of pulling used (pulling grips such as “Kellams” or pulling eyes affixed to the cable’s conductor). Sidewall bearing pressures are also dependent on the manufacturer. It is the engineer’s responsibility to calculate expected cable-pulling tensions and sidewall bearing pressures based on the manufacturer’s recommendations. Pulling tension calculations shall be provided to the Hurricane City for approval.

The number of 90-degree and 45-degree elbows will be limited to the following:

- For secondary or primary conduit runs using 4” PVC or less, the number of 90-degree elbows shall be limited to two (2), and if needed one (1) 45-degree elbow may be used in addition to the two (2) 90-degree elbows.
- For primary conduit runs using 6” PVC, the number of 90-degree elbows shall be limited to one (1).
- Any additional elbows (90 or 45-degree) needed to be installed must be approved by HCP.

B. BENDING RADIUS FOR CABLES

The minimum bending radius for both single and multiple conductor cables shall be per manufacturer’s specification.

C. BURIAL DEPTH

See Drawings DR-18

D. SOIL COMPACTION

1. Backfill placed over primary and/or secondary cables must be compacted. Machine compaction shall be used after placing a minimum of twelve inches (12”) of fill over the conduit.

Refer to the Conduit Installation section for compaction requirements.

E. MULTIPLE PRIMARY CIRCUITS IN ONE TRENCH

1. When the cables comprising two primary circuits (whether single or three-phase) are installed in a common trench the horizontal separation between the two circuits shall be twelve inches (12”) minimum.

NOTE: This requirement is not meant to prohibit random lay of different phases of the same circuit in a common trench.

**HURRICANE CITY
Underground Construction Standard
Cable Installation**

TABLE 2

**CLEARANCES FROM UNDERGROUND POWER CABLE TO OTHER
UNDERGROUND UTILITIES**

Water:	5 Feet horizontal
Sewer:	5 Feet horizontal
Natural Gas:	10 feet horizontal
Cable TV:	1 foot vertical
Phone:	1 foot vertical

HURRICANE CITY
Underground Construction Standard
Cable Marking Location

1. SCOPE

This specification details the standard method to be used for making primary and secondary underground cables to indicate the general direction from which each cable extends from a given site.

It also details a method for identifying individual phases in multi-cable primary and secondary cable systems.

II. DEFINITIONS

A. SECONDARY CABLES

All cables with voltage ratings of 600 volts or less including grounding conductors.

B. PRIMARY CABLES

All cables with voltage ratings greater than 600 volts.

III. INSTALLATION

A. DIRECTION IDENTIFICATION

Primary and secondary cables shall be marked with one tag indicating direction or exit from underground facilities (i.e., vaults, primary junction boxes, service holes, manholes, secondary junction boxes, transformers, or splice boxes). This tag shall indicate the general direction of the cable(s) to the next facilities where the cable is located. The tags used must be approved by the Hurricane City staff.

All tags will be labeled with next point of connector (i.e. Transformer 1 to Transformer 2).

All equipment will be numbered prior to tagging the cable in order to be accurate. The tagging will be inspected by City of Hurricane Power Department personnel prior to energizing.

NOTE: Approved tags (cow tag) can be purchased at any Intermountain Farmers outlet.

HURRICANE CITY
Underground Construction Standard
Cable Marking and Location

B. PHASE IDENTIFICATION

When individual phases in a primary or secondary multi-cable installation are to be identified, bands of colored tape shall be used. Each phase shall be identified with bands as follows:

“A” PhaseBlack

“B” PhaseRed

“C” PhaseBlue

SAFETY

Do not shortcut or forget safe working procedures. Regardless of the accuracy of cable labeling, it cannot be relied upon when working and handling cables. The energized status of any individual cable must be tested. Proper cable grounding procedures must be followed.

HURRICANE CITY
Underground Construction Standard
Conduit Installation

I. SCOPE

These standard outline installation details for plastic conduit (PVC) used in underground distribution.

II. DEFINITIONS

A. PLASTIC CONDUIT

Conduit shall be one of the following types:

1. PVC Schedule 40
2. Steel conduit shall not be used without the approval of HCP.

B. BURIAL DEPTH

1. Conduit:

Vertical distance measured from the surface under which conduits are installed to the center of the conduit nearest the surface.

2. Concrete Encased Conduit

Vertical distance measured from the surface under which conduits are installed to the top of the concrete envelope surrounding the conduits.

C. SWEEP

Changes in direction of a conduit or group of conduits with an angle of bend of 10 Degrees or less or a radius of bend of fifteen feet (15') or more.

D. Change in direction of a conduit or group of conduits that, due to the angle of bend or radius of bend, cannot be defined as a sweep.

III. APPLICATIONS

- A. Refer to drawing DR-18,20 for determining conduit depth and location for primary and secondary cable applications.**

HURRICANE CITY
Underground Construction Standard
Conduit Installation

B. CONDUIT SIZES

Refer to Drawing DR-18 for determining conduit sizes for primary and secondary conductors.

C. WARNING TAPE

Six-inch (6”) red warning tape shall be installed twelve inches (12”) below final grade for the length of the entire trench.

IV. INSTALLATION

- A. The minimum allowable burial depths for non-encased and concrete encased conduits are shown in the following table.

Table 3
BURIAL DEPTHS-NON-ENCASED AND ENCASED CONDUIT

Installed Under Paved Surface			All Other Locations	
	Non-Encased Conduit	Concrete Encased Conduit	Non-Encased Conduit	Concrete Encased Conduit
SCH 40 PVC Conduit Secondary	36 Inches	See Notes	36 Inches	See Notes
SCH 40 PVC Conduit Primary	48 Inches	See Notes	48 Inches	See Notes

- NOTES:
- A. If, in a particular installation, burial depths less than permitted by the table above are required, the reduced burial depths must be approved by the HCP.
- B. Concrete encased conduit must be with a three-inch (3”) envelope. There must also be six inches (6”) of select bedding and eighteen inches (18”) of fill on top of the concrete encasement. Drawing DR-19

HURRICANE CITY
Underground Conduit Standard
Conduit Installation

B. TRENCHES FOR CONDUITS

1. Trench Bottoms.

When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1”) in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6”) deeper than the burial depth required for the conduits and then backfilled to the required burial depth with sand or screened backfill. Backfill shall be compact to within 95 percent (95%) of the maximum dry density prior to installation of conduit.

2. Trench Backfill

a) Direct Buried Plastic Conduit.

1. The JUT (Utility Trench) trench shall be backfilled with (1”) minus material from the bottom of the trench to the top. No spoil material shall be used, unless screened, (1”) minus, and is compactable material.

b) Concrete Encased Plastic Conduit.

1. Concrete encased conduit is not the standard and will only be accepted in extreme circumstances.

c) Drying Time for Concrete Before Backfilling.

Backfill shall not be placed in trenches containing concrete-encased conduits until the concrete has been allowed to set for at least 36 hours.

C. SOIL COMPACTION

Backfill placed over direct buried plastic conduit must be compacted; machine compaction shall not be used within twelve inched (12”) of the conduits. For concrete encased plastic conduits, machine compaction may be used without restriction in proximity to the concrete envelope.

HURRICANE CITY

Underground Construction Standard

Conduit Installation

E. CONCRETE ENVELOPE REQUIREMENTS

1. Minimum Envelope Dimensions.

When conduits are encased in concrete, they shall be enclosed by a concrete envelope. See Drawing DR-19.

2. Concrete.

A three-quarter inch (3/4") minus 3000 PSI mix as per ASTM (American Society for Testing and Materials) C94 specification is required. In all cases a Type 2 modified, or Type 5 cement will be used. Air entraining agents shall not to be used. Slump shall not exceed six inches (6") at site.

3. Conduit Retention

Weights of approximately 75 pounds or other means may be used to prevent conduits from floating during pouring of the concrete envelope.

F. CONDUIT BENDS AND SWEEPS

1. Minimum Radius

a) Bends.

The minimum radius of bends in conduits shall not be less than ten (10) times the diameter of the largest conduit being installed. If smaller minimum bending radii are required, they shall not be less than the manufacturer's recommended minimum bending radii of the cables to be installed in the conduits.

G. SHORING, LAYING BACK, SPOIL PLACEMENT AND RETENTION

When employees must enter a trench to install conduits, the trench shall be shored or laid back and the spoil shall be effectively retained and placed back from the edges of the trench as required by local state and national codes or ordinances to ensure that the employees are not subject to moving ground or cave-ins.

HURRICANE CITY
Underground Construction Standard
Conduit Installation

- H. If conduit is damaged during installation, damaged section(s) shall be removed and replaced with like conduit and couplings. Use of split ducts for repair of damage during installation is not permitted. A full stock length (usually 10 foot segments) will be used to repair a damaged section. Repair collars will not be allowed.

- I. RISER POLE CONDUIT INCLUDES POWER, PHONE, TV

Conduits for a riser pole shall be rigid steel or aluminum shall continue up the pole from the PVC elbow to the top of the riser. The riser pole conduit shall be straight and supported with a six-inch (6") aluminum-strut system. Any crooked or misaligned conduits will not be accepted. The contractor shall install the first ten feet (10') of the riser and one six-inch (6") standoff. The city will provide the rest of the materials for the completion of the power riser at the contractor's expense. Placement and height of riser shall be approved by HCP personnel. See Drawings DR-26.

NOTE: There will be a fee charged for the installations: Please see HCP personnel for current fees. These fees are subject to change without notice.

HURRICANE CITY
Underground Construction Standard
Infrastructure Installation

I. SCOPE

These standards outline installation details for primary equipment (transformer pads, splice boxes, switch basements, sectionalizing cabinets, etc..) use in an underground distribution system.

II. INSTALLATION

A. ABOVE GROUND PRIMARY SWITCH BASEMENTS

1. Switch Basement Installation Depth.

The switch basement shall be installed with the top being within six inches (6”) above the finished grade.

Splice boxes shall be installed same as switch basements.

2. Transformer Pad Installation Depth.

The transformer pad shall be installed 6” above finished grade.

3. Sectionalizing Cabinets Installation

Sectionalizing Cabinets shall be installed according to Standards Drawings DR-14, DR-21, and DR-22.

B. LOCATION

Primary enclosures shall be located such that adjacent obstacles such as fences, buildings, etc. do not interfere with operation, installation, or maintenance of the enclosures. If less than ten feet (10’) of clear space is to be provided, HCP approval is required.

HURRICANE CITY
Underground Standard
Equipment, Line Location and Right of Way Requirements

I. SCOPE

This standard outlines the location, with respect to property lines, of underground distribution facilities. See Drawings DR-20,21,22

II. BACK LOT AND SIDE YARD LINE INSTALLATIONS

Installation along back lot and side yards will not be allowed. If front installation is not possible, Contact HCP for further review of electrical installation plan.

III. RIGHT-OF-WAY REQUIREMENTS

Before any power system design approval, the property owner or developer will be required to grant Hurricane City the proper easements and rights-of-way.

The standard requirements are as follows:

Residential:

10 feet (10') on the front of each lot or parcel
7.5 feet (7.5') on the sides and back of each lot or parcel

Multi-Building or Condominium:

10 feet (10') on the front of each lot or parcel

Commercial:

15 feet (15') on the front of each lot or parcel
7.5 feet (7.5') on the side and back of each lot or parcel

Common Areas:

The equipment (i.e. transformers, vaults, switches) will be placed along access roads as per standards. If placement along access roads cannot be accomplished as determined by HCP, equipment will be placed with at least ten feet (10') of clearance from any permanent structure.

All power equipment will be designed and installed as per the location drawings contained in these specifications; Drawings DR-20,21,22 in order to assure equipment falls within the established rights-of-way and easements and to maintain consistency of equipment placement throughout the City.

SECTION IV

HURRICANE CITY Underground Construction Standard Primary Junction Installation

I. SCOPE

These standards outline installation details applicable to fused 15 kV, 200 and 600-ampere primary junction installation.

II. INSTALLATION

- A. All single-phase pad mount transformers will have a ground sleeve, see Drawing DR-11. All three-phase transformers will be placed on the transformer pad as shown on Drawing DR-10.
- B. Fusing requirements for any industrial or commercial facility will be reviewed, coordinated, and approved by HCP. Any system that has the potential of serving more than one commercial or industrial location or more than one circuit/feeder such fusing will be determined by HCP and each subdivision or development will be fused according to its needs.
- C. Connection requirements vary between the type of service being rendered (residential, commercial, or industrial) and location on the electrical system.

HURRICANE CITY
Underground Construction Standard
Primary Junction Installation

Residential Single-Phase

The subdivision shall not contain a single transformer larger than 100 kVA. Fuse sizing must be approved by city staff.

Residential Three-Phase

Subdivision will be tapped via appropriate sectionalizing cabinets or switches, see Drawings DR-14,15 or DR-16,17. Where a switch cabinet is required, no more than nine (9) fused single-phase taps can be fed from the cabinet. Each tap shall have not more than 400 kVA of connected single-phase load. Loads served by such a system shall be balanced by connected transformer kVA per phase. No single transformer shall exceed 100 kVA. A set of three (3) fused disconnects will be provided on the riser pole serving the subdivision. Fuse sizing must be approved by city staff.

Commercial Single-Phase

Maximum single-phase load is 400 kVA. No transformer may be larger than 100 kVA. Fuse sizing must be approved by city staff.

Commercial Three-Phase

Taps to serve single-phase connected kVA of 400 or less are permitted but shall be connected to the feeder by a switched, fused cabinet. Where a switch cabinet is required, no more than nine (9) fused single-phase taps can be fed from the cabinet. Each tap shall have not more than 400 kVA of connected single-phase load. Single-phase loads shall be balanced between the phases by balancing connected transformer kVA. Fuses shall be sized based on connected kVA and shall coordinate with the up-line protective devices. HCP personnel shall be consulted early in the planning stage to determine the appropriate maximum fuse size. 750mcm backbone feeders will be required to be looped or developed in such a manner as to have future loop and back feed capabilities.

Residential and Commercial

When fused switchgear is required the developer/customer is responsible to pay a pro-rate share of the current costs for the existing three-phase fused bay. Current costs to be obtained from HCP.

**TABLE 4
FUSE SIZES**

Description	Location	Fuse Size	Cable Size
Residential Single-Phase Less Than 400 kVA	Riser Pole	40T	1/0
Residential Three-Phase 400 kVA-1200 kVA	Riser Pole Cabinet Outgoing Taps	40T 40E	1/0
Residential Three-Phase Greater Than 3600 kVA	Riser Pole Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than 1200 kVA	80T 80E	4/0
Residential Three-Phase Greater Than 3600 kVA	Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than 1200 kVA	80E 40E	4/0
Commercial Single-Phase Less Than 400 kVA	Riser Pole	40T	1/0
Commercial Three-Phase Less Than 1500 kVA	Riser Pole	80T	4/0
Commercial Three-Phase 1500 kVA-3600 kVA	Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than1200 kVA	80E 40E	4/0 1/0
Commercial Three-Phase Greater Than 3600 kVA	Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than1200 kVA	80E 40E	4/0 1/0

Note: The fuse sizes shown are a maximum. Fuse sizing must be approved by HCP.

III. TESTING BEFORE ENERGIZING

A. LOADBREAK ELBOWS AND INSULATING RECEPTACLES

Primary Junction Installation, which include load-break elbows and/or insulating receptacles, shall be operated before the installation is energized to ensure there is no interference from concentric neutral conductors, adjacent elbows, etc.

B. SWITCHES

Test operate all switches in fused, primary installations prior to energizing to ensure proper operation and that adjacent obstacles such as fences, walls, etc. do not interfere with the switch operating handle.

IV. LOCATION

Primary junction installations shall be located such that adjacent obstacles such as fences, buildings, etc. do not interfere with installation or operation and maintenance of the equipment.

HURRICANE CITY
Underground Construction Standard
Secondary Junction Installation

I. SCOPE

These standards outline the installation of secondary junction boxes and mobile home park meter pedestals.

II. INSTALLATION

A. BURIAL DEPTS

1. Secondary Junction Boxes.

- a. Secondary junction boxes shall be installed with 6 inches (6”) above final grade and be located six inches (6”) behind sidewalk. See drawings DR-12 and DR-13
- b. Drive over secondary boxes will not be permitted if box contains (1) 500mcm or (2) 350mcm wires. Drive over concrete boxes are not a power department standard and will only be allowed in special circumstances.

2. Mobile Home Park Metering Pedestals.

- a. Mobile Home Park Metering Pedestals shall be installed to the depth indicated on the pedestal by the manufacturer, see Drawings DR-25.

III. SAFETY

A. LOCKING

1. Secondary Junction Boxes.

- a. All secondary junction boxes shall be bolted with penta head bolts. Standard tumbler-type locks or other devices are not approved for this application.

2. Mobile Home Park Meter Pedestals.

- a. The access panel to the unmetered bus in all mobile home park meter pedestals shall be locked with pedestal equipment locks. Standard tumbler type locks or other devices are not approved for this application.

HURRICANE CITY
Underground Construction Standard
Cable Taps (200 Amperes)

I. SCOPE

These standards outline installation details for 200 ampere, 15 kV load break junctions used in underground distribution.

II. INSTALLATION

A. GENERAL

200 ampere, 15 kV load break junctions must be installed in primary enclosures. Not suitable for direct burial.

B. TESTING BEFORE ENERGIZING

Operate load break elbows and insulating receptacles before energizing 200 ampere, 15 kV load break junction installations to ensure:

1. They can be operated without interference from concentric neutral conductors, adjacent elbows, etc.
2. The mounting location of the load break junction is such that rings and covers or doors of primary enclosures, adjacent junctions, etc. do not interfere with operations.

Elbow arrestors or stand-off arrestors or a combination of the two will be required at all locations deemed necessary by HCP.

Underground Construction Standard Cable Taps (600 Amperes)

I. SCOPE

These standards outline installation details applicable to 15 kV, 600 ampere splice-tap configuration used in underground distribution systems.

II. INSTALLATION

When assembling 15 kV, 600 ampere splice-tap configurations, a spanner wrench may be used to facilitate installation or removal of connector plugs and reducing tap wells (with or without studs). They are not suitable for direct burial.

III. CAUTIONS

600 Ampere elbows are dead-break and only suitable for operation when de-energized.

SECTION

V

HURRICANE CITY

Underground Standard

Transformer Installation

I. SCOPE

These standards outline the installation of single-phase and three phase transformers used in underground distribution.

II. EQUIPMENT

A. PRIMARY SYSTEM CONFIGURATION

1. Single-Phase pad mount transformers.
 - a. Single-Phase pad mount transformers should be equipped with two primary bushings for installation in loop or radial feed primary systems.
2. Three-Phase pad mount Transformers.
 - a. Three-phase pad mount transformers shall be purchased and installed with six primary bushings and feed through capabilities.

III. INSTALLATION

- A. Connect the secondary ground strap, supplied on most pad mount transformers, between the transformer tank wall and the secondary neutral.
- B. The soil backfill to be placed around the transformer ground sleeve shall be compacted to within 95 percent (95%) of the maximum dry density to support the transformer. A level pad around all sides of five feet (5') shall be maintained.

CAUTION: Do not disconnect either end of the secondary ground strap unless the transformer is de-energized.

IV. TRANSFORMER SIZING

- A. Residential transformers will be incrementally sized based on 8KVA per 200 amperes.
- B. Commercial/Industrial transformers will be sized based on **80** percent (80%) of the panel size.

Underground Construction Standard Transformer Installation

V. TRANSFORMER ORDINANCE

Please refer to the Hurricane City's most recent transformer ordinance.

VI. TRANSFORMER POLICY

It is permissible for a Contractor to acquire transformers from sources other than HCP, provided the transformer(s) fully meets Hurricane City specifications.

It will be the policy of HCP that the electrical contractor will be responsible to provide to HCP, prior to energizing the circuit or transformer, but not limited to, the following:

1. Certified, load loss certificate, by serial number of unit
2. Certificate from manufacturer:
 - a) Compliance of standards testing required in the transformer specifications.
 - b) Warranty.
 - c) Polychlorinated Biphenyl (PCB) certificate.
3. Numbering of Transformer and Information needed
 - a) All nameplate information.
 - b) Street Address.

It is the responsibility of the Contractor to see that HCP inspector receives transformer information before the final inspection walk through. The City Power inspector will assign a number for each transformer to be painted on the front of transformer.

All appurtenances to the transformers such as, but not limited to, all elbows, neutral grounding bushings (when required), stand-offs, dummy receptacles, etc. will be provided by the contractor. Single-phase transformer secondary bar connectors capable of accepting 6-500mcm copper or aluminum conductors shall be supplied by the Contractor.

Prior to placing a transformer on order, it will be the responsibility of the Contractor to ensure that the transformer distributor is aware of the conditions of the ordinance. It also will be the responsibility of the Contractor to inform HCP of transformers placed on order, size of transformer, project name, and name of transformer distributor.

Transformer Bid Specifications

Single-Phase Pad-mounted Distribution Transformer

I. SCOPE

II. GENERAL

III This specification outlines the electrical characteristics and the mechanical features of single-phase, 60Hz; oil filtered, pad-mounted, dead-front compartmental-type distribution transformers with separable insulated high voltage.

A. STANDARDS

1. All transformers shall be constructed and tested in accordance with latest revision of ANSI C57.12.25 (American National Standards Institute); and the applicable NEMA (National Electrical Manufacturers Association) standards.
2. No used or remanufactured material or components will be acceptable.

B. RATINGS

1. KILOVOLT AMPERE (kVA) RATINGS

- a. The standard kVA ratings shall be one of the following:
25 KVA, 37.5 KVA, 50 KVA, 75 KVA, or 100 KVA as required.
- b. These standard kVA ratings are continuous and based on not exceeding either a 65° C average winding temperature rise or an 80° C hot spot temperature rise. The temperature rise of the insulating oil shall not exceed 65° C when measured near the top of the tank.

2. VOLTAGE

- a. The high voltage rating shall be 12470Y/7200 volts. The low voltage rating shall be 240/120 volts. Unless otherwise directed by HCP.

3. BASIC IMPULSE INSULATION LEVEL

- a. The basic impulse insulation level (BIL) shall be 95 kV.

C. CONSTRUCTION

1. GENERAL

- a. All transformers shall consist of a transformer tank and a high and low-voltage cable termination compartment. These components shall be assembled as an integral, tamperproof, and weatherproof unit for mounting on a pad. The transformer shall meet the requirements for tamper resistance as set forth by the Western Underground Committee. There shall be no exposed bolts, screws or other fastening devices which are extremely removable. There shall be no openings through which foreign objects such as wires or rods might be inserted to contact live parts.

Transformer Bid Specification

Single-Phase Pad-mounted Distribution Transformer

2. HIGH AND LOW-VOLTAGE COMPARTMENT

- a. Access to the high and low-voltage compartment shall be through a hinged door suitable for locking with a padlock.
- b. The high-voltage segment of the compartment shall contain the high voltage terminations and be provided with an elbow accessory parking stand. High voltage will be of the loop type/feed thru configuration.
- c. The low-voltage segment of the compartment shall contain the low-voltage terminations.

3. TANK

- a. All transformer tanks shall have sealed tank construction and sufficient strength to withstand a pressure of seven (7) PSIG without permanent distortion.
- b. A tank that has sealed tank construction is one that seals the tank from the atmosphere.
- c. The tank shall remain effectively sealed for a top oil temperature range of -5°C to 105°C.

4. MAN COVER

- a. Welded main cover construction shall be provided. If access to internal connection for testing is required, a handhole(s) shall be provided.

5. LOW-VOLTAGE TERMINATIONS

- a. The electrical characteristics of the completely assembled low-voltage terminations shall be:
 - i. Insulation Class – 1.2kV.
 - ii. Basic Impulse Insulation Level (BIL)-30 kV.
 - iii. One minute withstand – 10 kV.
- b. The terminals of the low-voltage terminations shall be as shown in Figure 4A, Low Voltage Terminals, of American National Standards Institute (ANSI) C57.12.25-latest revision.
- c. The number location and arrangement of the low-voltage terminations shall be as shown I Figure 2, Interchangeability Dimensions-Type 2 Arrangement, of American National Standards Institute (ANSI) C57-12.25-latest revision.
- c. All low-voltage terminations shall be externally bolted to facilitate field replacement.

HURRICANE CITY
Transformer Bid Specifications
Single-Phase Pad-mounted Distribution Transformer

6. HIGH-VOLTAGE TERMINATIONS

- a. All high-voltage terminations shall be 15 kV class universal bushing wells and inserts suitable for use with 15 kV class load-break elbow connectors. NOTE: All load-break bushing inserts shall be provided with the transformer.
- b. All high-voltage terminations shall be externally bolted to facilitate field replacement.
- c. The number, location and arrangement of the high-voltage terminations shall be shown in Figure 2, Interchangeability Dimensions-Type2 Arrangement, of American National Standards Institute (ANSI) C57312.25-latest revision.

7. NEUTRAL CONNECTIONS

- a. The H2 end of the high-voltage windings shall be connected to the transformer tank internally and this connection shall be securely grounded to the tank and shall be independent of all other connections.
- b. The low-voltage neutral shall be a fully insulated bushing. A ground pad shall be provided on the outer surface of the tank. A removable ground strap shall be provided and connected between the low-voltage neutral bushing and the ground pad.

8. CORE AND WINDINGS

- a. One piece core construction is desired. Where other construction is used, minimum assembly joints shall be provided. For approved two-part cores, the core shall be held together with bands and torqued bolts. Crimped banding is not acceptable for ratings over 50 kVA.
- b. Copper or aluminum winding conductors are desired.
- c. Core material may be either silicon steel or amorphous.
- d. Core losses shall be minimized by the core material and core construction.

9. INSULATION

- a. All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil or the coils shall be wound with primary conductor containing a thermosetting adhesive that when properly cured will form an effective bond.

HURRICANE CITY
Transformer Bid Specifications
Single-Phase Pad Mounted Distribution Transformer

- b. Insulating/cooling fluid within the tank shall be electrical grade mineral oil or a nonflammable environmentally accepted fluid.
- c. All fluids shall be certified and indicated on the nameplate to be less than 1parts per million (ppm) polychlorinated biphenyl (PCB) content.
- d. Fluids other than mineral oil shall have submitted with the quotation complete chemical and electrical characteristics and a statement of being non-PCB.

10. GROUND CONNECTION

- a. The tank shall have a welded ground lug boss attached on the secondary side of the tank near the bottom of the tank of secondary bushings and attached conductors.
- b. The grounding boss shall be free of paint and shall be 7/16 inch (7/16") deep and threaded for a one-half inch (1/2") 13 NC grounding stud or connector.
- c. The tank cover shall have a grounding strap between the cover and the tank.

D. ACCESSORY EQUIPMENT

1. HIGH-VOLTAGE PROTECTIVE FUSES

- a. All transformers shall be equipped with an externally removable, oil immersed, expulsion fuse, in a load-break bayonet suitable for hot stick operation. This fuse must be designed to protect the transformer in the event of internal or secondary faults or under overload conditions and must be hook stick operable.

2. PRESSURE RELIEF DEVICE

- a. Each transformer shall be equipped with self-actuating relief device to relieve slow pressure buildup and to automatically vent when pressure reaches + 10 PSIG and recloses when pressure falls to + 6 PSIG.

3. ROLLING, LIFTING, AND MOUNTING FACILITIES

- a. The transformer shall be equipped with lifting provisions of adequate strength and size and arranged on the transformer to permit lifting of the completely assembled and oil filled unit.
- b. An internal flange shall be provided at the base of the high and low-voltage compartment to provide means for mounting the transformer on a pad.

HURRICANE CITY
Transformer Bid Specifications
Single-Phase Pad-mounted Distribution Transformer

4. IDENTIFICATION NAMEPLATE

- a. An identification nameplate shall be located in the low-voltage segment of the high and low voltage compartments and shall be readable with cables in place.
- b. If the nameplate is mounted on a removable part, the manufacturer's name and the transformer serial number shall be permanently affixed to a non-removable part.
- c. The identification nameplate shall conform to Section 6.4, Instruction Nameplate, of American National Standard Institute (ANSI) C57.12.25 latest revision. The nameplate shall also conform to Section 5.12, Nameplates, of American National Standard Institute (ANSI) C57.12.00 latest revision.

E. TESTING

1. All transformers shall be tested in accordance with requirements of American National Standard Institute (ANSI) C57.12.25 latest revision. All transformers shall be capable of withstanding short circuit tests.

F. FINISH

1. The transformer shall be given a durable, corrosion resistant, green, or desert tan (as specified) outdoor finish capable of meeting or exceeding EEI finishing requirements.
2. All transformer surfaces in contact with the pad shall be designed or treated to minimize corrosion.

G. SHIPPING AND LABELING INSTRUCTIONS

1. Transformers shall be mounted on a pallet for shipment.
2. A shipping tag indicating the kVA size, manufacturer, voltage ratings, serial number and purchaser order number shall be attached to all transformers.

H. LOSS EVALUATION

1. Total losses will be invoiced at \$6.85 per watt over allowable losses according to the chart below.
2. Evaluated losses will be calculated by multiplying the appropriate dollars/watt values by guaranteed maximum load losses at maximum nameplate kVA rating and no-load losses at 100 percent voltage. These products will be added to the bid price for evaluation.

Transformer Bid Specification

Single-Phase Pad-mounted Distribution Transformer

3. Total watt losses shall not exceed the following:

Single-Phase Pad-mount 120/240 Volt

<u>kVA Rating</u>	<u>Losses in Watts</u>	<u>kVA Rating</u>	<u>Losses in Watts</u>
25 kVA	275 Watts	75 kVA	675 Watts
37.5 kVA	360 Watts	100 kVA	750 Watts
50 kVA	460 Watts	167 kVA	1,310 Watts

4. If the actual tested loss values exceed the guaranteed maximum values stated in the proposal of the Contractor, the Contractor will be charged a penalty value for every kilowatt by which the actual tested transformer losses exceed the guaranteed maximum losses upon which the proposal was evaluated. This penalty value will be the difference between the total actual test loss evaluation and the total guaranteed bid loss evaluation
5. All actual tested loss data will be supplied to HCP within five (5) days after shipment of the transformers.

I. VENDOR EVALUATION

1. Vendor evaluations, as well as loss evaluations, will be used to determine the low bidder. Delivery dates will be of prime concern during the bid evaluation.

J. EXCEPTIONS

1. Exceptions to this Specifications shall not be accepted, unless approved by HCP. Any exceptions shall be noted in the proposal.

K. WARRANTY

1. Manufacturer shall warrant to purchaser that the apparatus or service to be furnished hereunder shall be of the highest quality and free from defects in material, workmanship, and title and will be of the kind designated in the pertinent purchase order. The Manufacturer's warranty shall be effective for a period of twelve (12) months after the date of shipment to Purchaser.
2. The Manufacturer shall guarantee that all transformers furnished under this specification are of first-class material and workmanship throughout, that they have been tested in accordance with this specification, and that the results of the tests comply with the requirements of this specification, and, in lieu of other claims against it, agrees to replace or repair:
- a. Any transformer found to be defective in material or workmanship or found not to be in compliance with the requirements of this specification before or during installation of the transformer.

HURRICANE CITY
Transformer Bid Specifications
Single-Phase Pad-mounted Distribution Transformer

- b. Any transformer fail during normal and proper use within the manufacturer's guarantee period which shows defects of materials or workmanship.
- c. All transformers must be of new construction, no remanufactured transformers will be accepted. New construction means not used and is less than 2 years old.

HURRICANE CITY
Transformer Bid Specifications
Three-Phase Pad-mounted Distribution Transformer

I. SCOPE

A. GENERAL

This specification outlines the electrical characteristics and the mechanical features of dead-front outdoor three-phase, 60 Hz, oil immersed, self-cooled pad-mounted, compartment-type distribution transformer with separable insulated high voltage connectors.

B. STANDARDS

- 1. All transformers shall be constructed and tested in accordance with latest revision American Standards Institute (ANSI) C57.12.26, and the applicable National Electrical Manufacturers Association (NEMA) standards.
- 2. No used or remanufactured material or components will be acceptable. All transformers must be of new construction, no remanufactured transformers will be accepted. New construction means not used and is less than 2 years old.

II. RATINGS

A. KILOVOLT AMPERE (kVA) RATINGS

- 1. The standard kVA ratings shall be on of the following:

2.1.1.1 75 kVA, 112.5 kVA, 150 kVA, 225 kVA, 300 kVA, 500 kVA, 750 kVA, 1000 kVA, 1500 kVA, or 2000 kVA as required.
- 2. These standard kVA ratings are continuous and based on not exceeding either a 65° C average winding temperature rise or an 80° C hot spot temperature rise. The temperature rise of the insulating oil shall not exceed 65° C when measured near the top of the tank.

B. VOLTAGE

HURRICANE CITY
Transformer Bid Specifications
Three-Phase Pad-mounted Distribution Transformer

1. The high voltage rating shall be 12470Y/7200 volts. The low voltage rating shall be 208Y/120 volts or 480Y/277 volts as required, unless otherwise directed and approved by HCP. Transformer must be wound in a Wye-Wye scenario.

C. TAP RATINGS

1. The transformers shall be equipped with: (2) 2-1/2 percent taps above and (2) 2-1/2 percent taps below normal voltage. All taps shall be full capacity taps.
2. Tap changing to be through the wall in the high voltage connection compartment for external to tank adjustment.
3. Taps shall have the positions of the changer clearly marked to indicate actual voltage on the primary, or as a percentage (%) of above and below normal primary voltage.
4. Taps shall be operable only with the transformer de-energized.

D. BASIC IMPULSE INSULATION LEVEL

1. The basic impulse insulation level (BIL) shall be 95 kV.

III. CONSTRUCTION

A. GENERAL

1. All transformers shall consist of a transformer tank and a high and low-voltage cable termination compartment. These components shall be assembled as an integral, tamperproof, weatherproof unit for mounting on a pad. The transformer shall meet the requirements for tamper resistance as set forth by the Western Underground Committee. There shall be no exposed bolts, screws or other fastening devices which are externally removable. There shall be no openings through which foreign objects such as wires or rods might be inserted to contact live parts.

B. TANK

1. Transformer tank shall be suitable for outdoor installation. The tank shall be of a construction that effectively seals the tank interior from the atmosphere but will allow entry for service.
2. Construction of the seal shall maintain the integrity of the seal over an operating oil temperature range of -5° C to 105° C.
3. Tank construction shall be such that it has sufficient strength to withstand a pressure of seven (7) PSIG without permanent distortion.

Transformer Bid Specifications

Three-Phase Pad-mounted Distribution Transformer

C. HIGH AND LOW-VOLTAGE COMPARTMENT

1. The high and low-voltage cable terminating compartment shall:
 - a. Be compartmentalized into high-voltage and low-voltage segments by a suitable barrier.
 - b. Includes two doors, one for the high-voltage segment and one for the low-voltage segment. These doors shall have stainless steel hinges and pins and three-point latching with provisions for padlocking. Unlocking the padlock shall permit access to the low-voltage segment of the terminating compartment only. Access to the high-voltage segment of the terminating compartment shall not be attained until an additional fastening device has been released.
 - c. Meet the dimensional requirements of Figure 7 – Compartment Designations and Specific Dimensions for Loop-Feed and Radial-Feed Transformers, of ANSI Publication C57.12.26 latest revision.
 - d. The high-voltage compartment shall be equipped with accessory elbow stands for each elbow.

D. TERMINATION ARRANGEMENT AND DIMENSIONS

1. The termination arrangements and dimensions for Figures 6, 7, and 8 of ANSI Publication C57.12.26 latest revision shall be applicable to this specification. Figure 6 – Specific Dimensions for Loop-Feed Transformers Figure 7 – Compartment Designations and Specific Dimension for Loop-Feed and Radial-Feed Transformers. Figure 8 – Low-Voltage Terminal Arrangements and Specific Dimensions

E. HIGH-VOLTAGE TERMINATIONS

1. Configuration – The configuration of the high-voltage terminations shall be Loop Feed (ANSI C57.12.26 latest revision)
2. Type – The high-voltage terminations shall be 15 kV class universal bushing wells and inserts suitable for use with 15 kV class load-break elbow connectors.
The continuous current rating shall be 200 Amps.

NOTE: All load-break bushing inserts shall be provided with transformer.

F. LOW-VOLTAGE TERMINATIONS

1. Terminals – The terminals of the low-voltage terminations shall be as shown in Figure 9A, 9B, or 9C of ANSI Publication C57.12.26 latest revision for the applicable transformer size Figure 9 – Low-Voltage Terminals.

Transformer Bid Specifications

Three-Phase Pad-mounted Distribution Transformer

2. Configuration – The configuration of the low-voltage terminations shall be as shown in Figure 8 – Low-Voltage Terminal Arrangements and Specific Dimensions.
3. Secondary low-voltage bushings shall include a full capacity neutral (grounded conductor) bushing.
4. The electrical characteristics of the completely assembled low-voltage bushing and terminals shall be:
 - a. Insulation Class – 1.2 kV.
 - b. Basic Impulse Insulation Level (BIL) – 30 kV.
 - c. One minute withstand – 10 kV.
5. Internal connections to the secondary bushings shall be by lugs welded to the secondary conductor and bolted to the bushing stud.

G. FUSING EQUIPMENT

1. The transformer shall be equipped with externally removable, oil immersed, expulsion fuses in load-break bayonets, in series with under oil partial range current limiting fuses.
2. All under oil fuses shall be easily accessible through a large “hand hole” in the high voltage compartment. The hand hole shall be large enough and placed in such a location that all internal fusing elements will be “within” the hand hole area. In no case shall the hand hole area be smaller than 10 inches by 12 inches (10” X 12”) unless approved in writing by HCP. The hand hole cover shall be tamper resistant and its locking device shall be accessible from inside the high voltage or low voltage transformer compartment.
3. The transformer shall be equipped with an under oil partial range current limiting fuse. The bayonet expulsion fuses and backup current limiting fuses shall be coordinated to ensure that the current limiting fuse will only operate on faults internal to the transformer. The current limiting fuse used shall have an interrupting rating of 50,000 Amp (minimum) symmetrical.

H. CORE AND WINDINGS

1. All transformers must be wye-wye connected windings and shall have four – or five-legged core construction or shall otherwise include provisions to prevent excessive tank heating. The core construction or other provisions for preventing tank heating shall be adequate for unbalanced loading conditions of one or more of the primary phases of the transformer being energized from the same (single-phase) source.

Transformer Bid Specifications

Three-Phase Pad-mounted Distribution Transformer

2. One-piece core construction is desired. Where other construction is used, minimum assembly joints shall be provided. For approved two-part cores, the core shall be held together with bands and torqued bolts. Crimped banding is not acceptable for ratings over 50 kVA.
3. Copper winding conductors are desired.
4. Core material may be either silicon steel or amorphous.
5. Core losses shall be minimized by the core material and core construction.
6. Transformers shall be equipped with a common H0X0 bushing with a copper grounding strap to the transformer case.

I. INSTALLATION

1. All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil, or the coils shall be wound with primary conductor containing a thermosetting adhesive that when properly cured will form an effective bond.
2. Insulating/cooling fluid within the tank shall be electric grade mineral oil or a less flammable, environmentally accepted fluid where required.
3. All fluids shall be certified and indicated on the nameplate to be less than 1 parts per million (ppm) polychlorinated biphenyl (PCB) content.
4. Fluids other than mineral oil shall have submitted with the quotation complete chemical and electrical characteristics and a statement of being non-PCB.

J. PRESSURE RELIEF DEVICE

1. Each transformer shall be equipped with a self-actuating relief device to relieve slow pressure buildup and to automatically vent when pressure reaches + 10 PSIG and recloses when pressure falls to +9 PSIG.

K MOUNTING AND LIFTING

1. Mounting shall be suitable for concrete pad mounting. Provide suitable anchorage brackets for Seismic Zone3.

Transformer Bid Specifications

Three-Phase Pad-mounted Distribution Transformer

2. The tank shall have lifting provisions of adequate strength; size and arrangement on the transformer to permit lifting the transformer in an upright position when filled with insulating fluid.

L. GROUND CONNECTION

1. The tank shall have a welded ground lug boss attached on the secondary side of the tank near the bottom of the tank, clear of secondary and attached conductors.
2. The grounding boss shall be free of paint and shall be 7/16 inch (7/16") deep and threaded for a one-half (1/2") 13 NC grounding stud or connector.
3. The tank cover shall have a grounding strap between the cover and the tank.

M. ACCESSORIES

1. ANSI C57.12.26, latest revision, standard accessories shall be provided.

IV. FINISH

- A. The transformer shall be given a durable, corrosion resistant, non-chalking, green or desert tan (as specified) outdoor finish capable of meeting or exceeding EEI finishing requirements.

V. SHIPPING AND IDENTIFICATION

A. SHIPPING

1. Transformers shall be mounted on a pallet for shipment.

B. IDENTIFICATION

1. The nameplate shall contain the manufacturers name, address, kVA, primary voltage, secondary voltage(s), % impedance, rated temperature rise, a wiring diagram indicating connections and voltages with polarity (additive or subtractive), core losses (no load and full load), insulating fluid identification, and PCB content, weight when full, manufacturer part (catalogue) number, and serial number unique to the transformer.
2. The nameplate shall conform to ANSI standards C57.12.00 and C57.12.26 latest revisions.
3. The nameplate shall be mounted on a permanently attached backing plate with welds or rivets. Removable nameplates or nameplates attached to removable parts will not be accepted.

Transformer Bid Specifications

Three-Phase Pad-mounted Distribution

VI. TESTING

- A. All transformers shall be tested in accordance with requirements of American National Standard Institute (ANSI) C57.12.26 latest revision. All transformers shall be capable of withstanding short circuit tests.

VII. LOSS EVALUATION

- A. Total losses will be invoiced at \$6.85 per watt over allowable losses according to the chart below.
- B. Evaluated losses will be calculated by multiplying the appropriate dollars/watt values by guaranteed maximum load losses at maximum nameplate kVA rating and no-load losses at 100 percent voltage. These products will be added to the bid price for evaluation.
- C. Total watt losses shall not exceed the following:

3-Phase Pad-mount 120/208 Volt

<u>kVA Rating</u>	<u>Losses in Watts</u>	<u>kVA Rating</u>	<u>Losses in Watts</u>
75 kVA	815 Watts	300 kVA	2,380 Watts
112.5 kVA	1,125 Watts	500 kVA	4,060 Watts
150 kVA	1,300 Watts	750 kVA	6,500 Watts
225 kVA	1,950 Watts	1000 KVA	8,980 Watts

3-Phase Pad-mount 277/480 Volt

<u>kVA Rating</u>	<u>Losses in Watts</u>	<u>kVA Rating</u>	<u>Losses in Watts</u>
150 kVA	1,385 Watts	750 kVA	4,500 Watts
225 kVA	2,000 Watts	1,000 kVA	6,500 Watts
300 kVA	2,460 Watts	1,500 kVA	10,500 Watts
500 kVA	4,325 Watts	2,000 kVA	14,000 Watts

- D. If the actual tested loss values exceed the guaranteed maximum loss values stated in the proposal of the Successful Bidder, the Successful Bidder (Seller) will be charged a penalty value for every watt by which the actual tested transformer losses exceed the guaranteed maximum losses upon which the proposal was evaluated. This penalty value will be the difference between the total actual test loss evaluation and the total guaranteed bid loss evaluation.
- E. All actual tested loss data will be supplied to HCP within five (5) days after shipment of the transformers.

VIII. VENDOR EVALUATION

- A. Vendor evaluations, as well as loss evaluations, will be used to determine the low bidder. Delivery dates will be of prime concern during the bid evaluation.

IX. EXCEPTIONS

Transformer Bid Specifications

Three-Phase Pad-mounted Distribution Transformer

- A. Exceptions to this Specification shall not be accepted, unless approved by HCP. Any exceptions shall be noted in the proposal.
- X. WARRANTY
 - A. Manufacturer shall warrant to Purchaser that the apparatus or service to be furnished hereunder shall be of the highest quality and free from defects in material, workmanship, and title and will be of the kind designated in the pertinent purchase order. The Manufacturer's warranty shall be effective for a period of twelve (12) months after the date of shipment to Purchaser. Terms of Manufacturer's warranty shall be included in the bid proposal and will be a criterion for evaluation of the proposal.
 - B. The Manufacturer shall guarantee that all transformers furnished under this specification are of first-class material and workmanship throughout, that they have been tested in accordance with this specification, and that the results of the tests comply with the requirements of this specification, and in lieu of other claims against it, agrees to replace or repair.
 - 1. Any transformer found to be defective in material or workmanship or found not to be in compliance with the requirements of this specification before or during installation of the transformer.
 - 2. Any transformer fail during normal and proper use within the Manufacturer's guarantee period which shows defects of materials or workmanship.

SECTION VI

HURRICANE CITY Underground Construction Standard Secondary Line and Meter Installation Residential Subdivisions

I. SCOPE

These standards outline minimum requirements for the service equipment, service conductors, etc., installed from the secondary junction box to and including the meter, for residential subdivisions.

It also includes information necessary to determine ownership maintenance responsibility for associated conductors, equipment, etc.

II. APPLICATION

A. GENERAL

1. This standard shall be used as a guideline for determining whether or not the service equipment, service conductors, etc. that comprise the secondary service meet all applicable national, state, and local codes and ordinances and HCP requirements.

III. DEFINITIONS

A. SERVICE EQUIPMENT, See Drawings DR-24, DR-25.

1. The equipment, containing the disconnecting means and overcurrent protective devices, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff of the supply to a building.

B. UNDERGROUND SERVICE CONDUCTORS

1. The underground supply conductors that extend from the City's secondary junction box to the metering provision.

C. GROUNDING ELECTRODE

1. Grounding shall be done through a UFER grounding system, or per latest building code requirements.

D. GROUNDING ELECTRODE CONDUCTOR

1. The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
Residential Subdivisions

E. BURIAL DEPTH

1. Underground service conductors will be installed in conduits with supplemental protective covering or in raceways.
2. The vertical distance from the surface under which the conduit, supplemental protective covering, or raceway is installed, to the portion of the conduit, supplemental protective covering, or raceway nearest the surface.

F. METERING PROVISIONS

1. The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc. required to provide a place for mounting a National Electrical Manufacturers Association (NEMA) meter enclosure, required for installation of a meter.

G. SERVICE RISER

1. Conduit, conduit elbow, etc. that extend from the bottom of the service trench to the meter mounting provisions and main disconnecting means and enclose the service conductors.

H. SERVICE CONDUIT

1. Non-metallic conduit into which underground service conductors are pulled, excluding service risers.

IV. CODES

A. Underground services shall be installed in accordance with applicable HCP requirements and local, state, and national codes and ordinances.

B. All equipment and conductors installed shall meet or exceed applicable HCP requirements and local, state, and national codes and ordinances.

V. INSTALLATION

A. Type.

1. All underground service conductors shall be type USE (underground service.)

B. Protection.

1. Underground service conductors shall be protected by installation in conduit (PVC Schedule 40).

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Residential Subdivisions

C. Splices.

1. Underground service conductors shall not be spliced.

D. Installation Methods

1. In Conduit.
2. Underground service conductors pulled in conduit; care shall be taken to ensure that the conductors are not damaged during the pulling operation. Pulling tensions shall be monitored to ensure proper installation.

E. Grounding Requirements

1. A grounding electrode shall be connected via grounding electrode conductor to the underground service conductors (grounded conductors only) on the line side of and/or within the service disconnecting means.

F. Size.

1. The underground service conductors shall have adequate ampacity to supply the load requirements of the premises served by the conductors. HCP requires that all services less than 150 amperes be served by 2/0 aluminum conductor and services between 150-200 amperes be served by 4/0 aluminum conductor. Above 200 amperes, the service conductor will be a minimum of 350kcmil aluminum conductor.

VI. SERVICE EQUIPMENT

A. Continuous Current Rating

1. All service equipment shall have a minimum current rating of 100 amperes.

B. Short Circuit Current Rating.

1. Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

VII. SERVICE DISCONNECT MEANS

- A. All service disconnecting means shall have a current rating of not less than 100 amperes unless otherwise permitted by federal, state, or local authorities.
- B. When multiple switches or circuit breakers are used as the disconnecting means, their combined current rating shall not be less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Residential Subdivisions

VIII. SERVICE CONDUIT

A. General.

1. Service conduit installations shall be carefully designed (length, number of bends, bend radii, etc.) to ensure that the underground service conductors can be pulled into and through the conduit without damage.

B. Burial Depth.

1. Burial depths for service conduits shall be a minimum of 24 inches (24").

C. Trench Requirements.

1. Trench Bottoms.

- a. When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1") in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6") deeper than the burial depth required for the conduits and then backfilled to the required burial depth with compacted sand or clean backfill.

2. Trench Backfill.

- a. The JUT (Joint Utility Trench) trench shall be backfilled with (1") minus material from the bottom of the trench to the top. No spoil material shall be used, unless screened, (1") minus, and is machine compactable material.

IX. METERING PROVISIONS

A. General.

1. Typical requirements for meter mounting provisions for residences are shown on Drawings DR-24, when meter mounting provisions different from those shown are required, HCP shall detail specific metering provision requirements.
2. The meter mounting provisions must be installed in a true vertical plane.
3. Meter mounting provisions with extruded or cast aluminum meter jaws shall not be used.
4. Remote metering will not be allowed for new construction or rebuild/add on construction jobs.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Residential Subdivisions

5. The meter main will provide a disconnect.
6. All external exposed stand off conduit must be rigid steel and wrapped with anticorrosion tape where buried.

B. Location.

1. Meters **shall not** be located in carports, breezeways, covered or screened porches, or other areas that might be enclosed at some future date.
2. The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.
3. A level standing and working surface of 48 inches x 48 inches (48" x 48") shall be provided in front of all meters. Meters shall not be located behind fenced in areas.
4. Meters shall be set at a height of five feet six inches to six feet six inches (5'6" to 6'6").
5. Meters shall be installed on front of the structure (side of building facing the street) or within the first ten feet (10') of the front of the structure.
6. Meters must be accessible to the City Meter Reader and shall not be hindered by animals, landscape, fences, etc.

X. SECONDARY DISTANCES

- A. The distances from HCP transformer that secondary cable can be run due to voltage drop limitations are listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load.
- B. The maximum secondary cable distances are based on:
 1. Aluminum conductors in non-magnetic conduit
 2. A five volt (5V) drop across the secondary cable
 3. Up to 100 amperes of load current in the first table
 4. Up to 200 amperes of load current in the second table
 5. 0.95 load power factor
- C. The voltage drop calculations are based on Table 13 from the ANSI/IEEE Standard 141-1986, IEE Recommended Practice for Electric Power Distribution (IEEE Red Book).

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Residential Subdivisions

Table 5

SECONDARY 600V CABLE LENGTHS
RESIDENTIAL – UP TO 100 AMPERES

Conductor	Maximum Distance
1/0 AWG	150 feet
2/0 AWG	185 feet
4/0 AWG	280 feet

Table 6

SECONDARY 600 V CABLE LENGTHS
RESIDENTIAL – UP TO 200 AMPERES

Conductor	Maximum Distance
4/0 AWG	140 feet
350 kcmil	225 feet
500 kcmil	295 feet

- D. The residential subdivision design should consider the location of the power source as close as possible to the center of the load to keep voltage drop within satisfactory limits.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Mobile Home and Trailer Parks

I. SCOPE

These standards outline minimum requirements for service equipment, service conductors, etc. for mobile homes and trailer parks.

II. DEFINITIONS

A. SERVICE EQUIPMENT

1. The equipment containing the disconnecting means, overcurrent protective devices, and receptacle or other means for connection of a mobile home feeder assembly. This equipment shall be located adjacent to and not mounted in or on the mobile home.

B. FEEDER ASSEMBLY

1. The underground feeder conductors, including the grounding conductor together with the necessary fittings and equipment or a power supply cord designed to connect a mobile home to its metering provisions.
2. The conductors connecting the service equipment to the distribution panel inside the mobile home. There shall be four (4) conductors; one (1) of which shall be identified by a continuous green color or a continuous green color with one (1) or more yellow stripes for use as a grounding conductor.
3. As a minimum, a 5/8-inch x 8foot (5/8" X 8') ground rod shall be used as the grounding electrode. When a metal underground water pipe system is available the water pipes and the ground rod shall be used as grounding electrodes.

C. GROUNDING ELECTRODE CONDUCTORS

1. The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

D. BURIAL DEPTH

1. Underground service conductors installed in conduits with supplemental protective covering or in raceways.

The vertical distance from the surface under which the conduit, supplemental protective covering or raceway is installed to the portion of the conduit, supplemental protective covering or raceway nearest the surface.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Mobile Home and Trailer Parks

E.. METERING PROVISIONS

1. The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc., required to provide a place for mounting ring type socket meters, required for measuring usage of electrical energy.

III. CODES

A. INSTALLATION

1. Underground services shall be installed in accordance with the applicable HCP requirements and local, state, and national codes and ordinances.

B. EQUIPMENT AND CONDUCTORS

1. All equipment and conductors installed shall meet or exceed applicable HCP requirements and local, state, and national codes and ordinances.

IV. INSTALLATION

A. FEEDER ASSEMBLY

1. All conductors in the feeder assembly shall be insulated, color-coded, and installed without splices.

B. GROUNDING

1. The neutral conductor and the grounding conductor shall be bonded together only at the service equipment, not on or within the mobile home.
2. Continuous Current Rating.
 - a. Mobile home service equipment shall have a 100-ampere minimum rating unless otherwise permitted by federal, state, or local authorities.
3. Short Circuit Rating.
 - a. Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

C. PROTECTIVE EQUIPMENT SIZING

1. The service equipment shall contain a properly rated fused disconnect switch or a circuit breaker corresponding to the load requirements of the mobile home.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Mobile Home and Trailer Parks

D. BURIAL DEPTHS

1. The minimum burial depths shown as follows shall apply to mobile home underground service and underground feeder assembly conductors.
2. Direct Buried Plastic Conduit – 24 inches (24”)

E. CONDUCTORS

1. Underground service conductors shall be type USE (underground service entrance) and underground feeder assembly conductors shall be type USE or UF.

F. METERING PROVISIONS

1. Individual Meters.
 - a. Typical requirements for meter mounting provisions for mobile homes and trailers with individual meters are shown on Drawing DR-25. When meter mounting provisions different from those shown are required, specific meter mounting provision requirements shall be detailed by HCP.
2. Single Meter.
 - a. When mobile home parks or trailer courts are metered at a single point, the metering provisions at that point shall be detailed by HCP.
3. General Requirements.
 - a. Metering provisions must be installed in a true vertical plane.
 - b. Metering provisions with extruded or cast aluminum meter jaws shall not be used.
 - c. A level standing and working surface of 40 inches by 40 inches (40” X 40”) ~~30 inches X 30 inches (30” X 30”)~~ shall be provided in front of all meters, permitting ready access to the meter.
 - d. The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Mobile Home and Trailer Parks

- e. Mobile home meter pedestals shall be constructed and installed so that the vertical distance from the ground level to the centerline of the meter is 30 inches (30”) minimum to 72 inches (72”) maximum.
- f. Meter will be located at nearest supply point as determined by HCP.
- g. Meters must be accessible to the City meter reader and shall not be hindered by animals, landscape, fences, etc.
- h. The meter main will provide a disconnect. All 400 amp meter sockets shall contain a lever bypass

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

I. SCOPE

These standards outline minimum requirements for the service equipment, service conductors, etc. for apartments and condominiums. They also include information necessary to determine ownership and maintenance responsibility for associated conductors, equipment, etc.

II. APPLICATION

A. GENERAL

- 1. This specification shall be used as a guideline for determining whether or not the service equipment, service conductors, etc. that comprise the secondary service meet all applicable national, state and local codes and ordinances and HCP requirements.

B. SERVICE CONNECTION CRITERIA

- 1. Underground services **shall not** be connected to the City electrical system until:
 - a. Hurricane City authorized personnel has certified that the service is in compliance with applicable local, state and national codes and ordinances.

III. DEFINITIONS

A. SERVICE EQUIPMENT

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

1. The equipment, containing the disconnecting means and overcurrent protective devices, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff of the supply to a building.

B. UNDERGROUND SERVICE CONDUCTORS

1. The underground supply conductors that extend from the utility's secondary system to the customer's meter.

C. GROUNDING ELECTRODE – ALL LOCATIONS

1. As a minimum, a 5/8 inch X 8 foot (5/8" X 8') ground rod shall be used as the grounding electrode. When a metal underground water pipe system is available on the premises, the water pipe system and the ground rod shall be used as grounding electrodes.

D. GROUNDING ELECTRODE CONDUCTORS

1. The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

E. BURIAL DEPTH

1. Minimum of 24 inches (24") cover.

F. METERING PROVISIONS

1. The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc. required to provide a place for mounting ring type socket meters, required for measuring usage of electrical energy.

IV. CODES

A. INSTALLATION

1. Underground services shall be installed in accordance with HCP applicable requirements and local, state and national codes and ordinances.

B. EQUIPMENT AND CONDUCTORS

1. All equipment and conductors installed shall meet or exceed applicable HCP requirements and local, state and national codes and ordinances.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

V. INSTALLATION

A. UNDERGROUND SERVICE CONDUCTORS

1. Burial Depths.
 - a. The minimum burial depth for conduit protected burial underground service conductors shall be 24 inches (24").
2. Type.
 - a. All underground service conductors shall by type USE (underground service entrance).
3. Protection.
 - a. Underground service conductors should be installed in rigid nonmetallic conduit approved for the purpose (PVC Schedule 40).
4. Splices.
 - a. Underground service conductors shall not be spliced.
5. Installation Methods.
 - a. In Conduit.
 - i. Underground service conductors shall be pulled in conduit.
 - ii. Care shall be taken to ensure that they are not damaged during the pulling operation. Pulling tension shall be monitored to ensure proper installation.
6. Grounding Requirements.
 - a. A grounding electrode shall be connected, via grounding electrode conductors, to the underground service conductors (grounded conductors only) on the line side of an/or within the service disconnecting means.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

7. Size.

- a. Service Conductors Owned and Maintained by Customer.
- b. The underground service conductors shall have adequate ampacity to supply the load requirements of the premises served by the conductors. HCP requires that all services less than 150 amperes be served by 2/0 aluminum conductors and services between 150-200 amperes be served by 4/0 aluminum conductor. Above 200 amperes the service conductor will be a minimum of 350kcmil aluminum conductor.

B. SERVICE EQUIPMENT

1. Continuous Current Rating.

- a. All service equipment shall have a minimum current rating of 100 amperes unless otherwise permitted by federal, state, or local authorities.

2. Short-Circuit Current Rating.

- a. Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

C. SERVICE DISCONNECTING MEANS

- 1. All service disconnecting means shall have a current rating of not less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

D. SERVICE CONDUIT

1. General

- a. Service conduit installations shall be carefully designed (length, number of bends, bend radii, etc.) to ensure that underground service conductors can be pulled into and through the conduit without change.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

2. Burial Depths.

- a. Minimum burial depths for service conduits shall be as follows:
- b. Non-Metallic Conduit – 24 inches (24”).

3. Trench Requirements.

- a. Trench Bottoms.
- b. When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1”) in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6”) deeper than the burial depth required for the conduits and then backfilled to the required burial depth with compacted sand or screened backfill.
- c. Trench Backfill.
- d. Non-Metallic Conduit.
- e. At least twelve inches (12”) of compacted sand or screened backfill shall be placed over the conduits. The remaining backfill may be spoil from the trench if it is screened to 1” minus or smaller and is compactable.

E. METERING PROVISIONS

1. General.

- i. Typical requirements for meter mounting provisions for residences are shown in this specification and shall apply to all apartment and condominium situations.
- j. When meter mounting provisions different from those shown in this specification are required, specific meter mounting provision requirements shall be detailed by HCP.
- k. The meter mounting provisions must be installed in a true vertical plane.
- l. Meter mounting provisions with extruded or cast aluminum meter jaws shall not be used.
- m. Remote metering will not be allowed for new construction or rebuild/add on construction jobs.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartment and Condominiums

- n. The meter main will provide a disconnect. All 3 phase meter sockets shall contain a bypass lever. All 400 amp meter sockets shall contain a lever bypass
- o. All meter sockets shall be clearly labeled with permanent placards or permanent metallic stickers. See section V.E.4.

2. Location.

- a. Meters **shall not** be located in carports, breezeways, covered or screened porches or other areas that might be enclosed at some future date.
- b. The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.
- c. A level standing and working surface of 48 inches x 48 inches shall be provided in front of all meters. Meters shall not be located behind fenced in areas.
- d. Meters shall be installed on the front of the structure (side of building facing the street) or within the first ten feet (10') of the front of the structure nearest the source.
- e. Meters must be accessible to the City meter reader and shall not be hindered by animals, landscape, fences, etc.

3. Mounting Heights.

- a. Single Horizontal Row of Meters.
 - i. When meters for an apartment or condominium can be mounted in a single horizontal row, the vertical distance from the ground level to the center line of meters shall be five feet six inches (5'6") minimum to six feet six inches (6'6") maximum.
- b. Multiple Rows of Meters.
 - i. When meters for an apartment or condominium can be mounted in two (2) or more horizontal rows, the vertical distance from the ground level to the center line of the top row of meters shall be six feet six inches (6'6") maximum and the distance from the ground level to the center line of the bottom row of meters shall be four feet zero inches (4'0") minimum.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

4. Labeling Meter Bases.

- a. Meter bases shall be numbered according to the apartment/condominium numbers as recorded on the official plat.
- b. One inch (1") wide placards or metallic sticker shall be used to identify what each meter/unit disconnect breaker is feeding.
- c. Labels shall contain the unit number and/or address to correlate what each meter/unit disconnect breaker is feeding. For example: Unit 1, Unit2, or 299 n 2600 W, 287 N 2600 W.
- d. Labels shall be installed to the right or directly beneath the unit disconnect breaker to which the correlating meter is feeding.
- e. Placards shall be installed using self tapping screws and shall be lubricated using a rust resistive compound.
- f. No letters shall be used to identify meters/unit disconnect breaker. For example: Unit A, Unit B, Unit C are not permitted.

F. SECONDARY DISTANCES

1. The distances from the City of Hurricane Power transformer that secondary cable can be run due to voltage drop limitations are listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load.
2. The maximum secondary cable distances are based on:
 - a. Aluminum conductors in non-magnetic conduit
 - b. A five volt (5V) drop across the secondary cable
 - c. Up to 200 amperes of load current
 - d. 0.95 load power factor
3. The voltage drop calculations are based on Table 13 from the ANSI/IEEE Standard 141-1986, IEEE Recommended Practice for Electric Power Distribution (IEEE Red Book).

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

TABLE 7

SECONDARY 600V CABLE LENGTHS
APARTMENTS AND CONDOMINIUMS – UP TO 200 AMPERES

Conductor	Maximum Distance
4/0 AWG	140 Feet
350kcmil	225 Feet
500kcmil	295 Feet

The apartment/condominium facility design should consider the location of the power source as close as possible to the center of the load to keep voltage drop within satisfactory limits.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
for Commercial Facilities

I. SCOPE

These standards outline minimum requirements for service equipment, service conductors, etc. for commercial facilities.

It also includes information necessary to determine ownership and maintenance responsibility for associated conductors, equipment, etc.

II. APPLICATIONS

A. GENERAL

1. This specification shall be used as a guideline for determining whether or not the service equipment, service conductors, etc. that comprise the secondary service meet all applicable national, state and local codes and ordinances and HCP requirements.

C. SERVICE CONNECTION CRITERIA

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
for Commercial Facilities

1. Underground services **shall not** be connected to the City electrical system until:
 - a. Hurricane City personnel has certified that the service is in compliance with applicable local, state and national codes and ordinances and HCP requirements.

III. DEFINITIONS

A. SERVICE EQUIPMENT

1. The equipment, containing the disconnecting means and overcurrent protective devices, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff of the supply to a building.

B. UNDERGROUND SERVICE CONDUCTORS

1. The underground supply conductors that extend from the utility's secondary system to the customer's meter.

C. GROUNDING ELECTRODE – ALL LOCATIONS

1. Grounding shall be done thru a UFER grounding system, or per latest building code requirements.

D. GROUNDING ELECTRODE CONDUCTORS

1. The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

E. BURIAL DEPTH

1. Minimum of 24 inches (24”) cover.

F. METERING PROVISIONS

1. The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc. required to provide a place for mounting ring type socket meters, required for measuring usage of electrical energy.

G. SERVICE RISER

1. Conduit, conduit elbow, etc. that extend from the bottom of the service trench to the meter mounting provisions and main disconnecting means and enclose the service conductors.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
for Commercial Facilities

H. SERVICE CONDUIT

1. Non-Metallic conduit into which underground service conductors are pulled, excluding service risers.

IV. CODES

A. INSTALLATION

1. Underground services shall be installed in accordance with HCP applicable requirements and local, state, and national codes and ordinances.

B. EQUIPMENT AND CONDUCTORS

1. All equipment and conductors installed shall meet or exceed HCP requirements and local, state, and national codes and ordinances.

VI. INSTALLATION

A. UNDERGROUND SERVICE CONDUCTORS

1. Burial Depths.
 - a. The minimum burial depth for conduit protected buried underground service conductors shall be 24 inches (24").
2. Type.
 - a. All underground service conductors shall be type USE (underground service entrance).
3. Protection.
 - a. Underground service conductors should be installed in PVC Schedule 40.
4. Splices.
 - a. Underground service conductors shall not be spliced.
5. Installation Methods.
 - a. In Conduit.
 - i. Underground service conductors shall be pulled in conduit.
 - ii. Care shall be taken to ensure that they are not damaged during the pulling operation.

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For commercial Facilities

- iii. Pulling tension shall be monitored to ensure proper installation.

6. Grounding Requirements.

- a. A grounding electrode shall be connected, via grounding electrode conductors, to the underground service conductors (grounded conductors only) on the line side of an/or within the service disconnecting means.

7. Size.

- a. Service Conductors Owned and Maintained by Customer.
- b. The underground service conductor shall have adequate ampacity to supply the load requirements of the premises served by the conductors.
- c. HCP requires that all services up to 200 amperes be served by a minimum of 4/0 AWG aluminum conductor. Above 200 amperes, the service conductor will be a minimum of 350mcm aluminum conductor.

B. SERVICE EQUIPMENT

1. Continuous Current Rating.

- a. All service equipment shall have a minimum current rating of 100 amperes unless otherwise permitted by federal, state, or local authorities.

2. Short-Circuit Current Rating.

- a. Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

C. SERVICE DISCONNECTING MEANS

- 1. All service disconnecting means shall have a current rating of not less than 100 amperes unless otherwise permitted by federal, state, or local authorities.
- 2. Single phase or three phase commercial services will be required to have a lockable fuse or knife disconnect located on the building to disconnect power from the building. Disconnect must be situated in a manner as to leave the meter energized when disconnect is turned off.

HURRICANE CITY
Underground Construction Standard
Secondary Line and Meter Installation
For Commercial Facilities

D. SERVICE CONDUIT

1. General

- a. Service conduit installations shall be carefully designed (length, number of bends, bend radii, etc.) to ensure that underground service conductors can be pulled into and through the conduit without damage.

2. Burial Depths

- a. Minimum burial depths for service conduits shall be as follows:
 - i. Non-Metallic Conduit – 24 inches (24’')

3. Trench Requirements

- a. Trench Bottoms
 - i. When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1’’) in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6’’) deeper than the burial depth required for the conduits and then backfilled to the required burial depth with compacted sand or screened backfill.
- b. Trench Backfill
 - i. Non-metallic Conduit
 - ii. At least twelve inches (12’’) of compacted sand or screened backfill shall be placed over the conduits.

E. METERING PROVISIONS

1. General

- a. Typical requirements for meter mounting provisions for residences are shown in this specification and shall apply to all commercial facilities.
- b. When meter mounting provisions different from those shown in this specification are required, specific meter mounting provision requirements shall be detailed by HCP.

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Commercial Facilities

- c. The meter mounting provisions must be installed in a true vertical plane.
- d. Meter mounting provisions with extruded or cast aluminum meter jaws shall not be used.
- e. Remote metering will not be allowed for new construction or rebuild/add on construction jobs.
- f. The meter main will provide a disconnect. All 3 phase meter sockets shall contain a lever bypass. All single phase 400 amp meter sockets shall contain a lever bypass.
- g. Building layout, square footage, panel size in amps, number of meters/breaker sizes, voltage needed, and load calculations will be required before HCP can determine the sizing of all metering provisions.

2. Location

- a. Meters **shall not** be located in carports, breezeways, covered or screened porches, or other areas that might be enclosed at some future date.
- b. The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.
- c. A level standing and working surface of 48 inches x 48 inches shall be provided in front of all meters.
- d. Meters shall not be located behind fenced in areas.
- e. Access to meters shall not be hindered by any obstacles, including landscaping.
- f. Meters must be accessible to the City Meter Reader and shall not be hindered by animals, landscape, fences, etc.

3. Mounting Heights

- a. Single Horizontal Row of Meters
 - i. When meter for a commercial facility can be mounted in a single horizontal row, the vertical distance from the ground level to the center line of the meters shall be five feet six

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Underground Construction Standard
Secondary Line and Meter Installation
For Commercial Facilities

inches (5'6") minimum to six feet six inches (6'6")
maximum.

- b. Multiple Rows of Meters
 - i. When meters for a commercial facility can be mounted in two (2) or more horizontal rows, the vertical distance from the ground level to the center line of the top row of meters shall be six feet six inches (6'6") maximum and the distance from the ground level to the center line of the bottom row of meters shall be four feet zero inches (4'0") minimum.

4. Labeling Meter Bases

- a. Meter bases shall be numbered according to the apartment/condominium numbers as recorded on the official plat.
- b. One inch (1") wide placards or metallic stickers shall be used to identify what each meter/unit disconnect breaker is feeding.
- c. Labels shall contain the unit number and/or address to correlate what each meter/unit disconnect breaker is feeding. For example: Unit 1, Unit 2, or 299 N 2600 W, 287 N 2600 W.
- d. Labels shall be installed to the right or directly beneath the unit disconnect breaker to which the correlating meter is feeding.
- e. Placards shall be installed using self tapping screws and shall be lubricated using a rust resistive compound.
- f. No letters shall be used to identify meters/unit disconnect breaker. For example: Unit A, Unit B, Unit C are not permitted.

F. SECONDARY DISTANCES

- 1. The distances from the HCP transformer that secondary cable can be run due to voltage drop limitations are listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load.
 - a. Aluminum conductors in non-metallic conduit
 - b. A five volt (5V) drop across the secondary cable
 - c. Up to 200 amperes of load current
 - d. 0.95 load power factor

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Underground Construction Standard
Secondary Line and Meter Installation
For Commercial Facilities

The voltage drop calculations are based on Table 25 from the ANSI Standard 241-1983, IEEE Recommended Practice for Electric Power Systems in Commercial Buildings.

TABLE 8

SECONDARY 600V CABLE LENGHTS
COMMERCIAL FACILITIES – UP TO 200 AMPERES

Conductor	Maximum Distance
250mcm	170 feet
350mcm	225 feet
500mcm	295 feet

The commercial facility design should consider the location of the power source as close as possible to the center of the load to keep voltage drop within satisfactory limits.

SECTION VII

City of Hurricane Underground Construction Standard Street Light Installation

I. SCOPE

This standard outlines the requirements for installing streetlights erected in any subdivision within Hurricane City Limits.

II. EQUIPMENT SPECIFICATIONS/INSTALLATION

A. POLICY: It is the policy of the City of Hurricane that all streetlights erected in the City shall adhere to the following standard.

B. PURPOSE AND OBJECTIVE: To ensure streetlights are installed according to uniform construction guidelines and equipment specifications.

D. STREET LIGHT POLE SPACING AND HEIGHT:

1. Pole Height 15' 200' – 250'
2. Pole Height 25' 225' – 300'
3. A streetlight shall be placed at each intersection.
4. All poles shall be anchor base poles and the foundation design shall be adequate for the height of pole, the arm that is being installed, the soil conditions and 80-mile per hour winds.
5. Luminaries shall be 120 volt.
6. All streetlight bases must be precast and supplied by a preapproved vendor
7. For current acceptable streetlight makes and models, see HCP personnel.

Note: **All poles are black, all post top and cobra style heads are black.**

III. INSTALLATION STREET LIGHT

A. Installation

1. Customers requesting to add or delete streetlights will be required to meet with the HCP staff during a regularly scheduled planning meeting to discuss details and procedures.

City of Hurricane
Underground Construction Standard
Street Light Installation

2. If the City Council or Hurricane City Power Board determines a streetlight should be installed at City expense for safety or other reasonable public consideration, HCP will install the streetlight(s) as directed and according to this policy.

IV. OWNERSHIP

- A. Streetlights shall be installed at Owner/Developer expense in new/proposed subdivisions and projects. The owner will warrant lights for one year, then the Hurricane City accepts ownership.

V. FOOTING SPECIFICATION

- A. Per manufacturer, See Drawing DR-4. This drawing is for 15' decorative and 25' mongoose light only.

SECTION VIII

HURRICANE CITY Underground Construction Standard Concentric Neutral URD Primary Cable (URD is Underground Residential Distribution)

I. SCOPE

All primary cable used on the Hurricane City electrical system shall comply with the following:

A. Insulation Type – EPR

B. Insulation Thickness:

1. Minimum average thickness -220 mils minimum.
2. Minimum thickness at any point – 209 mils

C. Voltage Class – 15 kVA

D. All cable produced under this specification shall comply with the latest editions of AEIC C56 and ICEA S-68-516

E. All cable installed shall be new (not used) and within 2 years of manufacture date.

F. All cables installed in a conduit shall be the same voltage, insulation level, size and cable manufacturer.

G. Conductor sizes are:

1. 1/0 AWG aluminum compressed stranded with 16-#14 AWG bare copper concentric neutral wires (full neutral) with an encapsulating jacket whose thickness is not less than 0.05 inches (0.05”).
 - a. Jacket material shall be LLDPE or approved equal and shall be insulating.
 - b. Single-phase 1/0 AWG underground cable shall be installed in two and one-half inch (2 ½”) conduit and three-phase 1/0 AWG underground cable shall be installed in four-inch (4”) conduit, unless otherwise approved by HCP.
2. 4/0 AWG aluminum compressed stranding with 18-#14 AWG bare copper concentric neutral wires (1/3 neutral) with an encapsulating jacket whose thickness is not less than 0.05 inches (0.05”).

HURRICANE CITY
Underground Construction Standard
Concentric Neutral URD Primary Cable
(URD is Underground Residential Distribution)

- a. Jacket material shall be LLDPE or approved equal and shall be insulating.
 - b. 4/0 AWG underground cable shall be installed in four-inch (4") conduit, unless otherwise approved by HCP.
3. 750mcm aluminum compressed stranded with 24-#12 AWG bare copper concentric neutral wires (1/3 neutral) with an encapsulating jacket whose thickness is not less than 0.08 inches (0.08").
- a. Jacket material shall be LLDPE or approved equal and shall be insulating.
 - b. 750mcm underground cable shall be installed in six-inch (6") conduit, unless otherwise approved by HCP.

H. Approved cable manufacturers are:

1. Okonite
2. Kerite
3. CME

AEIC is Association of Edison Illuminating Companies

AWG is American Wire Gage

ICEA is Insulated Cable Engineers Association (formerly ICPEA)

EPR is Ethylene Propylene Rubber

LLDPE is Liner Low-Density Polyethylene

City of Hurricane
Underground Construction Standard
Primary Vault Specifications

I. THREE-PHASE AND SINGLE-PHASE ABOVE GROUND PRIMARY VAULT

A. Units must meet the following specification: See Drawings DR-15, DR-17.

1. HCP approved
2. Penta Head bolts on lid with locking capabilities
3. Fiberglass
4. All hardware including hinges to be stainless steel
5. Color – Munsell Green, Willow Green, or Desert Tan
6. Four-Way Junctions required

B. Approved Vendors

1. Nordic ND-350 Three Phase
2. Nordic ND-155 Single Phase
3. Other vendors of equivalent equipment are acceptable if approved by HCP.

C. Vaults will include:

1. Three-Phase
 - a. Three (3) four-way junctions, standoff brackets, and necessary receptacles, etc.
2. Single-Phase
 - a. One (1) four-way junction, standoff bracket, and necessary receptacles, etc.

HURRICANE CITY
Underground Construction Standard
Metal Enclosed Switchgear Specifications

I. METAL ENCLOSED SWITCHGEAR

- A. HCP shall determine the class of switchgear needed for each job. The switch gear specifications being a model P.H. 600 Amp Main Buss capacity. These will be designed per individual needs. Approved Manufacturers are A.B. Chance, S&C, and Federal Pacific.

1. Outdoor-Style, Manual Operation is as follows:

kV, Normal.....	14.4
kV, Maximum.....	17.0
kV, BIL.....	95
Main Buss Continuous, Amperes.....	600/200
Three-Pole Interrupter Switches	
Continuous, Amperes (Source/Feeder).....	600/200
Live Switching, Amperes (Source/Feeder).....	600/200
Two-Time Duty-Cycle Fault-Closing	
Amperes RMS Asymmetrical.....	23,400
Fuses with integral Load Interrupter	
Maximum, Amperes.....	200E
Live Switching, Amperes.....	200
Two-Time Duty-Cycle Fault-Closing	
Capacity, Amperes RMS Symmetrical.....	12,500
Short-Circuit Ratings	
Amperes, RMS Symmetrical.....	12,500
MVA Three-Phase Symmetrical at Rated Nominal Voltage.....	310

- B. The momentary and two-time duty-cycle fault-closing ratings of switches, momentary rating of bus, interrupting ratings of fuses, and on time duty-cycle fault-closing capabilities of the fuses with integral load interrupters shall equal or exceed the short circuit ratings of the pad-mounted gear.
- C. The pad-mounted gear shall consist of a single self-supporting enclosure, containing single blade interrupter switches, non-key interlock, dual purpose barriers for the switches and fuses (-G1 & G2), component grounding studs for switches and fuses (H & J).
- D. The switches and fuse components shall be arranged for full visibility when the enclosure doors are open. Open switch gaps and blown-fuse indicators shall be readily visible to provide for ease of operation.
- E. Interrupter switches shall have a two-time duty-cycle fault-closing rating equal to or exceeding the short-circuit rating of the integrated pad-mounted gear assembly. This rating defines the ability to close the interrupter switch twice against a three-phase fault with asymmetrical current in at least one phase equal to the rated value, with the switch remaining operable and able to carry and interrupt rated current. Tests substantiating this rating shall be performed at maximum design voltage with current applied for at least ten (10) cycles. Certified test abstracts establishing this rating

HURRICANE CITY
Underground Construction Standard
Metal Enclosed Switchgear Specifications

shall be furnished upon request.

- F. Interrupter switches shall have the capability established by test to perform switching duties which include interrupting load current up through the assigned live-switching rating, as well as transformer magnetizing currents associated with the applicable loads, cable-charging current, and line-charging current typical for distribution systems of the applicable voltage ratings. All arcing accompanying interruption shall be contained within the interrupters and products/gases evolved during interruption shall be vented through exhaust-control chambers to eliminate discharge of ionized gases. Switches shall have a single blade per phase and shall be externally operable. A quick-make/quick-brake mechanism, non-defeatable under normal operation and shall make operation of the switchblades independent of the speed of the manual operating handle.
- G. Solid-material power fuse shall be capable of detecting and interrupting all faults up to the short-circuit interrupting rating of the integrated pad-mounted gear assembly. Fusible elements shall be non-aging and non-damageable. All arching accompanying power fuse operation shall be contained within the fuse and all arc products and gases evolved shall be effectively contained within exhaust control devices during fuse operation. Power fuses shall have a blown-fuse indicator that shall be readily visible without removing the fuse from the mounting location. Fuse type shall be S & C Type SMU-20 for system compatibility.
- H. Fuse mounting jaw contracts shall be equipped with integral load interrupters to permit live switching of fuses with a rated hot stick. Integral load interrupters shall have an on-time duty –cycle fault-closing capability equal to the short-circuit rating of the pad-mounted gear. The duty-cycle capability defines the level of available fault current into which the fuse can be closed without a quick-make mechanism and when operated vigorously through its full travel without hesitation at any point, with the integral load interrupter remaining operable and able to carry and interrupt currents up to the emergency peak-load capabilities of the fuse.
- I. All terminations will be done with 3M Termination Kits and two (2) hole termination lugs. The contractor will supply the above-mentioned.

Optimizing the UAMPS Portfolio

Pool Project



Optimization of UAMPS' System

- UAMPS through its membership has a diverse and favorable resource mix
 - Gas, Coal, Hydro, Solar, Wind, etc.
- Market conditions are changing
 - Ancillary services could possibly yield more than energy
 - Ramping, losses, congestion relief etc.
 - Under normal market conditions, the goal should not be balancing on an hourly basis, it should be to utilize the energy imbalance market (EIM) and passively play the market to member's advantage
- MIGs could play a much larger role in taking advantage of the market
 - Modeling generation with the Balancing Authorities could yield capacity payments
 - Collaboration to identify opportunities for future markets and facilitate member sharing
- UAMPS would like to send market signals to its members to aid decision making
 - Should we turn off/on internal generation? Do we have flexible loads that we can utilize?
 - Flexible loads: water wells, pumps
- UAMPS would like to find a way for all members to benefit from each other's resources and create a win-win for everyone

UAMPS- A Diverse Mix

- In the current environment and what staff anticipates for the future diversity and flexibility are keys to Operational and Economic Success
- Dispatchable generation is going to be one of the most valuable assets for the next 7 years at least.
- UAMPS is setup for success
 - Thermal resources and Renewables working together

Markets- Balancing and Ancillary

- All of UAMPS membership is subject to market conditions. Markets are only going to get more complicated and prevalent
 - WEIM, WEIS, Markets +, WRAP, EDAM, CAISO RTO
 - Reliability is the number one goal.
 - When there is not an identified threat to the reliability of the system Staff must utilize the market to ensure members is maximizing the economic potential of their resources
 - This means out balancing at “Zero” is no longer our goal
 - If pricing is lower than our resource mix, we would like to take excess power from the grid.
 - If pricing is higher that our resource mix, we would like to pump MWs into the grid and get the benefit of higher pricing.
- Ancillary Services have the potential to yield as much economically if not more that energy
 - WEIM utilizes 70 different charge codes, the charges vary between energy usage and ancillary capabilities
 - Ramp up, Ramp Down, Losses, Congestion relief
 - Batteries in this environment are very useful, a balance must be struck with contractual obligations and economic prospects

MIGs

- A balance can be struck from MIG owners and other members to provide some of the ancillary services previously discussed and for the MIG owners to take advantage of the market.
- Communication is crucial
 - UAMPS is working a text based alert system where we can send market signals to all the membership.
 - An organized market requires most generators greater than 1 MW to be modeled and unit availability to be communicated to the BA/Scheduling Coordinator.
 - UAMPS would like to work on this with membership to prepare for the future but to also be a resource for Membership.
 - The more information Staff has regarding a Member's fleet, the useful we can be in disseminating information
 - Available Capacity, Production Costs, Startup/Shutdown Cost, unit limitations
- In addition to MIGs, flexible loads or utility loads that can be altered are a great asset
 - i.e. Water Wells, Water Pumps

Summary

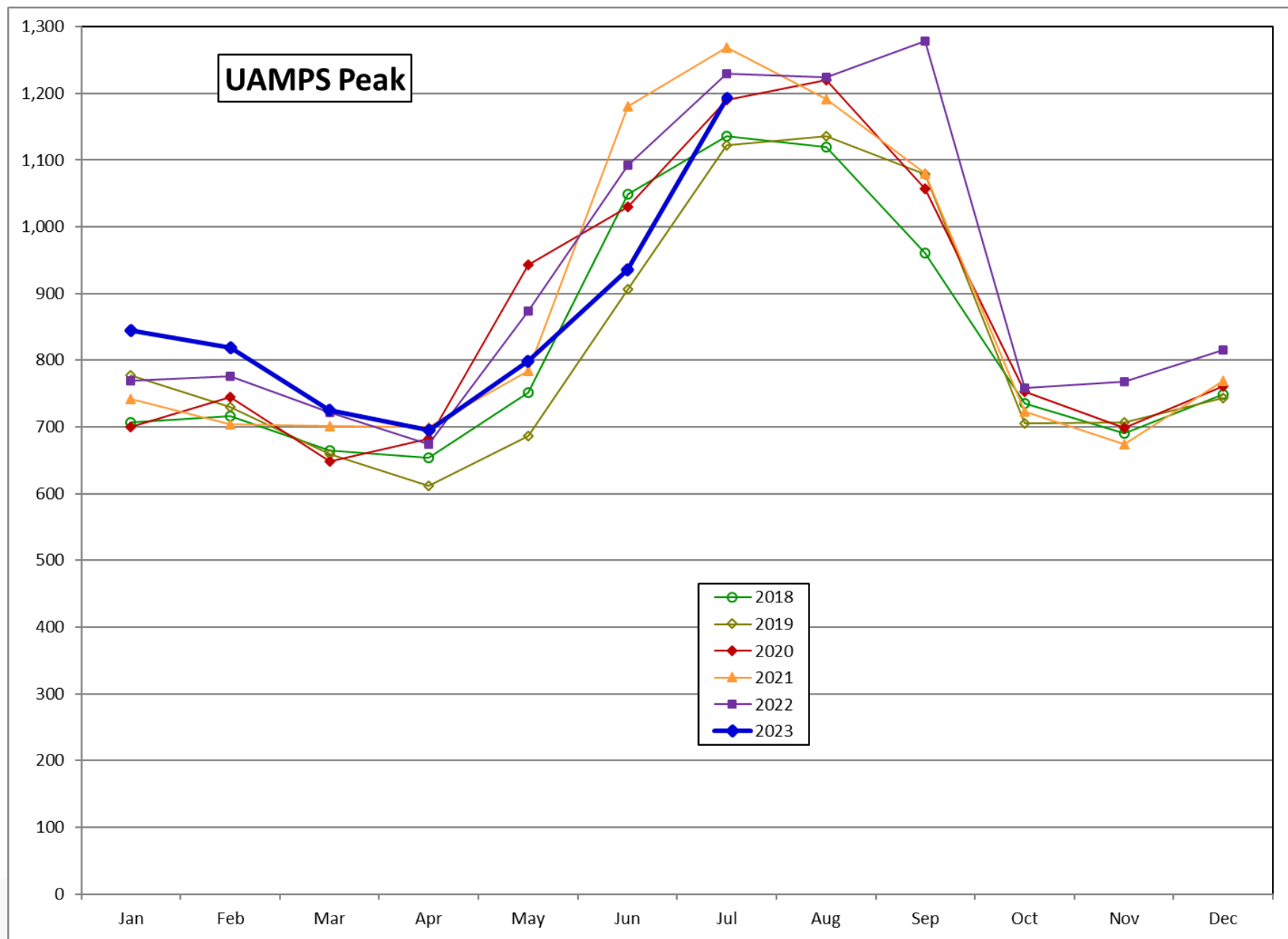
- UAMPS is very well positioned for the future
- Optimization of member owned resources before and after the meter is something with which staff would like to assist
- We can all work together to navigate the future of markets in the west.
- Staff would like to help membership traverse and understand the market impacts to their systems
- Please let UAMPS operations know how we can be of assistance!

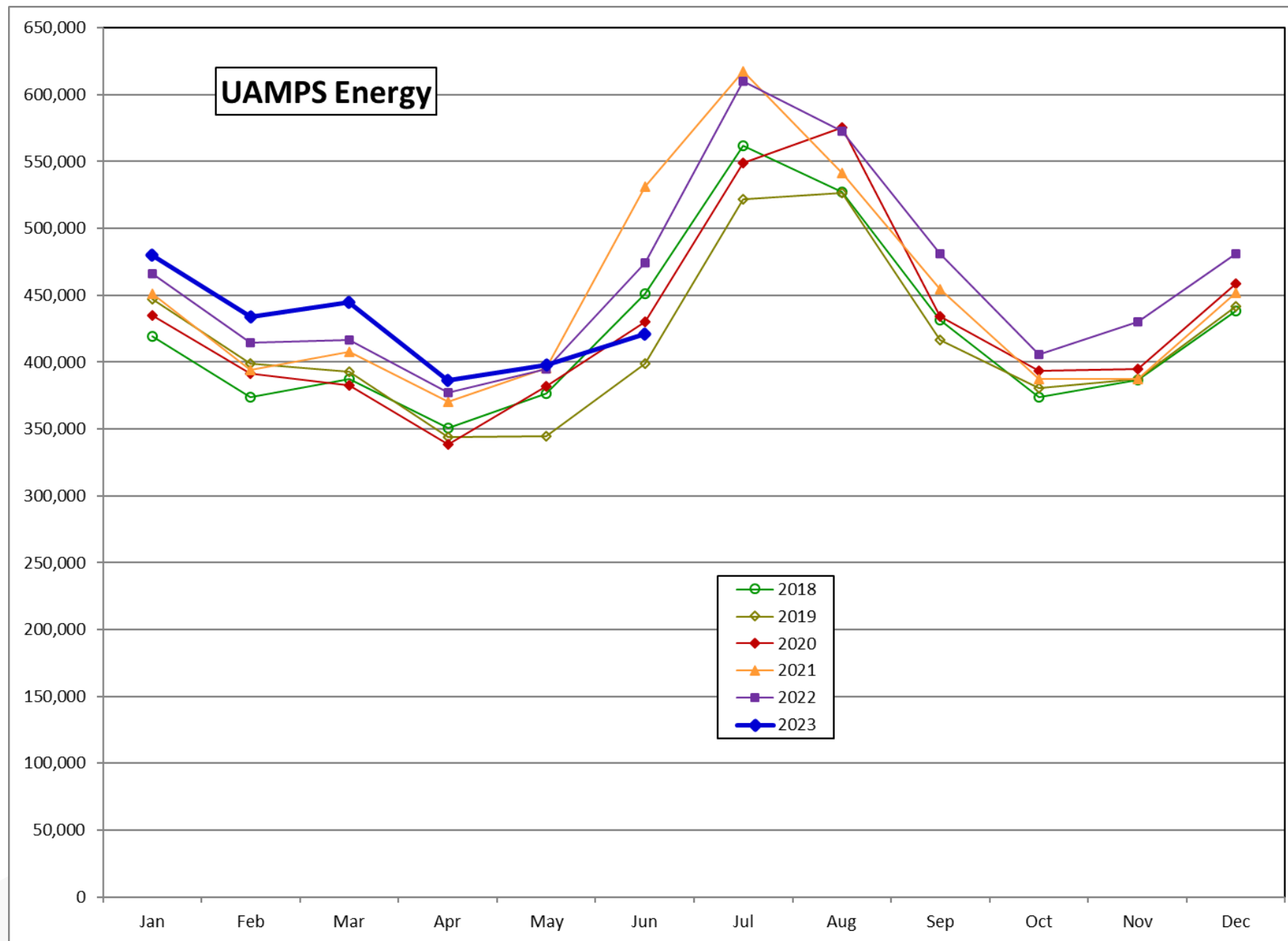
PX & Scheduling Report June 2023

Pool Project

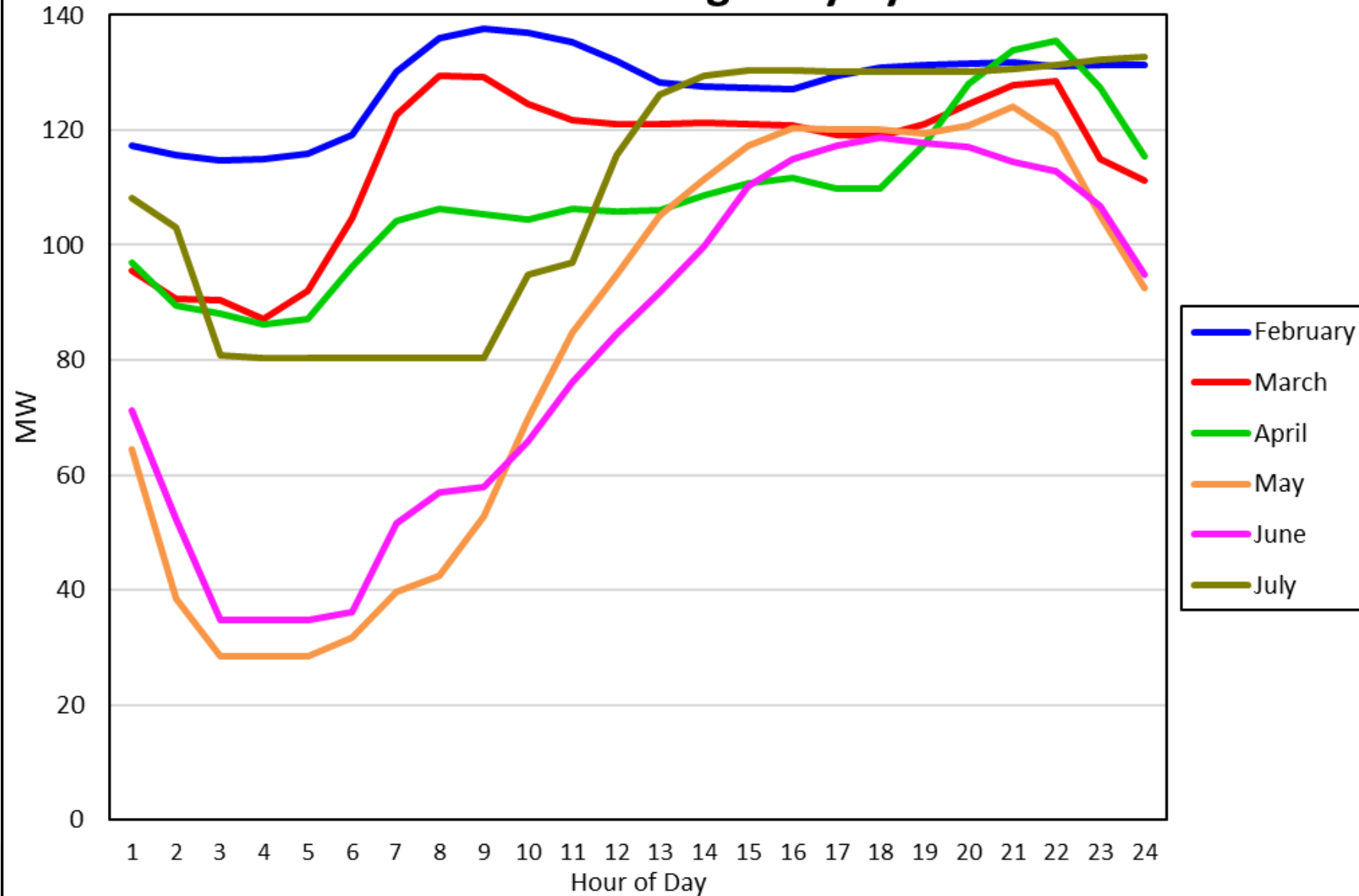


Kelton Andersen

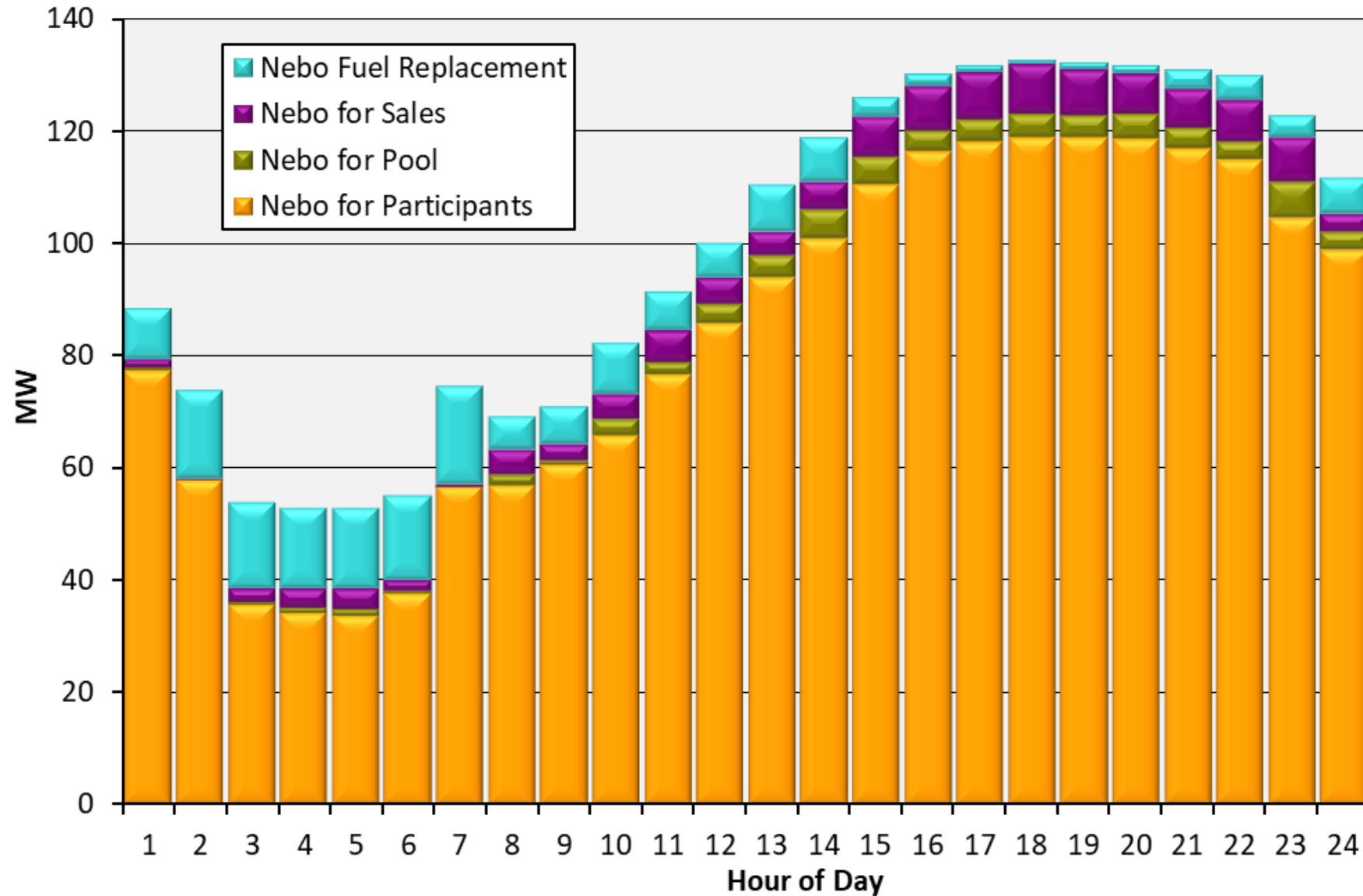




Nebo Generation Average Day by Month



Nebo Average Day MW for Jun-2023



Operations Report

Board of Directors



Rachel Stanford

Topic Discussions

- Natural Gas
 - Storage
- Industry News
 - NERC Grid Reliability
 - CAISO Battery Storage
- Seasonal Outlook
 - July Forecast
 - Seasonal Outlook
- Transmission
 - Southwest Intertie Project (SWIP)
 - Transmission Cost Savings



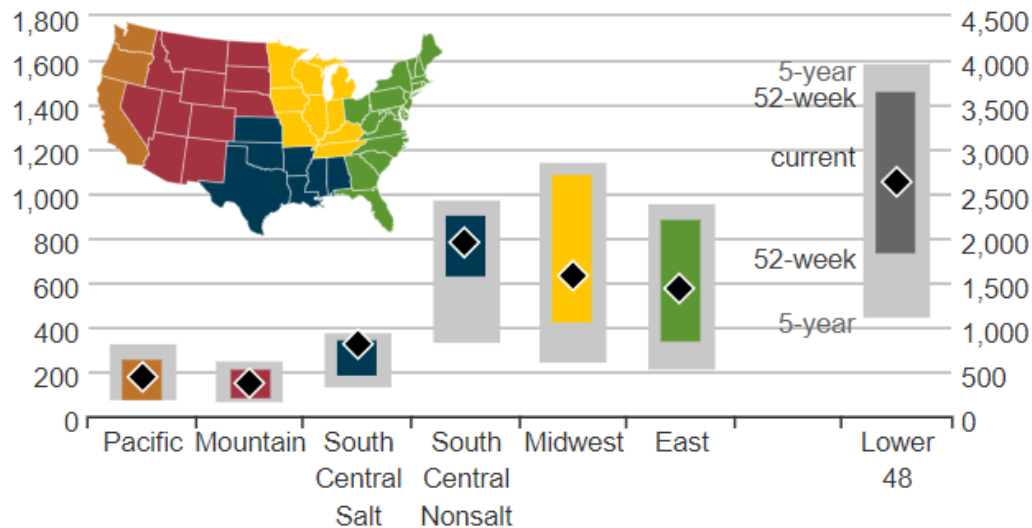
Natural Gas

National Gas Storage

Underground working natural gas storage
summary as of June 9, 2023

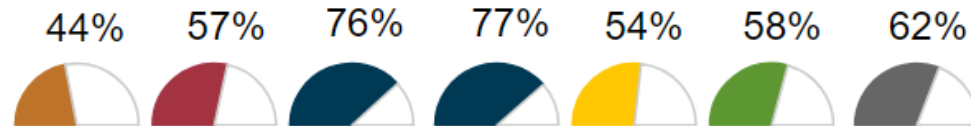


billion cubic feet

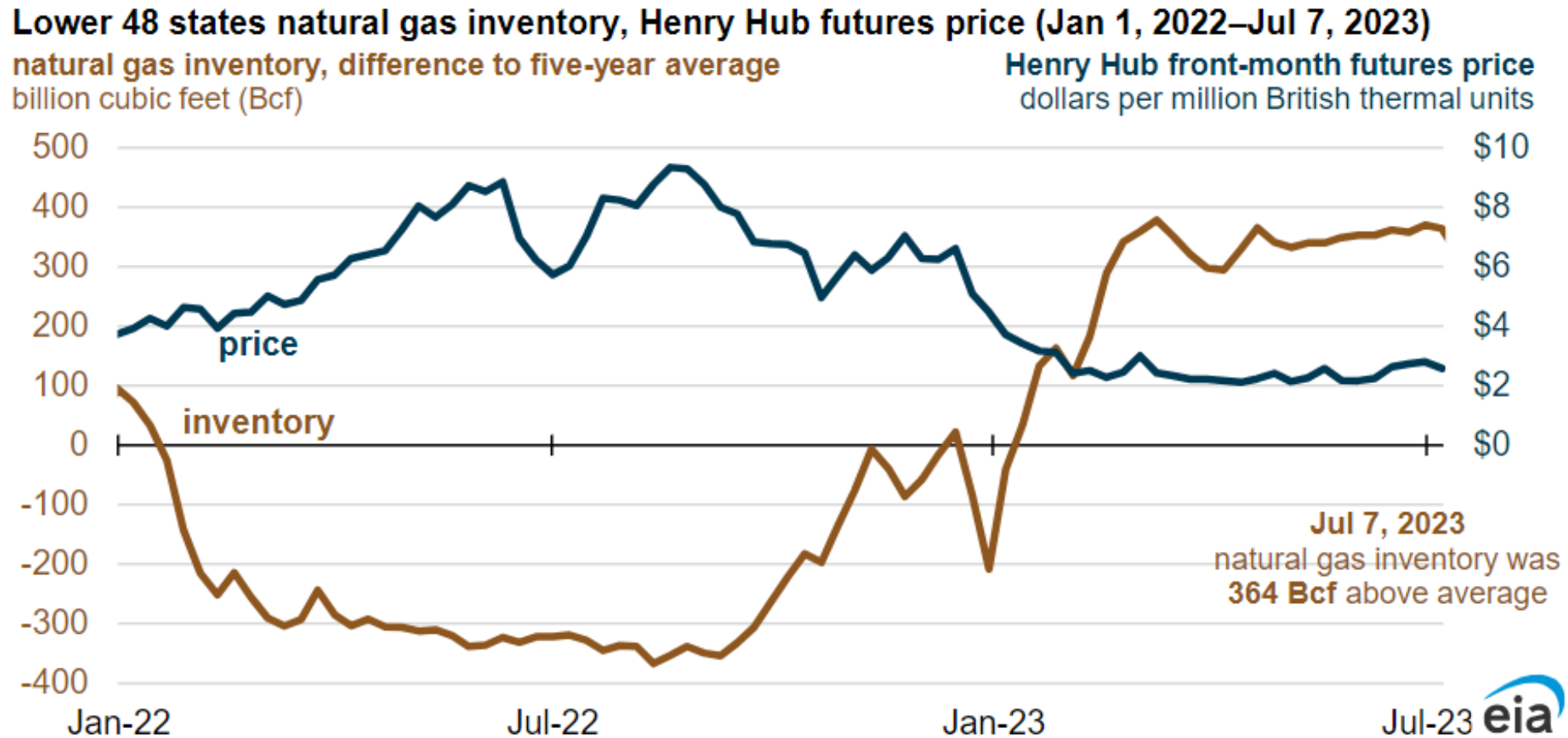


Pacific & Mountain Regions saw a 12% increase from the previous month's reporting

Underground storage capacity utilization

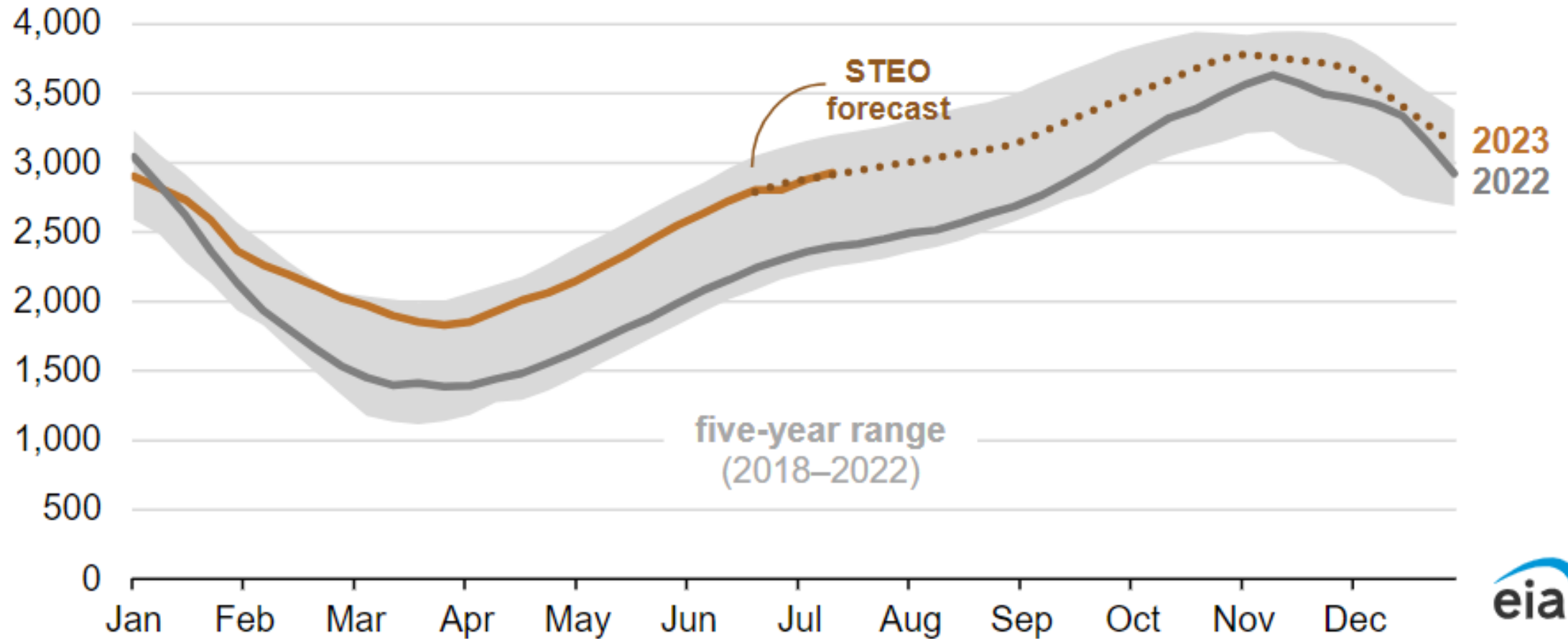


Natural Gas Storage Deposits Exceed 5-year Average



Lower 48 states working natural gas in underground storage (Jan 2018–Dec 2023)

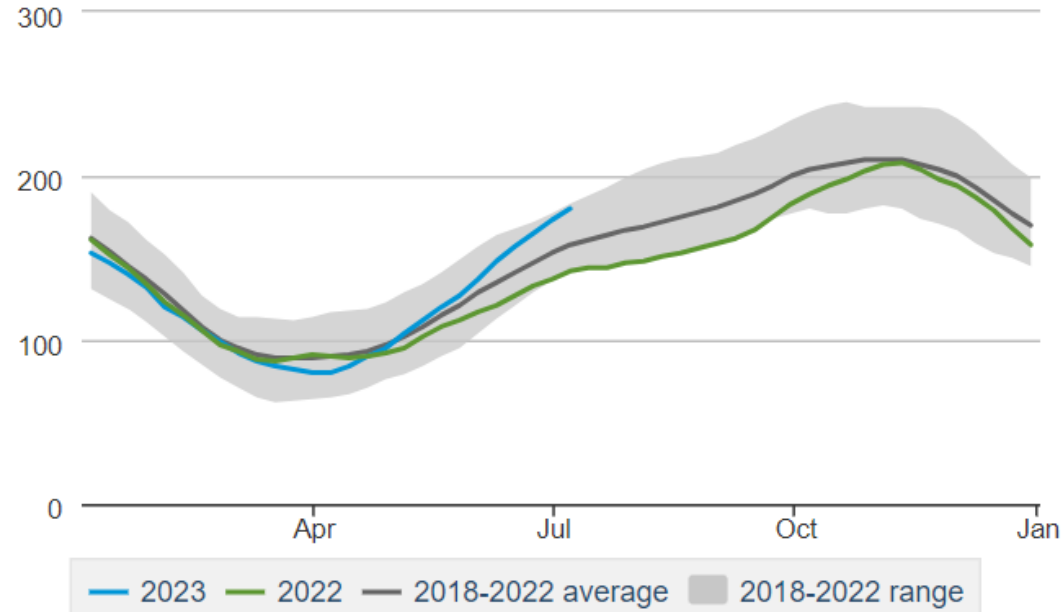
billion cubic feet



Mountain region weekly working gas in underground storage



billion cubic feet



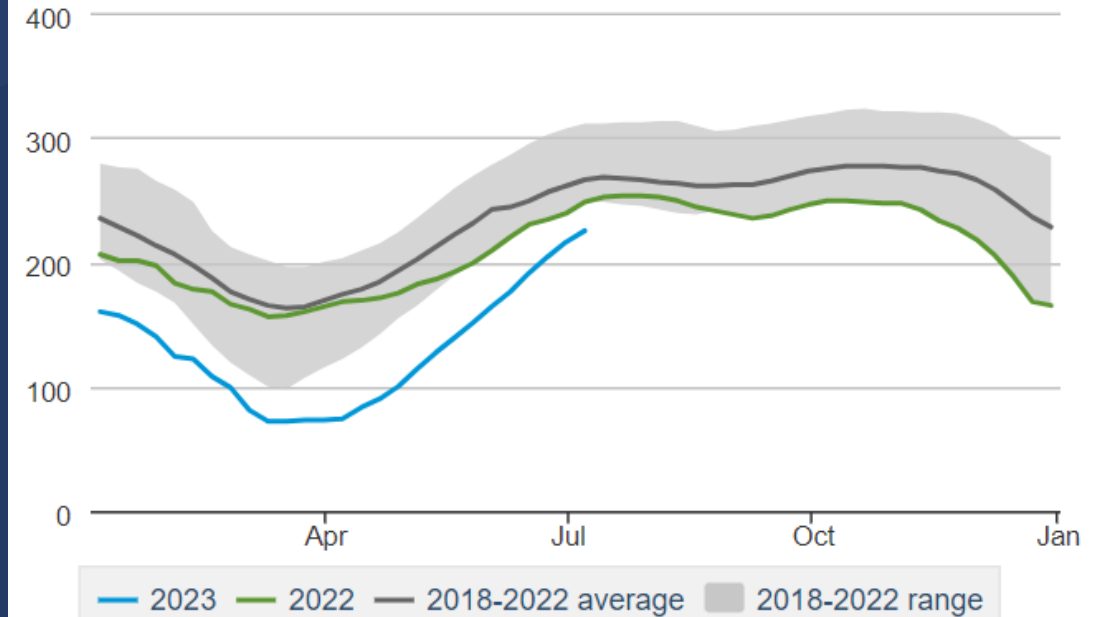
Mountain Region

Pacific Region

Pacific region weekly working gas in underground storage



billion cubic feet



UAMPS





Industry News

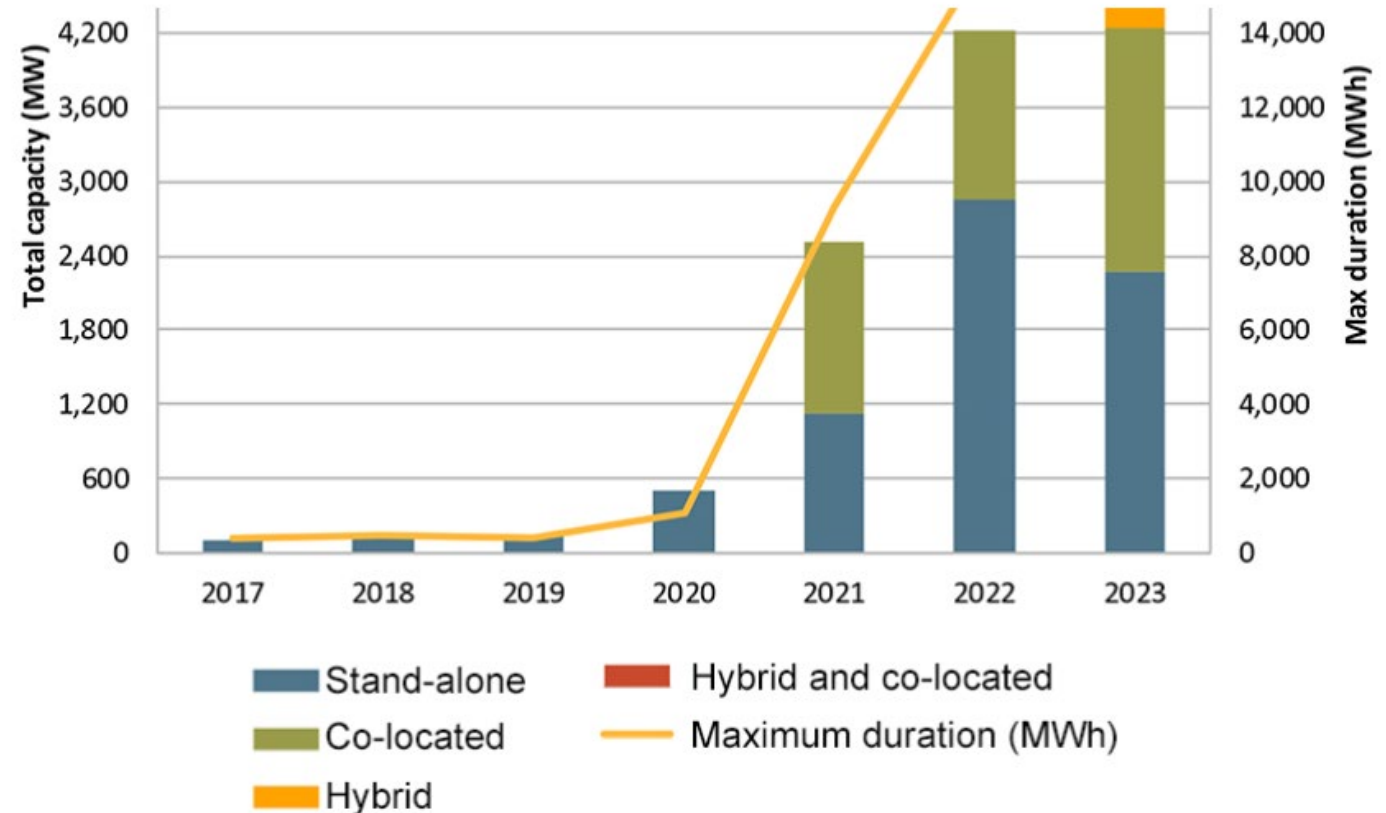
NERC Finds Grid Generally Reliable and Resilient



- Transmission Reliability has continued to improve
- Conventional generation, challenged with extreme weather, saw highest level of unavailability overall
- Overall generation saw its worst weighted equivalent forced outage rate in 2022
 - Increasing outage rates for coal due to number of start-ups and maintenance outages
 - Unavailability of gas-fired generation during winter months

5,000 MW of Batteries Connected to CAISO

- Charged during day when solar power is abundant
- Dispatched in the shoulder hours and evening to meet demand
- The CPUC energy plans call for more than 10,000 MW in aggregate storage capacity by 2026

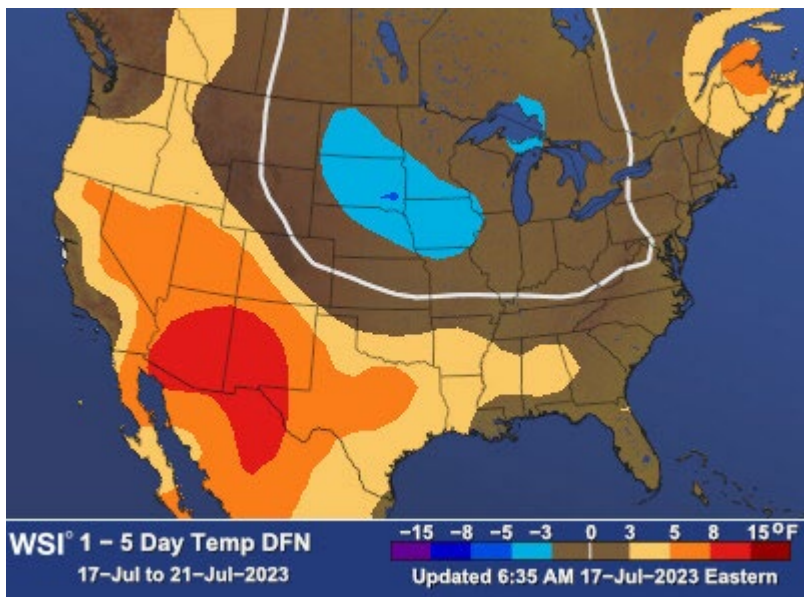


* Battery capacity in CAISO grew from 500 MW in 2020 to 5,000 MW in May, 2023

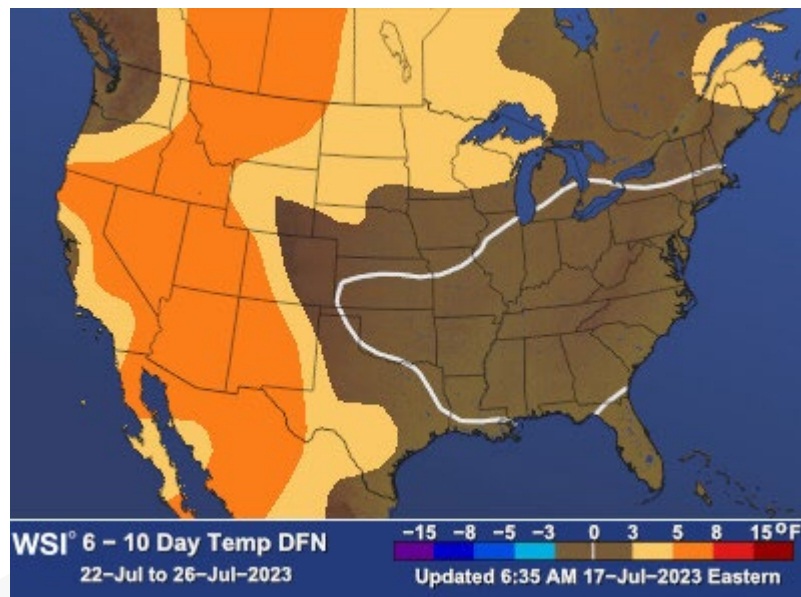
Seasonal Outlook



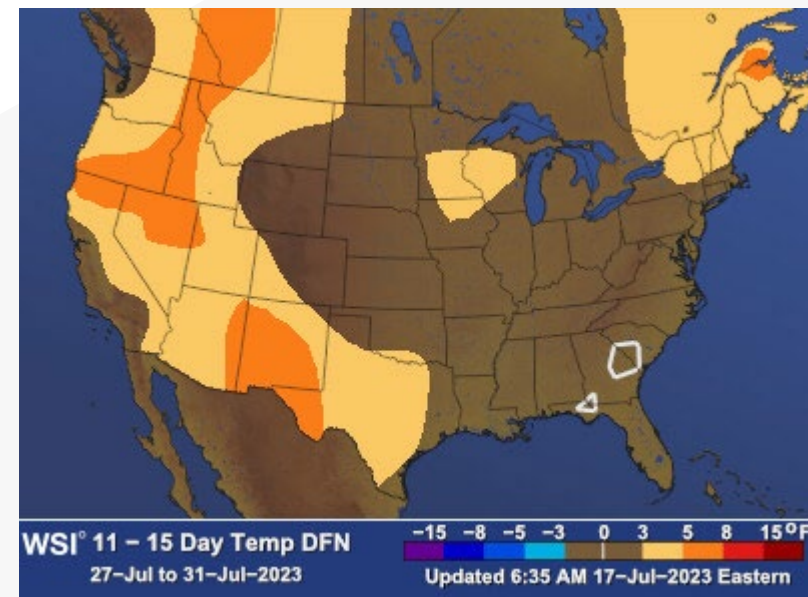
July Forecast



1-5 Day Forecast

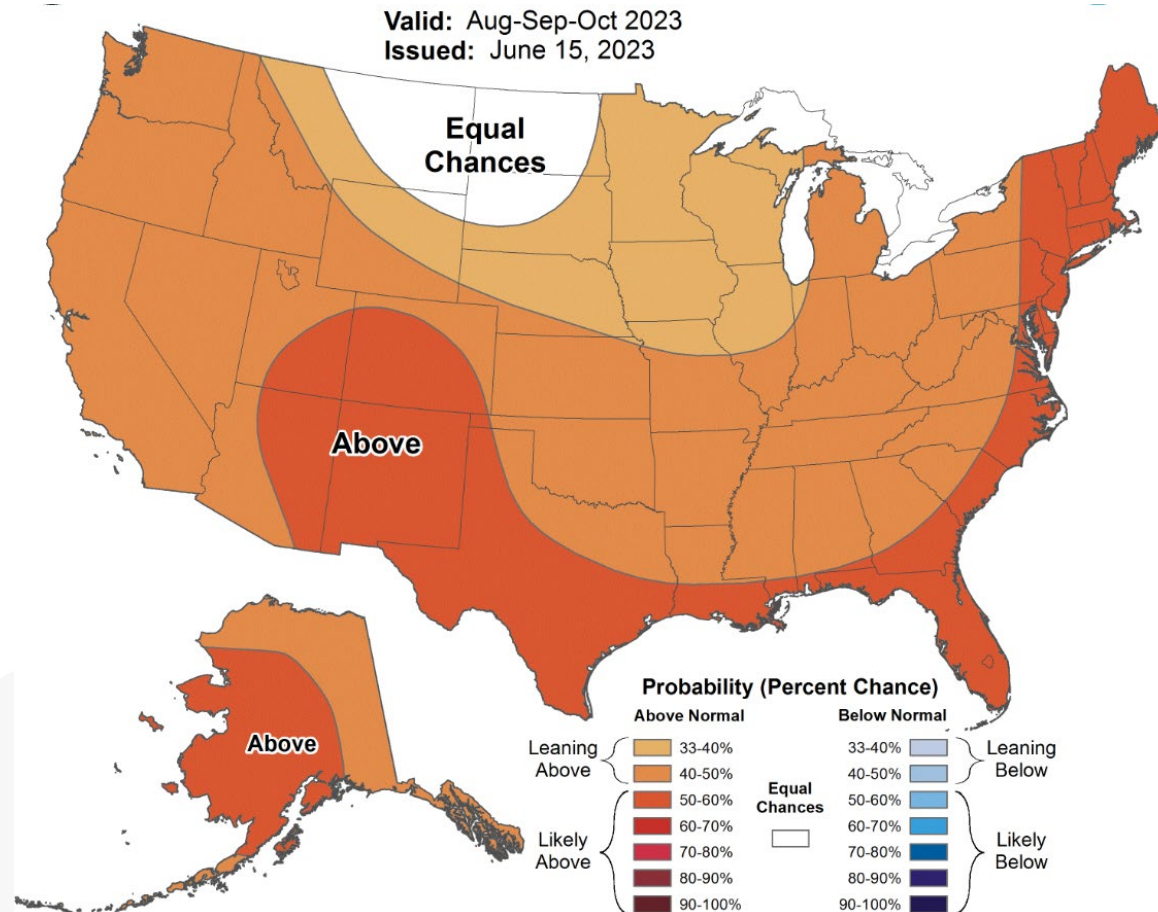


6-10 Day Forecast



11-15 Day Forecast

3-Month Forward Forecast



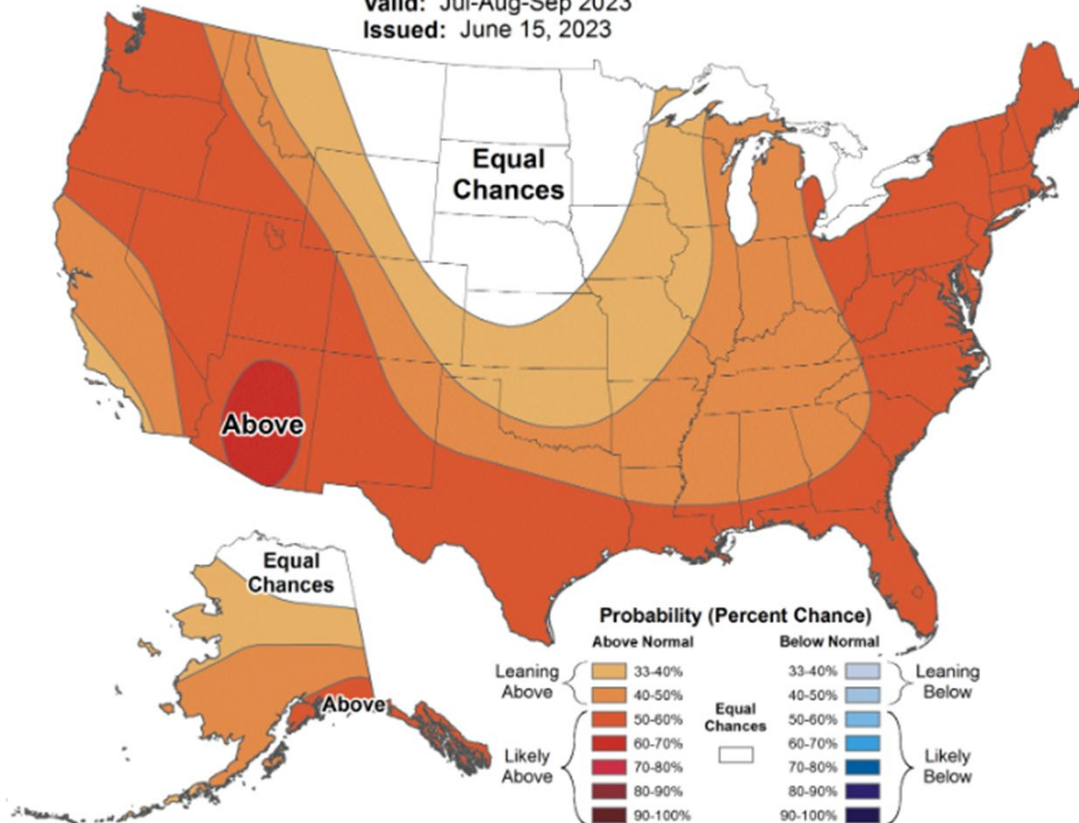
Seasonal Outlook From Prior Month



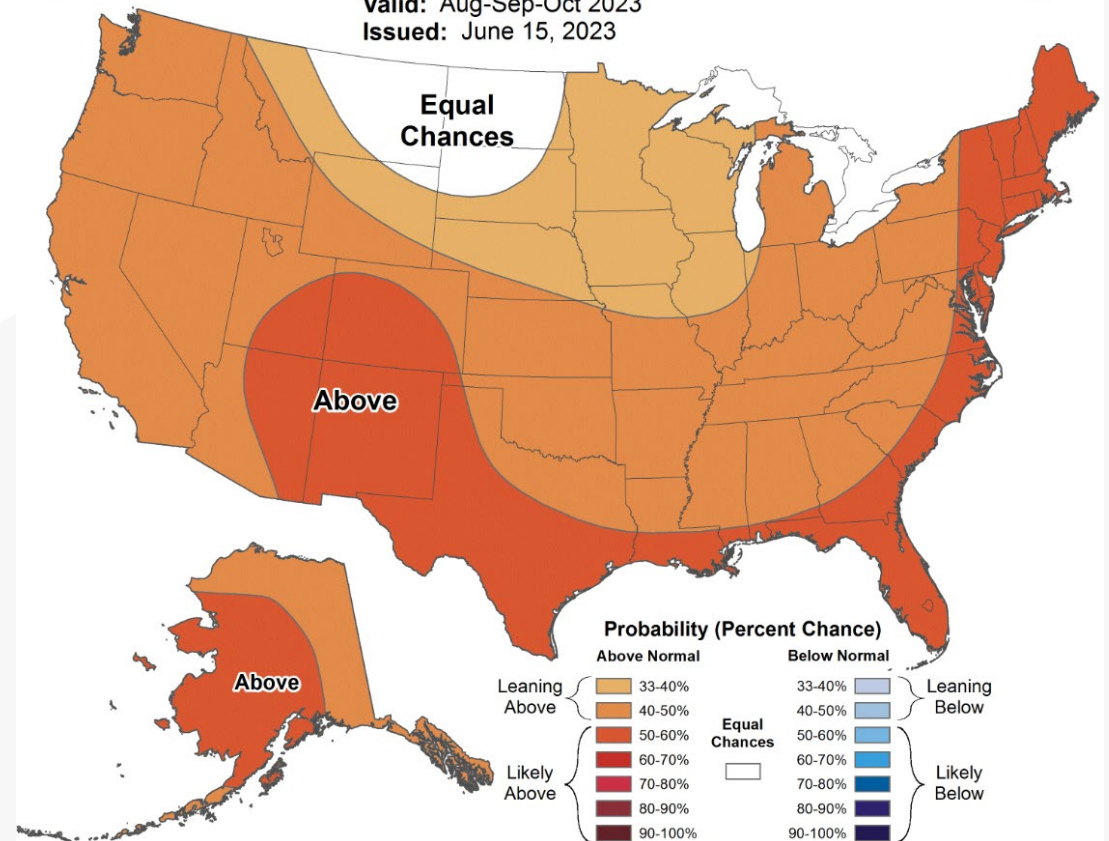
Seasonal Temperature Outlook



Valid: Jul-Aug-Sep 2023
Issued: June 15, 2023



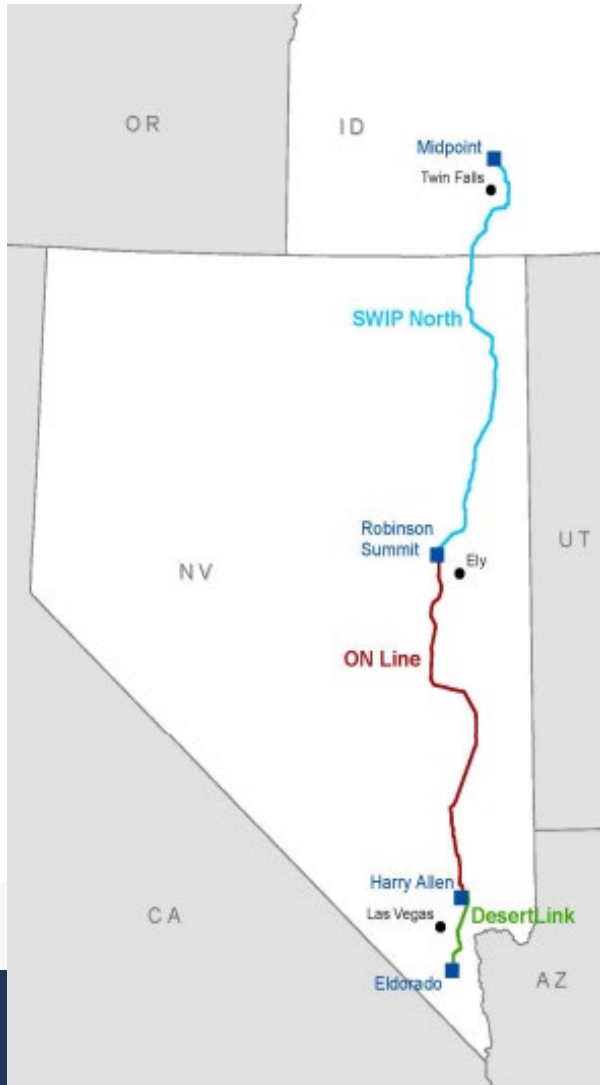
Valid: Aug-Sep-Oct 2023
Issued: June 15, 2023



Transmission



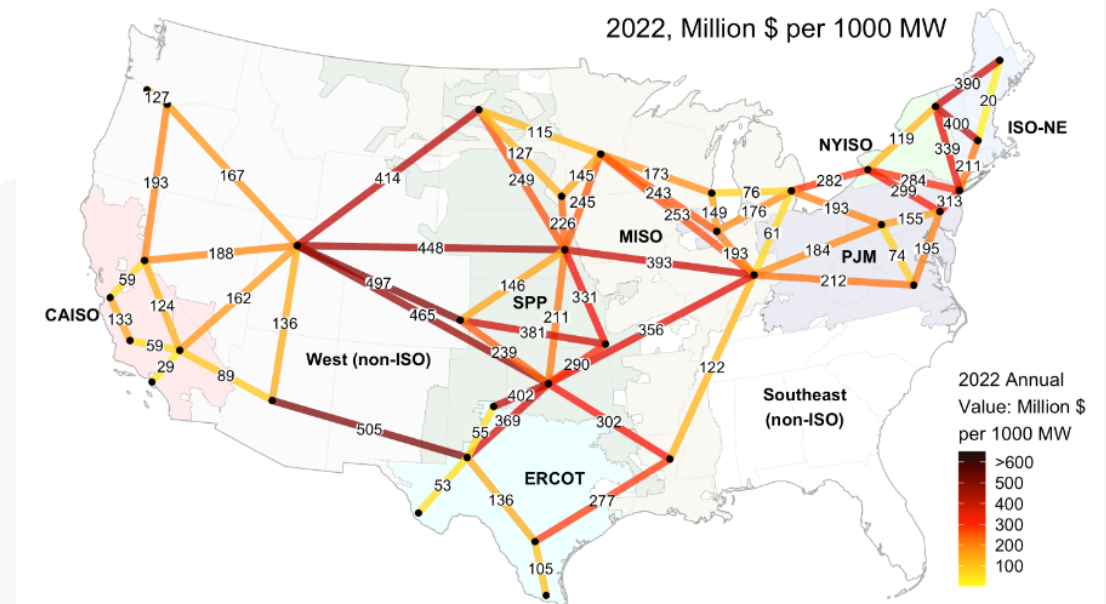
Southwest Intertie Project (SWIP)



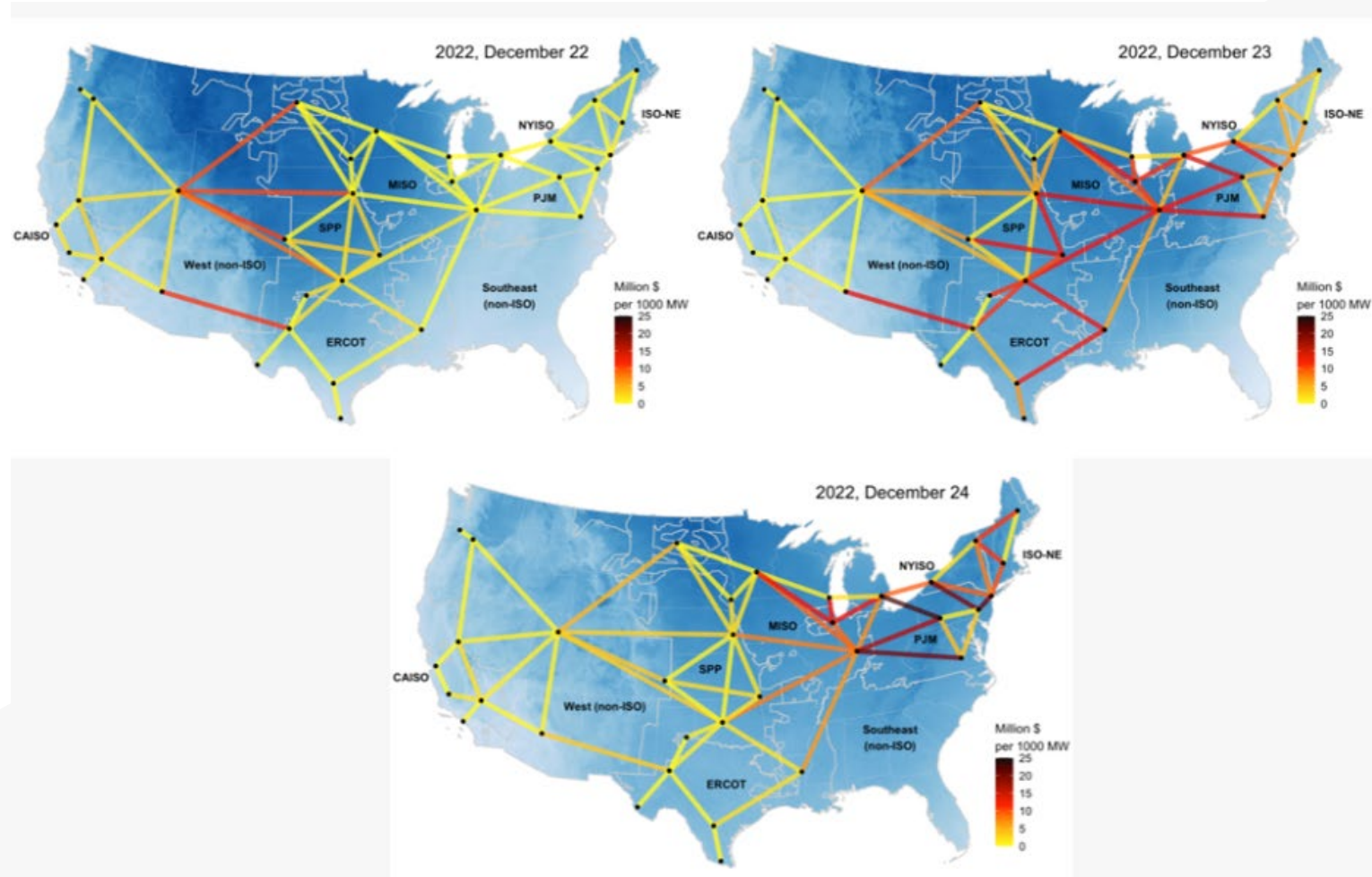
- **Phase I – ON Line (Robinson to Harry Allen)**
 - 231 mile 500 kV line
 - ISD January 2014
 - Joint Ownership: NVE 25%, LS Power 75%
 - 2300 MW transfer capacity (1200 MW NVE)
- **Phase II – DesertLink (Harry Allen to Eldorado)**
 - 60 mile 500 kV line
 - ISD August 2020
 - Joint Ownership: NVE 20%, LS Power 80%
 - 3500 MW transfer capability controlled by CAISO
- **Phase III – SWIP North (Midpoint to Robinson)**
 - 285 mile 500 kV line
 - Permitted, construction planned 2023, ISD 2025
 - 2100 MW transfer capacity
 - 100% LS Power Ownership
 - Upon completion of SWIP North, 2300 MW of transfer capacity will be available and triggers capacity swap such that NVE receives 1200 MW & LS Power receives 1100 MW from Midpoint to Harry Allen

New Transmission & Cost Savings

- According to a study by Berkeley National Lab, additional transmission in 2022 could have reduced US electric system costs
- Study looked at 64 potential transmission lines and the price spread
 - Average hourly price spread ranged from \$3/MWh to \$58/MWh
- Transmission lines with the highest value linked the Western & Eastern interconnections
 - Analysis highlights the importance for states and federal agencies to act quickly on transmission reform and move to implement interregional transfers



Winter Storm Elliott



Large Customer Contracts

Board of Directors



Emily Wegener

Considerations for Large Customers

- Similarly situated customers should pay similar rates
 - Preference to keep customers on approved rate schedules
 - Customers should pay proportionally for their cost of service
- Large customers often have unique characteristics
 - Ability to self generate
 - Ability to select where to locate facilities
 - Unique load profile and ability to curtail during high load hours
 - Ability to take service at higher voltage
 - Ownership of distribution level equipment
 - May have preference for renewable energy

General Service Rate Schedules

- Schedule 6
 - Loads >1MW over last 18 months, voltage under 46kV
 - Discounts for taking service <23kV
 - Single point of delivery
- Schedule 8
 - Generally same as schedule 6 except loads <1MW
- Schedule 9
 - Generally same as schedule 8 except take service at 46kV or greater
- Docket 20-035-04, December 30, 2020 Order, pages 80-90: recent tweaks to rate schedules

Schedule 32 & 34

- Allows customers to choose to receive energy from a Renewable Energy Facility (statutorily defined) if they pay the difference in cost
 - Must not shift any costs, including transmission interconnection
- Available to Schedule 6, 8, and 9 customers
- Utility or customer can find the resource
- Docket No. 18-035-08 Schedule 32 (University of Utah)
- Docket Nos. 16-035-27 (Facebook) 19-035-39 (SLC, Park City, & Ski Resorts) Schedule 34

Special Load Characteristics

- Docket No. 21-035-53 – U.S. Magnesium
 - Question of the value of the interruptible product to the system
 - Office of Consumer Services opposed, stating “special contracts should be reserved for customers who have truly unique circumstances to warrant provisions outside the generally available tariffs.”
 - Commission approved contract after confidential settlement
- Docket No. 21-035-69 – NuCor
 - NuCor agreed to purchase power from RMP and not self-generate or support legislation allowing self generation
 - NuCor compensated for up to 85MW curtailment with 7 minutes notice
 - NuCor agreed to address flicker issues

Special Contracts: Wyoming Schedule 400

- Tool to negotiate with large industrial customers
- Customer requirements
 - Greater than 10MW peak load at aggregated delivery points
 - Demonstrate “unique circumstances or characteristics of load” OR
 - Demonstrate “viable and competitive energy source or business location”
- \$5,000 application fee for consideration
- Revenue exceeds cost of service, including fixed cost recovery
- Docket No. 20000-602-ET-21 (Record No. 15836)

CRSP / CREDA Report
July 2023

Colorado River Storage Project



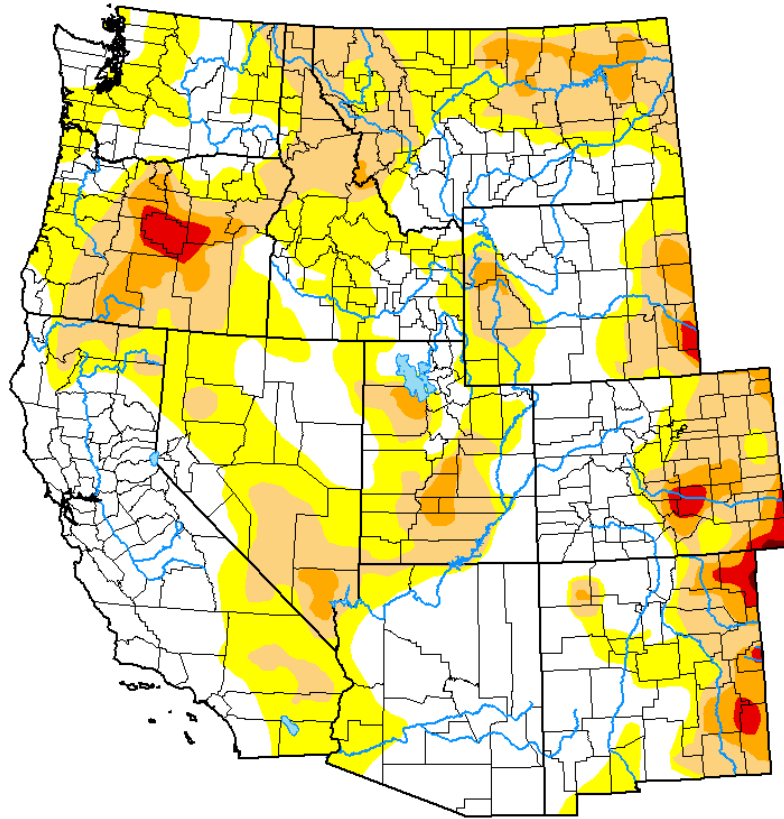
Kelton Andersen

Topic Discussions

- CRSP Hydrology
- CREDA Items
- Provo River Remarketing
- Olmsted Remarketing

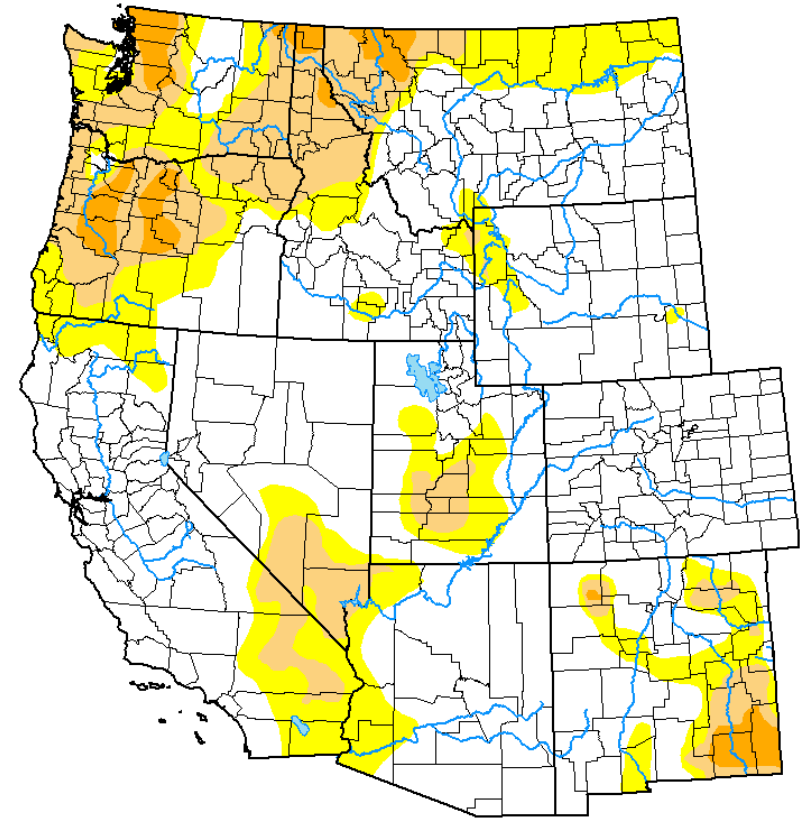
Drought Monitor

April 2023



4/13/2023

July 2023

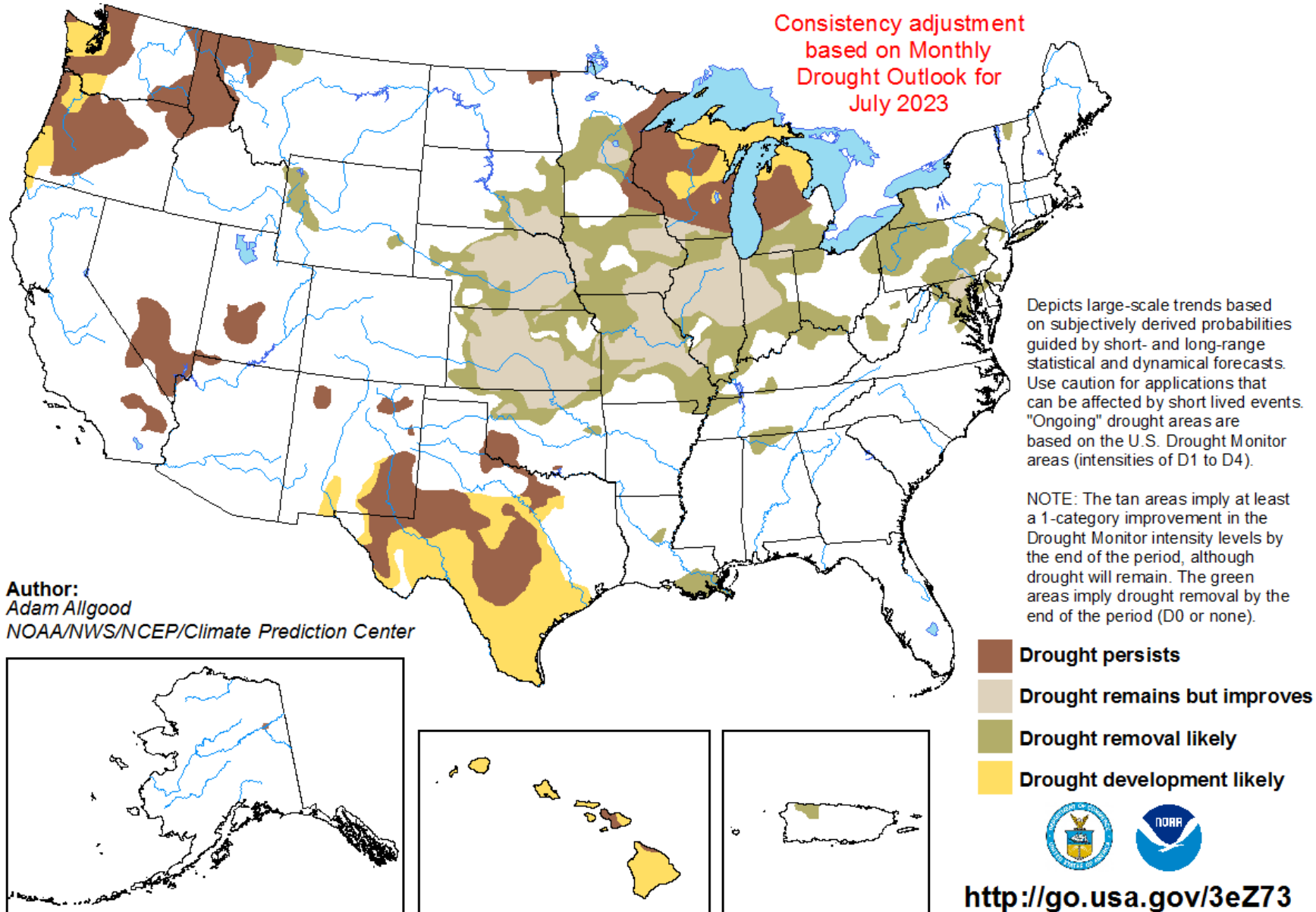


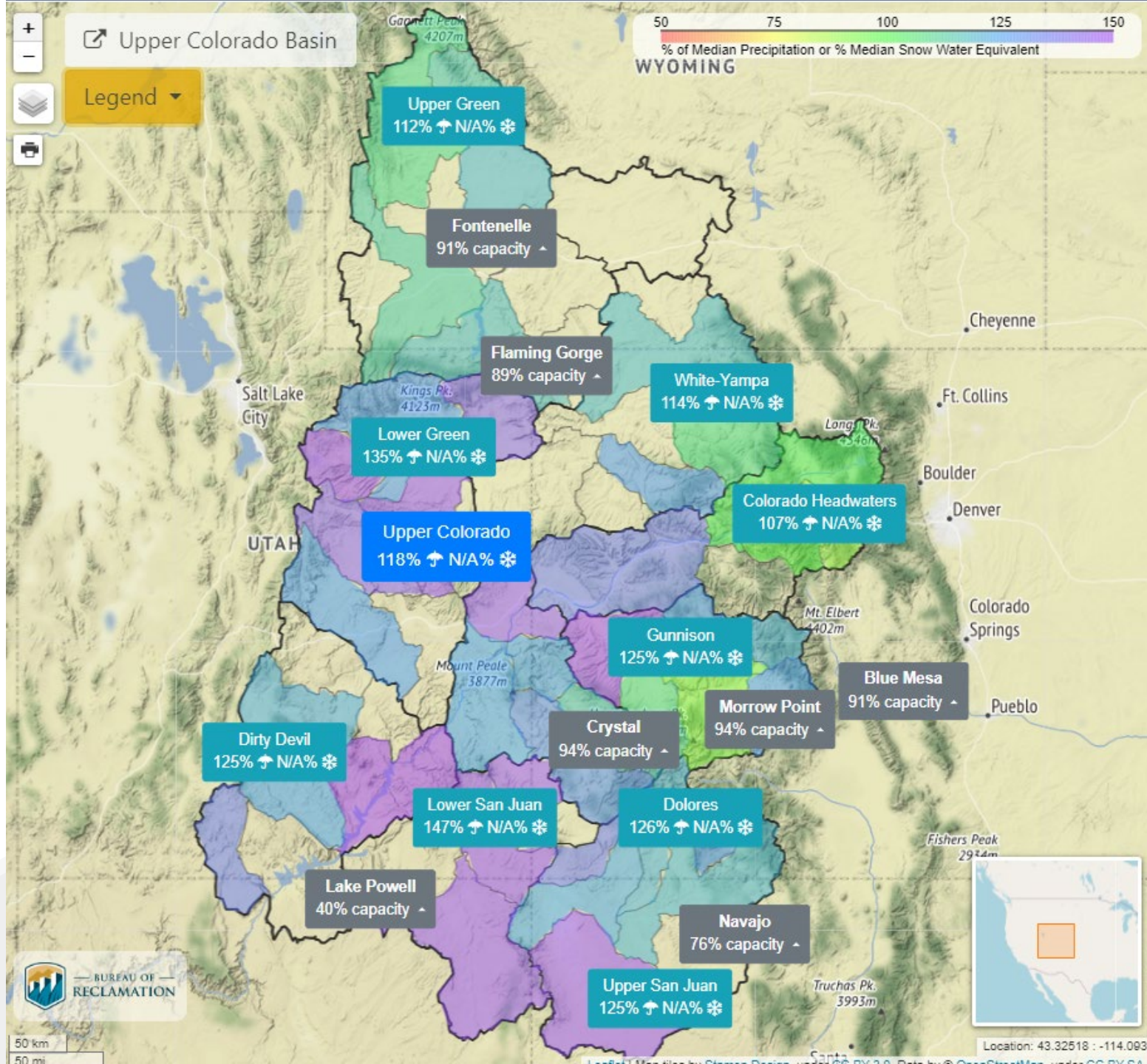
7/13/2023

U.S. Seasonal Drought Outlook

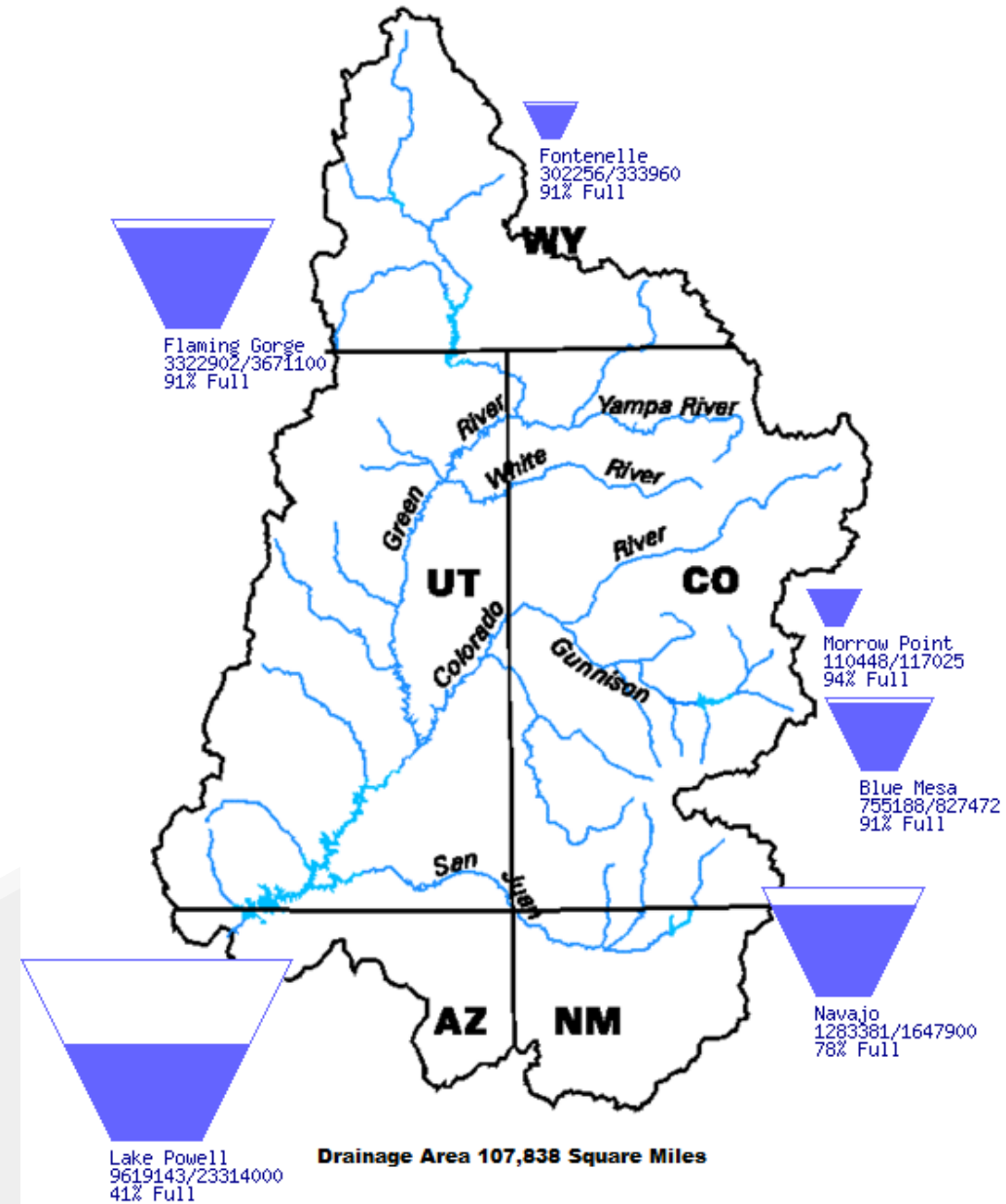
Drought Tendency During the Valid Period

Valid for July 1 - September 30, 2023
Released June 30, 2023



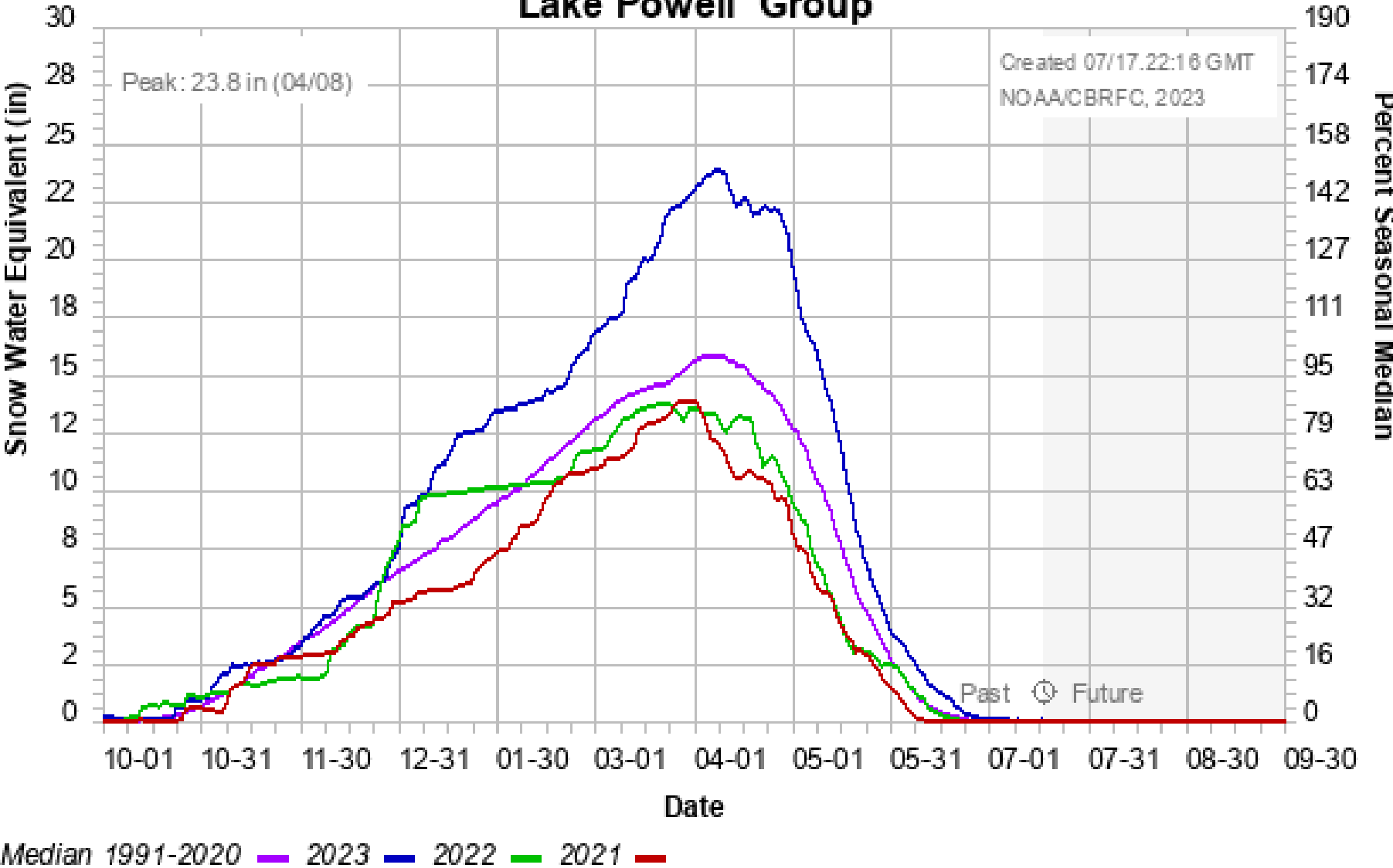


Upper Colorado River Drainage Basin





Colorado Basin River Forecast Center Lake Powell Group



Lake Powell Conditions

- Status of Lake Powell
 - Current lake elevation = 3,584 feet
 - = 116 feet below the spillway
 - = 94 feet above penstock intake level
 - Current storage is 9.6 million acre-feet
 - = 41% of reservoir capacity



Lake Powell Inflow



- Status of Lake Powell:

- Historical unregulated inflow to Lake Powell by water-year

- 2010 = 73% of average
 - 2011 = 147%
 - 2012 = 45%
 - 2013 = 47%
 - 2014 = 96%
 - 2015 = 94%
 - 2016 = 89%
 - 2017 = 110%
 - 2018 = 43%
 - 2019 = 120%
 - 2020 = 54%
 - 2021 = 32%
 - 2022 = 63% of avg.

- 2023 = 146% of avg. forecasted (probable range of 146% to 170%)

- 2023 inflow:

- Actual

- Apr = 155%
 - May = 218%
 - Jun = 149%

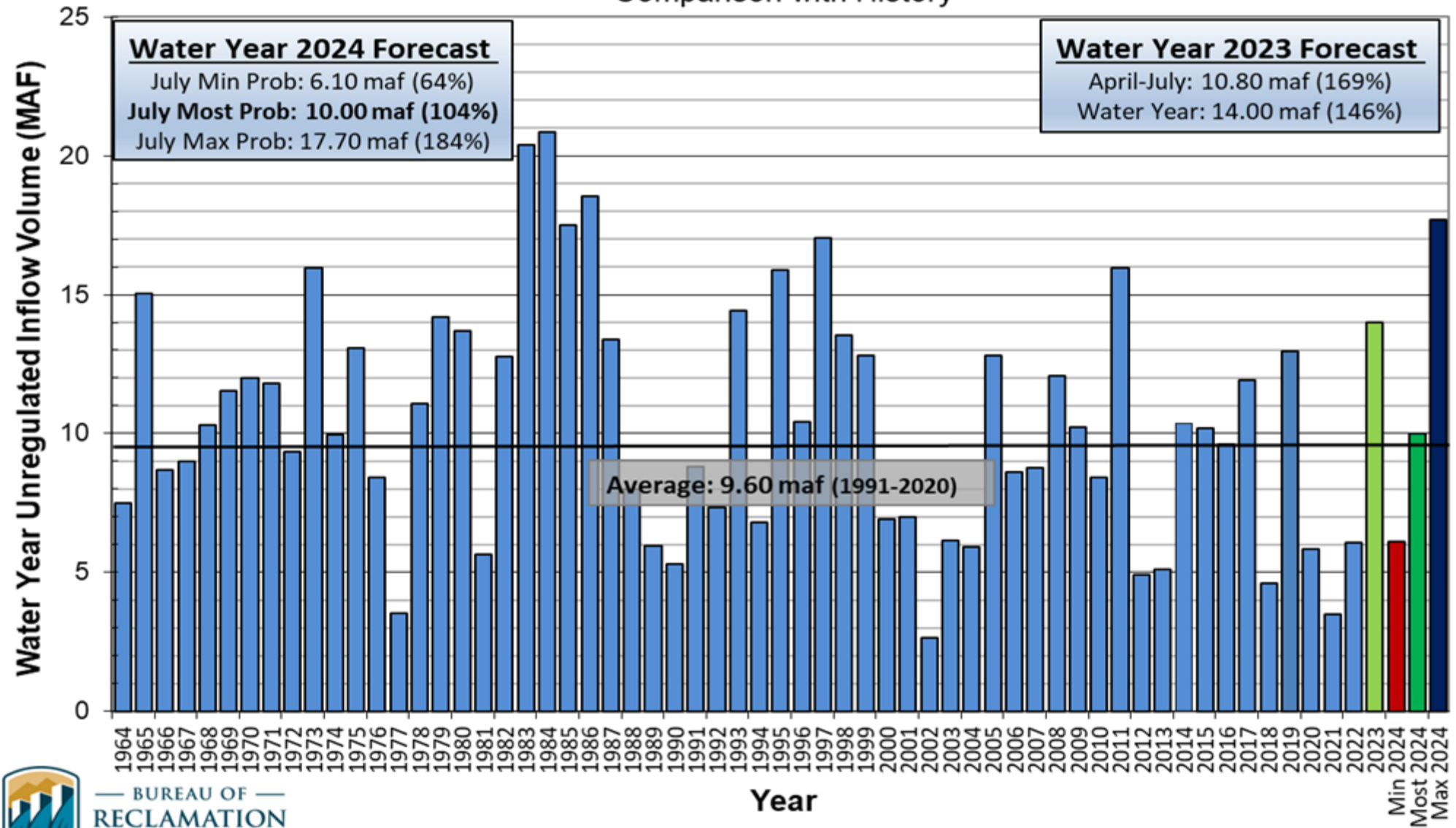
- Forecast

- Jul = 121%
 - Aug = 133%
 - Sep = 124%

Lake Powell Unregulated Inflow

Water Year 2023 and 2024 Forecast (issued July 3)

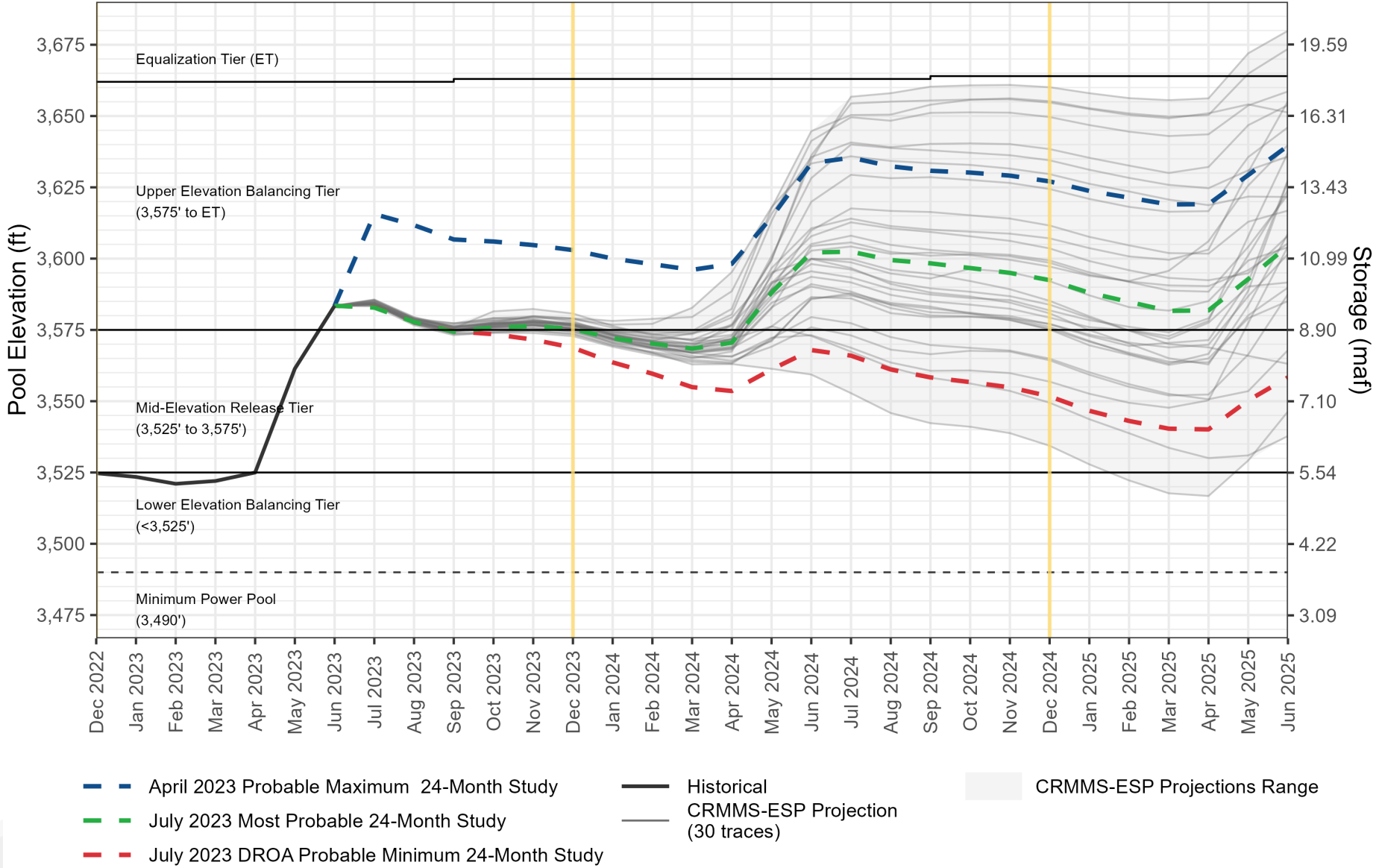
Comparison with History



BUREAU OF
RECLAMATION



Lake Powell End-of-Month Elevations
CRMMS Projections from April and July 2023



CRSP Rate



- Current CRSP rate effective through year 2023
 - Set to be in place for 2 years
- WAPA going through FRN process (Federal Register Notice)
 - WAPA-206
 - Proposal has No rate change
 - \$5.25/kW-month
 - \$12.36/MWh

Resource Investigation Committee

- WAPA looking to find affordable and reliable resources to augment hydropower resources
- Request For Information resulted in mostly long term offers for wind and solar with rates comparable to CRSP rates
- CREDA prefers option to have optional WAPA replacement energy with customers
- FRN currently under way



Provo River Remarketing

- Existing contracts expire Sept 30, 2024
- New contracts for Oct-2024 to Sep-2054 (30 years)
- Setting aside pool of 3% for new customers
 - New customers must be eligible preference entities
 - New customers must submit formal application
 - Existing customers have opportunity to apply for 3% pool
 - Application time open from Apr 17th to Jun 15th, 2023
- Applications submitted to WAPA on June 8th
 - Payson
 - SESD
 - Springville

Provo River Entitlement Share

