

# **Informational Interconnection Study Report**

## **Supplemental Study**

150MW Solar Photovoltaic Generating Facility

Boone – Midway 230kV line

Pueblo County, Colorado

11/16/2021



## **1.0 Executive Summary**

This report includes the results of a supplemental study requested by the Customer for Informational Interconnection Service Request (INFO-2020-13). INFO-2020-13 is a request to interconnect a new 150MW Solar Photovoltaic (PV) Generating Facility on the Boone – Midway 230kV line.

The study assumed 2026 Heavy Summer conditions. This study case reflects the 2021 Spring DISIS assumptions. The INFO-2020-13 project was modelled as a 150 MW Solar PV Generating Facility tapping the Boone-MidwayPS 230kV transmission line. The case was dispatched to reflect a high south stress. A typical Solar PV facility found in the study case (that includes a 230-34.5kV main transformer, an equivalent 34.5kV collector system, an equivalent 34.5-0.63kV pad-mounted transformer, and equivalent Solar PV generator) was used to represent the project. The study assumed that the generation facility would be adjacent to the transmission line.

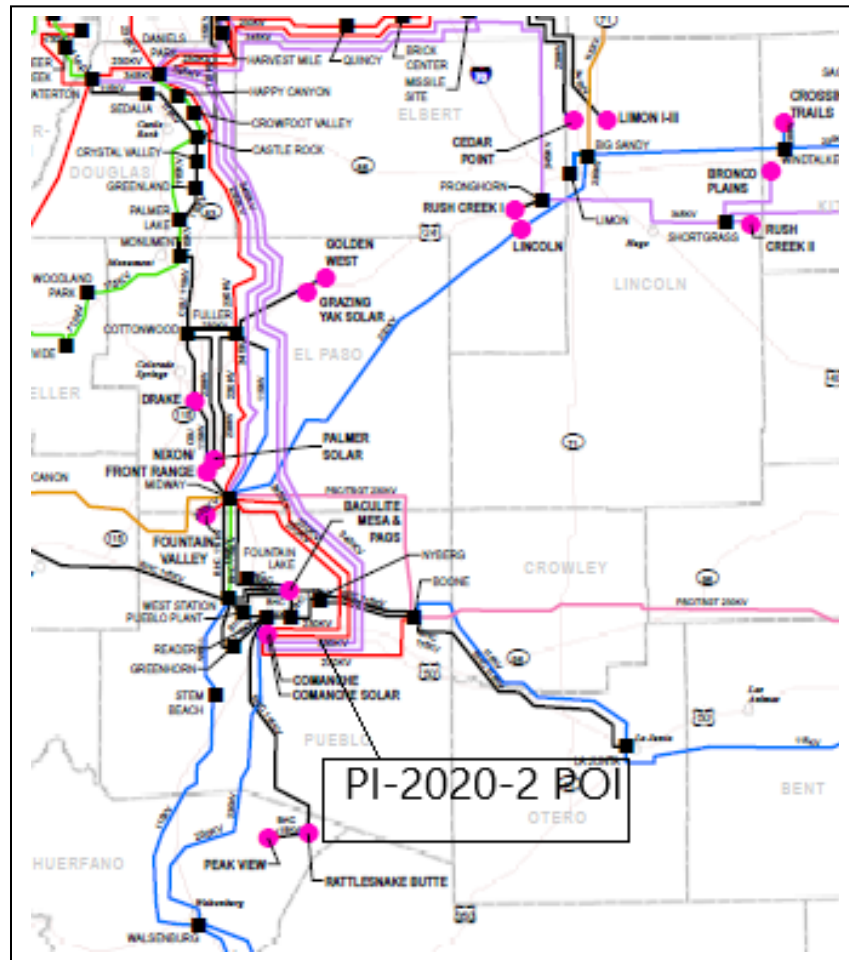
The study identified some contingency overloads that require further investigation.

## **2.0 Introduction**

INFO-2020-13 is the Informational Interconnection Service Request for a new 150MW Solar PV Generating Facility. The Customer requested a study to determine the impact of the project on the transmission system that reflects the 2021 Spring DISIS system under 2026 summer peak conditions. This study attempts to address this interest through this supplemental study that builds upon former study results.

The geographical location of the transmission system near the POI is shown in Figure 1.

**Figure 1 – Point of Interconnection of INFO-2020-13**



### 3.0 Study Scope

The purpose of this study is to determine the system impact of interconnecting a new 150MW Solar PV Generating Facility on the Boone-Midway 230kV Line.

#### Study Assumptions:

1. Study assumed 2026 Heavy Summer conditions.
2. The study case reflects the 2021 Spring DISIS assumptions.
3. INFO-2020-13 was modelled as a 150 MW Solar PV Generating Facility.
4. The case dispatched to reflect a high south stress (Case: "26HS2ap\_21P1\_South\_ST\_20210816\_v33").
5. The Boone-MidwayPS 230kV transmission line in the case is modelled as bisected with the "GI-20-13-HV" 230kV tap bus that provides a 230kV interconnection for a 253 MW ERIS project that is represented out-of-service in the case. The Boone-"GI-20-13-HV" 230kV transmission line has a normal rating of 394 MVA. The "GI-20-13-HV"-MidwayPS 230kV line has a normal rating of 319 MVA.
6. The proposed "INFO-2020-13" 150 MW Solar PV project was modelled in the case as bisecting the Boone-"GI-20-13-HV" 230kV transmission line. The interconnection point (prior to adding the project) had a 0.991 p.u. voltage.
7. A typical Solar PV facility found in the study case (that includes a 230-34.5kV main transformer, an equivalent collector system, an equivalent pad-mounted transformer, and equivalent Solar PV generator) was used to represent the project. The study assumed that the main step-up transformer would be adjacent to the transmission line (a very short gen-tie line). "26HS2ap\_21P1\_South\_ST\_20210816\_v33\_9\_G=150.sav" is the study case name.

### 4.0 Steady State Analysis

The results of the single contingency analysis (P1) are given in Table 1.

**Table 1 Power Flow Analysis Results of INFO-2020-13 – 150MW Generating Facility at Boone-MidwayPS 230kV Line**

Overloaded Facility	Type	Owner	Facility Normal Rating (MVA)	Facility Loading in Benchmark Case		Facility Loading in Study Case		% Change due to INFO-2021-2	Single Contingency Definition
				MVA Flow	% Line Loading	MVA Flow	% Line Loading		
Waterton – Waterton_TP 115kV	Line	PSCo	127.0	126.0	99.2%	130.2	102.5%	3.3%	System Intact
Fountain Valley – Desert Cove 115kV	Line	West Plains	222.0	214.5	96.6%	227.1	102.3%	5.9%	MIDWAYPS – MIDWAYBR 230.0
Monument – Gresham 115kV	Line	Tri-State	145.0	140.2	96.7%	148.9	102.7%	6.2%	DANIELPK – FULLER 230.0
MidwayPS – GI-20-13_HV 230kV	Line	PSCo	319.0	280.2	87.8%	358.6	112.4%	28.0%	COMANCHE - GI-20-14_SUB 345.0

The table displays contingency overloads that need to be investigated further. For example, the table shows that the MidwayPS-“GI-20-13\_HV” 230kV line contingency flow reaches 112.4% of its 319.0 MVA. The Boone-“IN\_13\_Tap”-“GI-20-13-HV” 230kV line has a case rating of 394.0 MVA; therefore, the line section between “IN\_13\_Tap” and “GI-20-13\_HV” did not overload while the “GI-20-13\_HV” to MidwayPS 230kV did overload.

**Note** – Thermal overloads for single contingencies are calculated using the normal rating of the facility. All overloads are in red.