Attachment K.1a
Cathodic Protection Rectifiers Narrative

Completeness Attachment K.1.a

The Water Bureau and project design team have confirmed the need to provide cathodic protection at three general locations along the pipelines: the Multnomah Connection, the intertie, and the FW pipeline connections to existing conduits. Broadly, cathodic protection rectifiers ("**CPRs**") protect the pipelines against corrosion by applying a small electric current that prevents the corrosive reactions between the metal of the pipelines and the environment that would otherwise naturally occur. These CPRs are pipeline appurtenances that were not explicitly shown or discussed in the original pipeline applications (Application Narrative Section 2 through 2.D) and are therefore proposed to be added as described below.

Defined terms used in this narrative are provided in the overall application Introduction or defined herein. The application narrative notes the presence of existing CPRs (rectifiers) in the study area (page 5, Narrative Section 2.A):

> *Today, the existing Bull Run Conduits 2, 3, and 4 traverse the study area through land in and around Lusted Road. There are over 10 miles of existing Water Bureau pipelines in the study area. There are also 176 existing Water Bureau pipeline appurtenances in the study area and 95 are at ground level or above ground, which include: […]*
>
> - *16 rectifiers*

Like other appurtenances within the study area, CPRs are typical of existing pipeline appurtenances and other utility equipment in the area. These appurtenances are found along each of the Water Bureau's existing water conduits. Examples of CPRs along Lusted Road are shown on Figures 1 and 2 below. The proposed CPRs have the same function as existing Water Bureau CPRs in the project area and are similar to utility equipment seen along county roads, including existing utility cabinets, pole-mounted utility boxes, power poles, and similar infrastructure.

Figures 1 and 2. Existing pole-mounted CPRs and utility structures along Lusted Road

Proposed CPRs

West of the Multnomah Connection on Lusted Road, three CPRs are proposed in a single utility cabinet adjacent to the RW pipelines. This is located in the RR zone. The cabinet will house the CPRs and a small distribution panel, as illustrated in Figure 3. The cabinet will be located along a driveway on tax lot 1400 (1S4E23C) and set back a minimum of 30 feet from the Lusted Road ROW. The cabinet will be similar to other utility cabinets in the area. It will be approximately 24" by 72" by up to 90" high and placed on a small concrete pad.

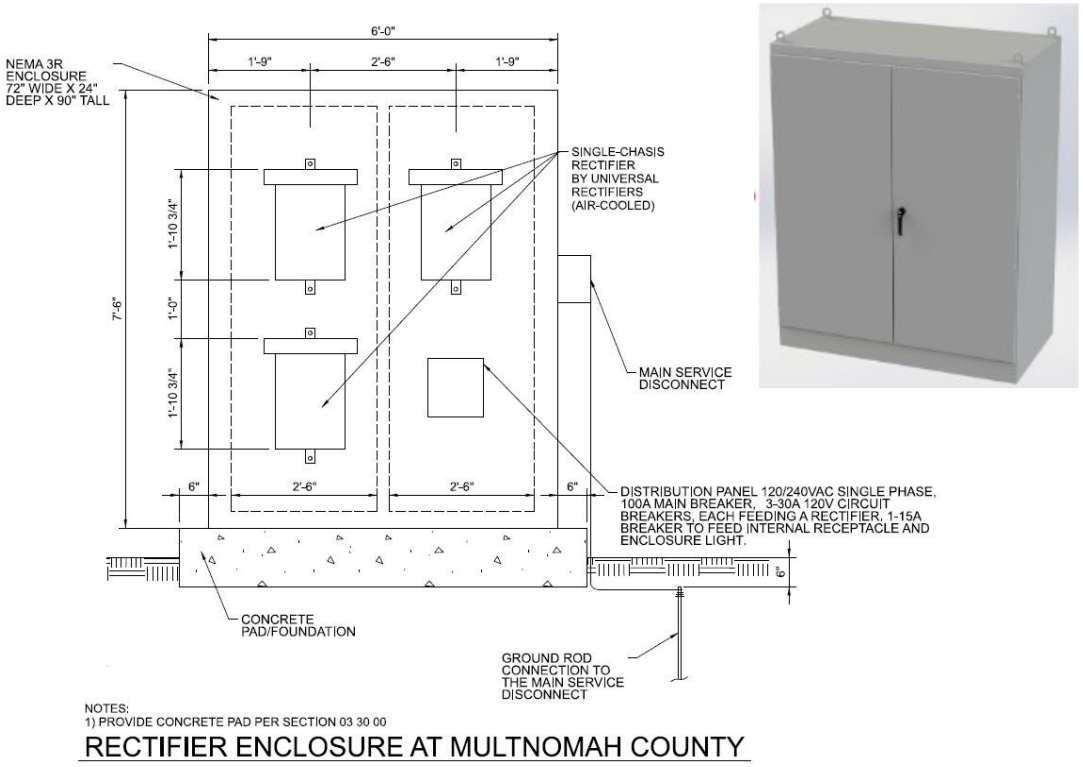

Figure 1. CPR cabinet proposed along the RW pipelines with approximate dimensions

At the FW intertie, located in the MUA-20 zone, five CPRs will be station-mounted on the side of the intertie vault, extending no more than 30 inches above ground (Figure 4). Like the vault that supports them, these CPRs will be screened by perimeter vegetation and not be visible from off site.

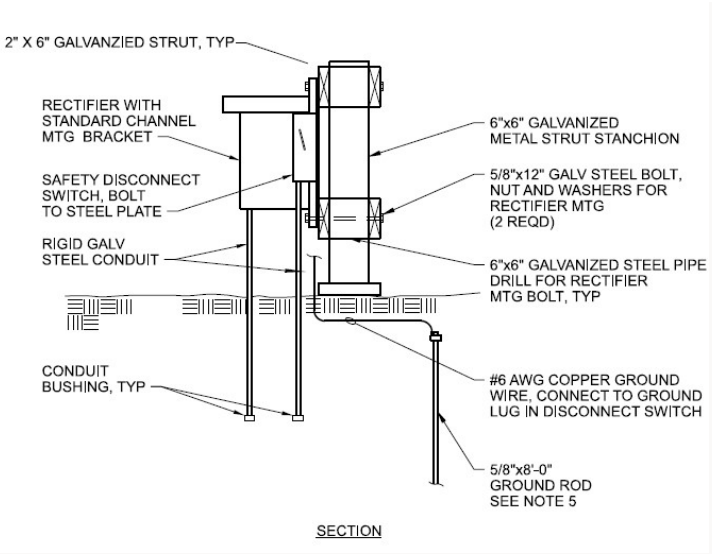

Figure 2. Section showing station-mounted CPR proposed at intertie

The CPRs along the FW pipelines will be installed at the three connection points with existing Bull Run Conduits (see Figure 10 in Application Narrative Section 2.A, which shows Conduit 2, 3, and 4 connections). All three connection points are located in the MUA-20 zone. These CPRs are small boxes mounted on poles in the road ROW (Figure 5). These proposed CPRs at the Conduit connection points are similar to existing pole-mounted CPRs serving Bull Run conduits in the area, such as those illustrated in Figure 1 above.

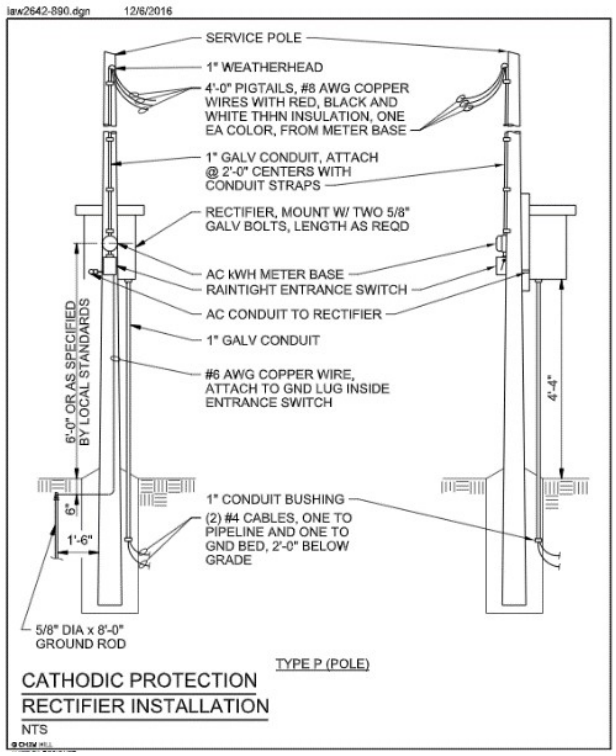

Figure 3. Section showing pole-mounted CPR

Application Narrative Section 2.A: Conditional Use Review

Like the other appurtenances described in Application Narrative Section 2.A, the proposed CPRs meet the applicable conditional use criteria in MCC 39.7515.

As described in the application narrative, the proposed pipelines pass through or are adjacent to rural residential, public facilities (roads and associated utilities), agricultural, and forest land uses in the study area. The pipelines and appurtenances, including the proposed CPRs, are similar in design and function to the existing water utility facilities in the study area. Water Bureau pipelines and appurtenances have existed in road ROW and public utility easements across private property in the study area for over 100 years. Local water districts served by the Bull Run water system have relied on water pipelines and related facilities in this area since the early 1900s. Water pipelines and appurtenances preceded and support much of the development that has occurred in the study area—and have played a role in defining its character. Water facilities, including above-ground CPRs, have co-existed with agricultural and forest operations as well as rural residential development in the study area for decades, and do not conflict with these land uses.

Like the pipelines and appurtenances described in Application Narrative Section 2.A, there is no light, odor, or noise producing equipment associated with the proposed CPRs. For these reasons and because the proposed CPRs, like the other proposed pipeline appurtenances, are similar in design and function to those along the existing Bull Run conduits in the study area, the CPRs are consistent with the character of the area and meet approval criterion MCC 39.7515.A.

Approval criterion MCC 39.7515.B (natural resources) is satisfied because none of the proposed CPR sites are located in natural resource areas, including areas with SEC overlay zones. Similar to other appurtenances, the CPRs are either located in existing public ROW (CPRs at the Conduit connection points) or in previously cleared areas of private lands that are also not in a natural resource state (at the Multnomah Connection and the intertie).

Approval criterion MCC 39.7515.C (farm and forest practices) is satisfied because no CPRs are proposed near lands devoted to forest use and, as demonstrated in Completeness Attachment K.1.b, the proposed CPRs, like other appurtenances, do not increase the potential for the pipelines to force a significant change in, nor significantly increase the cost of, accepted farm practices in the surrounding lands.

Approval criteria MCC 39.7515.D through MCC 39.7515.H are also satisfied based on the findings presented in Section 2.A and supporting appendices. The proposed CPRs have no greater impacts relative to these criteria than the appurtenances described in Section 2.A. As to MCC 39.7515.D (public services), the CPRs do not require any public services that were not contemplated by the service provider review of the intertie. The CPRs are served by low voltage electrical lines and PGE has confirmed that it can provide the required electrical service. As to MCC 39.7515.E (big game habitat), like the pipelines the CPRs serve, all are located outside any big game winter habitat area. As to MCC 39.7515.F (hazardous conditions), the CPRs do not use any hazardous materials and cause no traffic or geotechnical risk. As to MCC 39.7515.G (comprehensive plan), the CPRs do not require any water supply, wastewater disposal, or increased service demands from service providers. As to MCC 39.7515.H (other), none of the other approval criteria are impacted by the CPRs. The CPRs also do not change any of the analysis of compliance of the pipelines with standards in Application Narrative Section 2 Overview except as clarified below under Definitional and Other Updates to Application Narrative.

For these reasons, the proposed CPRs meet the applicable conditional use criteria in MCC 39.7515 for the RR and MUA-20 zones.

Application Narrative Section 2.B: Design Review

Like the other appurtenances documented in Section 2.B, the proposed CPRs meet the applicable design review criteria in MCC 36.8040. Because there is no parking associated with the CPRs, the applicable criteria are MCC 36.8040(A)(1)(a) and (1)(c), (4) and (7).

As described in the application narrative, the pipelines and appurtenances are typical of the existing water system facilities in the area. The Water Bureau's existing facilities, which include 16 CPRs in the area, have co-existed harmoniously with rural residential development, agriculture, and forestry in the area for decades. Above ground pipeline appurtenances including air valves, vents, and the proposed CPRs are found along each of the Water Bureau's existing water conduits. The proposed appurtenances function and look like existing Water Bureau infrastructure in the project area and are similar to utility equipment seen in typical county road ROWs, including existing fire hydrants, utility cabinets, power poles, pole-mounted utility cabinets, and similar infrastructure. Proposed CPR details are shown in Figures 3-5.

The proposed CPR utility cabinet at the RW pipelines is on private property, set back from the front and side yards and south of an existing driveway. It will be a neutral grey color and similar in height to nearby shrubs. The utility cabinet will be located more than 100 feet from existing residences. At this distance and with existing buffering vegetation, it is generally not visible from buildings and will have no impact on views.

The proposed CPRs at the FW intertie will be mounted on the side of the intertie vault, a low, knee-high structure within the intertie site. These CPRs, like the vault they are affixed to, will be screened by perimeter vegetation and not be visible from off site, as illustrated in Section 2.B of the application and in the site visualizations in Completeness Attachments H.2.d through H.2.g.

The proposed pole-mounted CPRs at the Conduit 2, 3, and 4 connections will be located in the road ROW, with a similar look and function as the existing pole-mounted CPRs in the ROW (see Figure 1). Like other appurtenances in the ROW, they are similar to utility equipment seen in typical county road ROWs, including existing utility cabinets, power poles, pole-mounted utility cabinets, and similar infrastructure.

For these reasons, the proposed CPRs will relate harmoniously to the natural environment, existing buildings, and the road's visual corridor and meet design review criterion MCC 36.8040(A)(1)(a).

Like the other appurtenances described in the application narrative, the proposed CPRs are located and designed to effectively, efficiently, and attractively serve their function. The CPRs are necessary for pipeline protection, and the applicant is proposing the minimum number needed to provide cathodic protection along the pipelines.

Three CPRs are clustered in a utility cabinet at the Multnomah Connection, eliminating the need for multiple pole-mounted CPRs. The aggregated CPRs in a compact enclosure effectively and efficiently serves its function. The cabinet is a neutral color, set back from residences and road ROWs, and typical in size and shape as other utility structures in the area (Figure 2 is an example of a similar utility structure on Lusted Road. The compact cabinet sits on a small concrete pad, which also effectively and efficiently serves its function. The concrete pad is the minimum size needed to support the cabinet and is set in the ground so that there are no visual impacts created by the pad.

Five CPRs are clustered along the pipeline pathways at the intertie vault, affixed directly above the pipelines on the sides of the vault to effectively and efficiently provide cathodic protection to the two

incoming and three outgoing pipelines. The CPRs are low to the ground and fully screened by perimeter vegetation at the intertie.

The three pole-mounted CPRs will be located in the road ROW, effectively and efficiently providing cathodic protection as required at the conduit connections. These CPRs have the same appearance and function as other existing pole-mounted CPRs in the ROW, and generally blend in and are consistent with road's visual corridor landscape.

For these reasons, the proposed CPRs effectively, efficiently, and attractively serve their function and meet design review criterion MCC 36.8040(A)(1)(c). They are sized and located to minimize impacts on residents, are interrelated with the pipelines, and are spaced as needed for pipeline protection and operations which provides spatial variety and order.

Like other pipeline appurtenances, the surface area of the proposed CPRs is small, less than 20 sf and outside of areas with trees or significant vegetation. Installation of the CPRs will not require substantial changes to existing grades. The location and design of the CPRs are typical of existing utility equipment and pipeline appurtenances in the area, with minimal disturbance to the natural landscape and existing grades. Additionally, all CPRs are located outside of SEC zones.

For these reasons, the proposed CPRs will preserve the landscape and existing grade to the maximum practical degree and meet design review criterion MCC 36.8040(A)(4). Preserved trees and shrubs will be protected during construction.

The proposed CPRs are typical of existing pipeline appurtenances and utility equipment in the area. As noted above, these features are located away from buildings and in or near existing rights-of-way or access drives. They are typically spaced a quarter mile or more apart and have no existing screening or buffering. In the decades that they have been part of the existing landscape, existing CPRs have had no adverse impacts on neighboring properties. Similarly, the proposed CPRs have been located to minimize adverse impacts. The cabinet at the Multnomah Connection is located on the private property so that it will be set back and effectively screened by existing vegetation, and the five CPRs at the intertie vault will be fully screened by perimeter vegetation that will be planted at the intertie. The remaining single pole mounted CPRs will be located in the ROW and do not require additional screening or buffering in order to satisfy design review criterion MCC 36.8040(A)(7).

For the reasons set forth above, the proposed CPR appurtenances have been designed and located to avoid or substantially minimize impacts within the pipeline corridor and on neighboring properties, and they meet the applicable design review criteria in MCC 39.8040.

Application Narrative Sections 2.C (EFU Review) and 2.D (SEC Review)

None of the proposed CPRs are located within the SEC or EFU zone areas, and therefore no changes to Application Narrative Section 2.D are needed.

Definitional and Other Updates to the Application Narrative

CPRs are hereby added to the definition of appurtenances in the Introduction to the Application Narrative (General Terms, page iv):

> *"Appurtenances: Auxiliary, physical components of a pipeline, such as accessways, vents, drains, cathodic protection rectifiers, and valve boxes, located along pipeline alignments"*

On page 4, Application Narrative Section 2 Overview, there is a statement that "above-ground appurtenances are spread far apart and do not exceed 2.5 feet in height." This reference to height is hereby amended to except the three CPRs on poles in the ROW and the single utility cabinet along the RW pipelines.

On pages 17-18, Application Narrative Section 2 Overview, there is a discussion of yards in the MUA-20 zone. The proposed CPRs in this zone are under 30 inches (at the intertie) or within the ROW (at the Conduit connection points, and therefore yard standards are met or do not apply.

Yard standards in the RR zone are addressed on page 21, Application Narrative Section 2 Overview. The proposed CPR utility cabinet at the Multnomah Connection is set back 30 feet from the front lot line and 10 feet from the side lot line, meeting the yard standards.