

SUPPLEMENTAL SECTION B-10
VISUAL RESOURCES REPORT

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SUPPLEMENTAL SECTION B-10 VISUAL RESOURCES REPORT

B-10.1 LIGHT AND GLARE

B-10.1.1 Existing Conditions

The proposed Phase II project is an expansion of the existing Phase I plant which is located on a single site in a rural forest clearing. The Phase I plant will be illuminated at night for facility operations under normal conditions and for means of egress under emergency conditions. Illumination levels were designed in accordance with the Illuminating Engineering Society (IES) standards recommended by the following guidance:

- ANSI/IES RP-7, 1983, Industrial Lighting
- ANSI/EIS RP-8, 1983, Roadway Lighting
- Federal Aviation Administration (FAA)
- Occupational Safety and Health Act (OSHA)

In addition, existing high-mast lights in the adjacent industrial yards provide wide-area illumination. Other lights in the immediate area include entry and yard lights around a small grouping of residences located within about two-thirds of a mile of the project site. Evergreen trees surround the project site on all four sides, as well as a 25-foot-high wall with vegetated berm along Keys Road, screen lights originating from the Phase I plant, the Satsop Development Park and other adjacent land uses.

B-10.1.2 Impacts

The proposed Phase II project would not significantly increase the existing light and glare conditions. The Phase II project would be illuminated at the same times and illumination levels as the existing Phase I plant. Table B-10-1 summarizes the illumination levels expected at the proposed Phase II project.

Lighting would be provided for the purposes of general operator access and safety under regular operating conditions. Precise and detailed placement of lighting fixtures has not yet been determined, but light poles will likely be standard street light height, in the range of 20 to 50 feet. Outside lighting around the exterior of buildings and ancillary equipment would likely be attached to walls.

**Table B-10-1
 Expected Illumination Levels for Exterior CT Facility Areas**

Exterior Location	Maintained Foot-Candles
Boiler platforms	10
Emergency lighting	3
Hydrogen manifold area	20
Electrical switchyard	5
Exterior walkways and platforms	2
Roadway	1
Security fence	0.5
Outdoor areas containing equipment that requires periodic inspection	5
Cooling tower	5

Source: DeRidder 1995

Spot lighting (up to 20 foot-candles) would be provided for purposes of localized area illumination for specific work activities such as the hydrogen manifold area. This lighting would be of higher intensity than wide-area lighting, but will be limited to specific areas and occasional usage. Emergency lighting would be provided for purposes of personnel egress and continuance of critical activities during emergency conditions. These instances are anticipated to be infrequent.

During construction, there would be some lighting associated with construction machinery. During operation of the Phase II project, the most visible points of illumination would be small, high-intensity anti-collision lights on the emission stacks to warn aircraft. These lights are intermittent and would be similar to warning lights present on the nearby WNP-3 and WNP-5 cooling towers.

Light and glare impacts upon nearby residents and travelers along Keys Road are expected to be insignificant. Prior to the start of construction of Phase I, there were existing high-mast lights providing wide-area illumination of the industrial yards. Local residents are already used to this local light source and the separation distance of approximately 3,375 feet provides a buffer zone for light falloff. The 25-foot-high wall with a vegetated berm located along Keys Road will reduce the light from the Phase II project. Vegetation located on the berm and scattered existing vegetation between the project site and residences would screen most of the lights. Additional screening is provided by high trees located along the residential road since the residences are set back an estimated 50 to 75 feet. In specific locations where glare or light spillover would impact Keys Road or be obtrusive to nearby residences, lighting angles could be adjusted to minimize glare impacts, or supplemental light shields/vegetation could be used for extra screening.

B-10.1.3 Mitigation Measures

B-10.1.3.1 Environmental Design Features

- The 25-foot-high noise wall, vegetation located on the berm and scattered existing vegetation between the project site and residences will screen most of the lights.
- Additional screening is provided by high trees located along the residential road since the residences are set back an estimated 50 to 75 feet.

B-10.1.3.2 Potential Mitigation Measures

- In specific locations where glare or light spillover would impact Keys Road or be obtrusive to nearby residences, lighting angles could be adjusted to minimize glare impacts, or supplemental light shields/vegetation could be used for extra screening.

B-10.2 AESTHETICS

B-10.2.1 Assessment Methodology

This section describes existing visual conditions of the proposed project setting. The visual inventory study consisted of the following:

- Setting criteria for rating levels of visual quality and viewer sensitivity
- Assessing existing visual quality levels
- Identifying viewer types, estimating their view of the facility (general visibility and distance range), and their visual sensitivity
- Selecting key representative viewpoints

Regional topography and site context information were reviewed using U.S. Geological Survey topographic maps. Detailed topography and layout for the project site were analyzed by reviewing project plans provided by the Certificate Holder and its engineering and design contractor. Field work was then conducted by driving and hiking the area to qualitatively determine general visibility of the project site from residences, major roads, and other potentially sensitive viewpoints. Based on visibility, representative viewpoints were photodocumented and two key viewpoints were selected for visual simulation (see Figure B-10-1).

Assessment methods were based on a combination of visual assessment techniques which characterize visual impact in terms of changes in visual quality, character, and viewer sensitivity. Visual quality levels were estimated for both regional and immediate project area settings. The regional landscape setting is defined as those areas north of the Chehalis River, typically at a distance of 1 mile or greater. Levels of visual quality and viewer sensitivity were qualitatively estimated based upon general criteria that establish ratings of “high,” “moderate,” or “low” as described below.

Levels of visual quality consist of three primary components: *vividness*, the memorability of the landscape resulting from distinctive landmark features or visual patterns; *intactness*, the visual integrity between natural and modified landscape components and the absence of encroaching disturbances; and *unity*, the visual coherence, composition, and harmony of landscape elements. Visual quality was evaluated using the following general criteria:

- **Low** - Landscape is common to the region and exhibits few, if any, memorable features or patterns which provide visual diversity. A prevalence of encroaching human elements or landscape modifications exist which do not compatibly blend with the natural surroundings (low visual intactness and unity). Human alterations (such as roads and powerlines) exhibit low maintenance or siting sensitivity (such as grading and alignment).
- **Moderate** - Landscape exhibits reasonably attractive natural and human-made features/patterns, although they are not visually distinctive or unusual within the region. The landscape integrity of the area provides some positive visual experiences such as natural open space with some existing disturbance (farm fields, etc.), or well-maintained industrial parks and residential areas.
- **High** - Landscape exhibits distinctive and memorable visual features (such as landforms and rock outcrops) and patterns (vegetation/open space) which are largely undisturbed--usually a rural or open space setting. Development or visual disturbances, if present, are exceptionally well-planned to integrate with the natural landscape materials and character.

Viewer sensitivity is dependent on viewer types and exposure (number of viewers and view frequency), view orientation and duration, and viewer awareness and sensitivity to visual changes. Levels of viewer sensitivity were evaluated using the following criteria:

- **Low** - Viewer types in the project vicinity representing low visual sensitivity include agricultural and power plant workers. Compared with other viewer types, the number of viewers is generally considered small, and the duration of view is short. Viewer activities typically limit awareness and sensitivity to the visual setting immediately outside the workplace, which are often screened by vegetation or adjacent buildings.

- **Moderate** - Viewer types representing moderate visual sensitivity consist of highway and local travelers. The number of viewers varies depending on location; however, in the vicinity of the proposed plant, viewer numbers tend to be moderately large since they include travelers using SR 12 and other roads throughout the Chehalis River Valley. Viewer awareness and sensitivity are also considered moderate because destination travelers often have a focused orientation.
- **High** - Residential and recreational viewers and those congregating in public gathering places (such as churches and schools) are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to specific building orientation or the enjoyment of the experience. Views may be of long duration and high frequency.

B-10.2.2 Visual Quality

B-10.2.2.1 Regional Setting

The site for the proposed Phase II project is within the property boundaries of the Satsop Development Park, which includes WNP-3 and WNP-5, two discontinued nuclear power projects. The Satsop Development Park is located in hilly terrain on the south side of the Chehalis River Valley. Two 496-foot-high cooling towers, associated with the nuclear facility, are dominating visual elements within the existing landscape.

The Chehalis River Valley is bounded by tree-covered hills rising approximately 540 feet from the elevation of the valley floor and is dissected by secondary water courses, including the Satsop River, Fuller Creek, Newman Creek, and Vance Creek. Agriculture is the primary activity in the valley, and the landscape is a patchwork of fields whose textures and colors change with the season. Farm buildings, surrounded by groupings of trees, are located throughout the valley. Other elements in the valley which contribute to the visual character of the region include a golf course, trailer park, and gravel pits.

Overall visual quality of the regional landscape setting is classified as “moderate.” The regional landscape exhibits moderate vividness because the natural and agricultural features, which are reasonably attractive, are not visually distinctive or unusual within the region. Visual intactness is also moderate because agricultural activities are visually compatible with the colors, textures, and patterns of the river valley, but other elements such as roads, farm buildings, and the cooling towers are not visually integrated with the surrounding landscape. Many farm buildings, for example, are light colored and have reflective metal roofs. Regional visual unity is rated moderate to high. Most scene elements seem to complement a rural/agricultural setting. With the exception of the cooling towers, constructed roads and utility corridors blend with the landform or are not visible.

B-10.2.2.2 Plant Site

From SR 12, the site is accessed by traveling south on Keys Road which passes agricultural fields and then crosses the Chehalis River. The road then ascends a wooded hillside and emerges into a clearing that was formerly used as an equipment laydown area during construction of WNP-3 and WNP-5. A portion of the laydown area is occupied by the existing Phase I plant, which will share the site with the proposed Phase II project.

Visually, this area can be characterized as industrial. The existing Phase I plant gives the site an industrial appearance with block building forms ranging from 20 to 64 feet in height. Ancillary elements include enclosed combustion turbines and steam turbines, fuel and liquid storage tanks, electrical switchyards, two 41- to 46-foot-high cooling towers, fencing, two heat recovery steam generators, and two 160-foot-high emission stacks with airplane warning lights. Figure B-10-2 shows an isometric view of the existing Phase I plant without the surrounding existing vegetation or topographic features.

During certain seasons or weather conditions, water vapor and combustion products are visible from the cooling towers and emission stack of the Phase I plant. In addition, existing transmission poles extending along the northern portion of the existing BPA Olympia-to-Aberdeen right-of-way will be replaced as part of the Phase I construction. The existing wooden poles in the right-of-way will be replaced with steel towers similar to the two rows of steel towers currently in the right-of-way. These towers will carry new transmission lines from the plant to the Satsop substation located approximately 4,000 feet east of the project.

A composite visual quality rating of “low” for the immediate project area is a result of low ratings of vividness, intactness, and unity. Although the hilly terrain of the area provides some visual variety, the flat landscape of the project site is fairly monotonous. There are no long-range penetrating views. Surrounded by a uniform stand of trees around the periphery of the cleared laydown area, there is limited color, texture, or pattern variety. Visual intactness is low because elements of the existing storage yard are not visually integrated with the landscape. No screening is provided, and visually contrasting materials consist of asphalt, cinders, and steel. Visual unity is also low because layout configuration of the storage yards is rectilinear (contrasts with native forms), piles of stored materials are scattered across the site, and the transmission line corridor passes through a linear swath of cleared vegetation.

B-10.2.3 Viewer Types and Sensitivity

Primary viewer types in the vicinity of the proposed Phase II project site are residents, travelers along SR 12 and local roads, agricultural workers, and nuclear plant workers.

The nearest communities are Montesano, Satsop, and Elma which are located along SR 12. Residents along the edges of these communities generally have open views across the Chehalis River Valley. These views are bounded by tree-covered hillsides seen in the distance. The WNP-3 and WNP-5 cooling towers, and the upper portion of the discontinued nuclear facility building, are widely visible. Community residents represent the highest concentration viewers in the region, and will be potentially sensitive to visual changes. Typical viewing range to the plant site from the closest community of Satsop will be approximately 2 miles. Similar viewing conditions will exist for scattered farmstead residences throughout the valley between SR 12 and the Chehalis River where the minimum viewing distance will be approximately 1 mile.

The closest and most sensitive residential views are in the vicinity of several houses located on a rural road paralleling the BPA transmission line right-of-way (Figure B-10-1). These viewers are located approximately 2,300 feet from the project area. Existing views from this location consist of the existing Phase I plant, electrical equipment, including transmission lines and towers, and laydown yards containing concrete forms, steel reinforcing bars, and other remnants of WNP-3 construction. The number of viewers at this location is small, estimated to be 8 to 15. But because the plant site will be relatively close, the residential viewers could be sensitive to visual changes.

SR 12 is the main east-west travel route through the Chehalis River Valley. The attention of travelers is drawn to the open agricultural fields south of the highway. Views are open for approximately 2 miles and are terminated by tree-covered hillsides. Again, the existing cooling towers and the nuclear facilities are dominant visual elements. Visual sensitivity for travelers along SR 12 and local streets within nearby communities is considered "moderate."

Views from local roads within the immediate plant site area are generally short-range and are typically blocked by vegetation and topography. A few elevated dirt roads located in the hills south of the site have open, overlooking views of the discontinued Satsop nuclear facilities, and the Chehalis River Valley can be seen in the distance. Since these roads are not considered destinations for scenic driving and traffic volumes are estimated to be low, overall visual sensitivity is considered "moderate" to "low."

Approximately 2 miles south of the intersection of SR 12 and Keys Road, the latter passes immediately adjacent to the plant site. The primary travelers along this section of Keys Road will be power plant employees and a few local residents. In general, local residents who travel this road are expected to be more sensitive to visual impacts than industrial workers, but the overall visual sensitivity of travelers using Keys Road is considered "low" because of the short view duration and the presence of existing industrial yards which has desensitized viewers over time. The higher visual sensitivity of residential travelers, compared to other types of travelers, is reflected in the higher sensitivity rating already given to residential viewers.

Agricultural workers throughout the Chehalis River Valley will have views comparable to those of travelers along SR 12. Workers at the Satsop Development Park have short-range views that are predominately blocked by dense evergreen trees and hilly topography around the facility. The visual sensitivity of agricultural and power plant workers will generally be low because attention is focused on work activities with limited awareness of peripheral visual conditions.

B-10.2.4 Visual Changes Introduced by the Proposed Project

Prior to construction of the Phase I plant, materials stored on the plant site were relocated and the foundations of former buildings were removed. The site was regraded. A 25-foot-high wall with vegetated berm has been constructed to screen views along Keys Road. This berm is be vegetated with native shrubs, grasses, and other appropriate vegetation in a random arrangement to simulate native patterns.

The purpose of this berm is primarily to provide partial visual screening for nearby residents and travelers along Keys Road. Visual screening will be provided during project construction and general operation, both in the day and at night. The relationship of the berm to the existing Phase I plant and to the proposed Phase II project is shown in Figure B-10-2 and Figure B-10-3, respectively.

B-10.2.5 Project Visibility

A field visit was conducted to qualitatively note or photograph potential views of the project site from a variety of surrounding land use areas, located both near (less than 1/8 mile) and distant (up to 4 miles). These represent residential, traveler, and industrial/agricultural viewer types. Since topography limits most views from the south and east, field work concentrated to the north and west of the project site. Areas checked included:

- Peripheral edge of the community of Satsop
- SR 12 corridor (east/west)
- Keys Road corridor (north/south)
- Agricultural fields in the Chehalis River Valley
- Elevated dirt roads in the hills south of the project site near WNP-3
- Area immediately surrounding the project site within a 1/2-mile radius

Other surrounding areas were visited, but views were either blocked by topography or vegetation.

Based upon the number of viewers, viewer types/sensitivities, and viewing distance, two viewpoints were selected from the general areas having project visibility. These two viewpoints, located on Figure B-10-1, were used in the preparation of two photo simulations depicting proposed conditions of the Phase II project. Viewpoint 1 (Figure B-10-4) is looking south from SR 12

approximately 1/4 mile east of the Keys Road junction. It represents the mid-to-distant viewing range (1 to 2 miles) seen by the largest number of viewers including SR 12 travelers, residents of nearby communities, and agricultural workers.

Figure B-10-4 shows the existing nuclear facility buildings protruding above the treeline. The cooling towers for WNP-3 and WNP-5 dominate the existing view. The emission stacks of the proposed Phase II project, if visible above the treeline, will be located west of the existing cooling towers. Based upon available project and topographic data, the tops of the stacks will likely be at or just below the treeline elevations from this viewpoint. Since visibility versus no visibility is close to the threshold of model accuracy based on available data, the tops of the stacks protruding above the treeline are shown as a conservative graphic depiction.

The flashing airplane warning lights on the emission stacks may also be visible at night, as are the lights on the existing cooling towers. General visibility of the project buildings and ancillary facilities would not be visible from this viewpoint because the site is screened by topography and vegetation.

The second viewpoint (VP2, Figure B-10-1) was chosen because the view is sensitive due to close residences that are within about two-thirds of a mile of the proposed Phase II project. As shown in Figure B-10-5, this view shows the existing power transmission lines as well as portions of the proposed facility, including the emission stacks. The vegetated berms adjacent to and west of the plants partially block the view towards the facility as well as the view of some of the existing buildings on other portions of the laydown area. Figure B-10-6 presents the existing view of the Phase I plant for comparison.

The vegetated screening berms along Keys Road will block views of the lower portion of the facility, but the tops of the turbine buildings, cooling towers, emission stacks, and electrical switchyards will be visible. The most visible portion of the plant from this location will be the electrical switchyards, which are the closest elements. Visibility will decrease somewhat as screening vegetation reaches maturity. After vegetation is established, views of the project site area may be improved as compared to current conditions. Again, the facility's higher components will protrude above the screen.

In addition to the views selected for visual simulation representing travelers and residents who have higher visual sensitivity views were selected for less sensitive viewer types, including agricultural and industrial workers.

General visibility of the proposed Phase II project by agricultural workers in the Chehalis River Valley will be similar to that of travelers on SR 12 represented by Viewpoint 1. As from most other viewpoints, it is possible that agricultural workers could see a small portion of the emission stacks protruding above the treeline in the distance.

Satsop Development Park workers will have views of the facility when using Keys Road, but once inside the Development Park, views of the facility will be blocked by intervening trees.

B-10.2.6 Visual Impacts

The assessment of impacts of the proposed Phase II project on visual quality included consideration of contrasts between current and proposed conditions for high or moderate levels of visual quality and high or moderate levels of viewer sensitivity as shown in Table B-10-2. Following these guidelines, high sensitivity and a moderate change in visual quality could be considered potentially significant. Where sensitivity and visual change were both judged to be moderate, impacts are not considered potentially significant.

**Table B-10-2
 Visual Impact Assessment Matrix**

Sensitivity Level	Level of Change in Visual Quality ^(a)		
	High	Moderate	Low
High	PS	PS	A/N
Moderate	PS	A/N	N
Low	A/N	N	N

^(a) N = Not Significant
 A/N = Minor Adverse, Not Significant
 PS = Adverse, Potentially Significant (without mitigation)

Visual impacts of construction activities of the Phase II project would be “not significant” regarding the overall landscape setting. Viewers throughout the Chehalis River Valley would not observe construction of the buildings or ancillary facilities, with the possible exception of a small portion of the emission stacks. For nearby residents and travelers on Keys Road passing adjacent to the site, construction of the Phase II project would be seen less and less as the planting on the berm matures and screens views.

Once grading operations and exterior construction are completed, the site would be hydroseeded to enhance visual conditions. The wall and vegetated berm located adjacent to the project site along Keys Road would provide some degree of visual screening of construction activities. Equipment enclosure buildings and exterior tanks would be painted earth-tone beige and gray to reduce contrasts. The emission stacks would be painted to blend with the sky as seen from distant viewpoints.

Visual impacts of the constructed Phase II project upon the existing regional landscape (Figure B-10-4) are expected to be “minor adverse, not significant.” Even though project buildings and

ancillary facilities would not be seen, a small portion of the emission stacks may be visible from some viewpoints in the Chehalis River Valley. The cooling towers, juxtaposed against the horizontal profile of the background hills, are objects of attention for viewers looking across the open plain of the Chehalis River Valley. If visible, the presence of small portions of the emission stacks will be an additional, but minor, element to the west of the existing and taller cooling towers of WNP-3 and WNP-5. Depending on the time of year and weather conditions, attention to the stacks could be more pronounced when a vapor plume is present.

The impact to local residents adjacent to the site (Figure B-10-5) is expected to be “minor adverse, not significant” due to overall visual compatibility of the project with the existing conditions. Even though the emission stacks and the higher plant structures would be visible, the proposed Phase II project would be screened by the 25-foot-high wall with vegetated berm along Keys Road. The buildings enclosing the turbine equipment would also reduce visual impacts. The screening berm is primarily intended to reduce the visual impacts to nearby residents, and would also reduce the visual impacts for travelers using Keys Road, even though the visual sensitivity for travelers is comparatively lower than other viewer types. Replacement transmission line towers will be constructed within the existing BPA right-of-way with negligible additional visual impact.

B-10.2.7 Mitigation Measures

- The Phase II will be constructed on an industrialized, developed site as part of the Satsop Combustion Turbine project. There are few nearby residences and few travelers using the adjacent Keys Road.
- The Phase II project will be located further east of the Phase I project. A screening berm is being built between the power plants and Keys Road as part of the Phase I construction, with a 25-foot-high noise wall behind the berm. This berm and noise wall will screen the plant from viewers using Keys Road, and will screen all but the tallest portions of the plants from viewers at nearby residences.
- Equipment enclosure buildings and exterior tanks will be painted beige and gray to reduce contrasts.
- Two 200-foot-high emission stacks, painted a light color, will be constructed.

Figure B-10-1 Sensitive Viewpoint Location Map

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Figure B-10-1 continued

Figure B-10-2 Existing Phase I Isometric View

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Figure B-10-2 continued

Figure B-10-3 Proposed Phase II Conceptual Isometric View

8 1/2 by 11; color, needs two placeholders. Must start on odd-no. page.

Figure B-10-3 continued

Figure B-10-4 Simulated View of the Proposed Phase II Project Stacks

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Figure B-10-4 continued

Figure B-10-5 Simulated View of the Proposed Phase II Project (Viewpoint 2)

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Figure B-10-5 continued

Figure B-10-6 Simulated View of the Existing Phase I Project (Viewpoint 2)

8 1/2 by 11; color, needs two placeholders. Must start on odd-no. page.

Figure B-10-6 continued