11.6 Iowa Hill Visual Resources Study Plan

11.6.1 Pertinent Issue Questions

The Iowa Hill Visual Resources Study Plan addresses the following visual resource Issue Questions:

- What are the visual effects of Project construction and operation (including night lighting and glare) on sensitive viewing locations such as residential and public access areas?
- What are the concerns of area residents about the visual effects of the Project?
- Will construction and operation of the Project be consistent with the visual quality objectives established by the Eldorado National Forest in the Land and Resource Management Plan?
- Will construction and operation of the Project be consistent with the El Dorado County General Plan?

A separate study will address the following noise Issue Question:

- What are the auditory effects of Project construction and operation on the surrounding residential and public access areas?

A separate study will address the following property value Issue Question:

- What is the effect of the Project on the property values of those residents that are substantially adversely affected by the visual effects of the Project?

The analysis would be conducted after the Visual Resources Study is complete and the residents substantially adversely affected by the visibility of the Project determined. The study would evaluate the effect of the Project on the property values of those residents found to be substantially adversely affected by the visibility of the Project.

11.6.2 Background

SMUD will conduct a visual assessment of the proposed Iowa Hill Pumped Storage Development Project (Project) as described in the Iowa Hill Pumped Storage Development Project Description, Draft Revision 1 (SMUD 2003a).

The visual assessment will evaluate the visual effects of Project construction and operation from sensitive viewing locations. Project construction features include areas to be permanently altered to accommodate construction activities such as the upper reservoir berms, transmission corridor, switchyard, laydown areas, temporary stockpiling areas, trailer and office locations, and road widening. Operations to be evaluated that may affect the visual resource include the "bathtub ring appearance" caused by the seasonal daily fluctuation of water levels on Slab Creek reservoir. Results from the Water Balance Model analysis of the Project's effects on water levels at Slab Creek Reservoir will be needed to conduct the visual analysis of operations.

11.6.3 Project Features to be Evaluated in the Visual Assessment

The Project features identified below are the features to be included in the visual assessment. The use of the term "Project features" in the remainder of this Study Plan refers to the features that are numbered 1 through 15 below.

11.6.3.1 Upper Reservoir Site

Visible Project features at the upper reservoir site would be laid out in Sections 19, 20 29 and 30. The reservoir would be located primarily on SMUD-owned land, as well as adjacent Sierra Pacific Industries (SPI) land and federally owned lands within the Eldorado National Forest (ENF).

The upper reservoir will be laid out in Sections 19 and 30. The outer surface of the upper reservoir berms will consist of crushed rock from the tunneling operation and earth from the upper reservoir basin. Downstream embankment slopes are designed at 2.0 horizontal feet to 1.0 vertical foot for the downstream slope and to 2.5

horizontal feet to 1.0 vertical foot for the upstream slope. The upper reservoir would be constructed from a combination of the native material at the reservoir site and excavated rock from the powerhouse, tunnel and shaft.

During construction SMUD would balance the excavation and fill requirements of the total Project eliminating any need for permanent spoil areas at the upper reservoir by incorporating excess material into the reservoir berm and the area to be landscaped. Approximately 350,000 cubic yards of overburden from the reservoir site would be temporarily stockpiled at the "Potential Temporary Storage Area for Organic Soil" located at the edge of the Iowa Hill plateau southwest of the reservoir. In addition, there is a "Potential Construction Trailers/Field Office Area" located on a small knoll south of the reservoir, and a "Potential Equipment Staging/Laydown Area" located at the edge of the plateau east of the reservoir. These areas are identified on the Exhibit G, Plan View map. There would be no structures or service cranes installed at the upper reservoir site. Because of safety concerns, SMUD would not allow public access to the upper reservoir. Access will be controlled with a security fence topped with three strands of barbed wire and locked gates (SMUD 2003a). Project features at the upper reservoir site to be evaluated for visual effects are:

1. Upper reservoir
2. Potential temporary storage area for organic soil
3. Potential construction trailers/field office area
4. Potential equipment staging/laydown area

11.6.3.2 Lower Slab Creek Reservoir Site

There would be several site features located along the east shoreline of Slab Creek Reservoir. The switchyard would be a level area cut into the existing slope. Surrounding the swithchyard would a potential four-acre, level area for equipment staging/laydown, also cut into the slope. The staging/laydown area would be used for construction trailer and employee parking, and sanitary facilities. There would be a potential construction trailers/field office/washhouse/restroom area south of the switchyard and laydown area, and adjacent to Slab Creek Reservoir Access Road. The tunnel entrances for the low-pressure tunnel, ventilation tunnel, and access tunnel would also be located in this area. The Slab Creek Reservoir Access Road would be widened from its current 10-foot width to 12 feet that would require cutting back of the canyon slope. Slab Creek Reservoir elevations would fluctuate on a daily basis under Project operations. Results from the Water Balance Model analysis will identify the spatial and temporal effect of operations on reservoir fluctuations.

Project features that would be subsurface and not visible, according to the Project Description (SMUD 2003a) include the intake/outlet structure, three tunnels (main, cable/ventilation, and concrete-lined, low pressure) and the powerhouse. The intake structure would be 80 feet below the maximum water surface elevation of Slab Creek Reservoir. During construction there would be structures and/or service cranes installed on the site.

Project features at the lower reservoir site to be evaluated for visual effects are:

5. Intake/Outlet Structure
6. Switchyard
7. Potential staging/laydown area
8. Potential construction trailers/field office/washhouse/restroom area
9. Entrance to the concrete lined low-pressure tunnel
10. Entrance to the cable and ventilation tunnel
11. Entrance to the main access tunnel
12. Slab Creek Reservoir Access Road widening
13. Slab Creek Reservoir Shoreline

11.6.3.3 Transmission Line Right of Way

The preferred option for the transmission tie-in is route E, which will run from the switchyard at Slab Creek Reservoir, up Iowa Hill to the north and east, across Iowa Hill to the north and east, and intersection with the

existing SMUD transmission line almost due east of the Project. The right of way for the route crosses Forest Service and SPI lands. Project features associated with the transmission line to be evaluated for visual effects are:

14. Transmission line towers
15. Transmission line right of way clearing
16. Transmission line access roads

11.6.4 Eldorado National Forest Visual Management Direction

The proposed Iowa Hill Development would be located within the administrative boundary of the ENF, and portions of the upper reservoir and sections of the transmission line would be located on ENF lands. The ENF uses the USDA Visual Management System (VMS) to manage the visual resources of the Forest (USDA Forest Service, 1974). The visual resources have been inventoried, and the management direction is reflected in the 1988 Land and Resource Management Plan (LRMP) (USDA Forest Service 1988) in terms of visual quality objectives (VQOs). The VQOs represent a composite rating of the scenic integrity or visual "variety" of the landscape, combined with a "sensitivity level" rating that reflects the number and relative concern of viewers for the scenic quality of the landscape. Landscape variety and sensitivity levels are combined with a "distance zone" rating which identifies the distance from which viewers typically experience the landscape.

The VQO in the vicinity of the upper reservoir and transmission line route are predominantly Partial Retention (PR) in response to views of the area from residences outside the Forest. These views are referred to by the Forest Service as "community views". The VQO at the lower reservoir site and the lower portion of the transmission line is Retention (R) in response to the visual importance of Slab Creek Reservoir as a scenic water feature and high use recreation area.

Forest Service management direction under the PR VQO is for "management activities [to] remain visually subordinate to the characteristic landscape when managed according to the partial retention visual quality objective. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape. Activities may also introduce form, line color, or texture which are found infrequently or not at all in the characteristic landscape, but they should remain visually subordinate to the visual strength of the characteristic landscape (USDA Forest Service 1974)."

Forest Service management direction under the R VQO is "this visual quality objective provides for management activities which are not visually evident. Under Retention, activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern etc., should not be evident (USDA Forest Service 1974).

The El Dorado County General Plan includes goals and objectives associated with the protection of visual resources, however there are no inventory and assessment systems similar to those of the Federal agencies for managing visual resources. Therefore the visual assessment of private lands will be based on the questions from the California Environmental Quality Act (CEQA) Environmental Checklist Form (Bass, et al. 1999).

Would the project result in:

a) A substantial adverse effect on a scenic vista?
b) Substantially damage scenic resources, including but not limited to trees, rocks outcroppings, and historic buildings, or a state scenic highway?
c) Substantially degrade the existing visual character or quality of the site and its surroundings?
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

11.6.5 Visual Assessment Study Objectives

Study objectives for visual assessment are:

1. Identify the areas from which Project features and operational effects may be seen.
2. Select representative viewpoint locations within the identified seen areas to evaluate the visual effect of the project features.
3. Select viewpoints representative of the sensitive viewing locations from which the Project features could be seen (such as residential areas and recreation sites).
4. Assess the visual effects of Project features from selected representative viewpoints using Arc-Info three dimensional modeling of Project features, except Slab Creek Reservoir where photography will be used in lieu of modeling.
5. For viewpoints where the visual effects of the Project are determined to be of high concern, use photo editing techniques to simulate the visual appearance of the Project.
6. Evaluate the consistency of the Project with visual resource management direction of the Forest Service and County.
7. Identify potential opportunities to mitigate or lessen substantially adverse Project effects.
8. Get input on the study results from residents affected by the Project.

11.6.6 Study Area and Sampling Locations

The study area for the visual assessment of the upper and lower reservoir sites, and the transmission line right of way is defined as a 3-mile radius around the Project features listed above. Three miles was selected as the study area boundary because it defines the inner boundary of the Forest Service VMS "middleground distance zone" which ranges from three to five miles. Three miles was identified as the study area based on field reconnaissance of the Project area which found beyond three miles there would not be a significant affect on views due to the scale of the Project features, the ruggedness of the terrain, the heavily wooded nature of much of the Project area, and atmospheric haze.

11.6.7 Information Needed From Other Studies

Engineering Design Information

Engineering design information will be needed prior to the initiation of this Study Plan. More detailed information showing the changes in grade to occur (grading plans) and written information describing clearing, grading, blasting, and specifics for post-project remediation, including landscape plans will need to be provided. A map showing the approximate location of the transmission line towers and right of way, and descriptions of the color and texture of the upper reservoir site berm will be needed prior to evaluating the Project facilities. Results from the Water Balance Model analysis of the Project's effects on water levels at Slab Creek Reservoir will be needed prior to assessing the visual effect of Project operations on Slab Creek Reservoir.

11.6.8 Visual Assessment Study Methods And Schedule

Subtask 1: Seen Area Analysis

A seen area analysis will be conducted using ArcInfo-based computer programs to identify the possible landscape from which Project features can be seen (an example of the output can be seen in the figure below). The seen area analysis will use DEMs with 40-foot contour intervals of the surface. Since vegetation will not be modeled, the output will reflect the visibility of the project features as if there were no vegetative screening. Because of this, the seen area analysis is used as a starting point for identifying the potential visibility of the Project features.

Subtask 1 will begin immediately after receiving the information needed from the engineering studies discussed in Section 1.1.6.1. It will take approximately one month to complete this task.

Subtask 2: Viewpoint Selection

Results from the seen area analysis will be used to identify potential sensitive viewing areas from which Project effects would be assessed. The results of the seen area analysis will be used with County parcel maps, County road information and Forest Service recreation use area information to identify potential viewing areas from which the significant portions of the Project could be seen. These areas will be field checked by SMUD, the ENF Landscape Architect and other interested parties to determine whether the project could actually be seen given the presence of intervening vegetation (that is not modeled in the seen area analysis described above). Areas where the project features could be visible will be identified as potential viewpoints (VPs). The view from the VP will be documented photographically, and the VP coordinates (x, y and z) recorded.

Results from the field reconnaissance will represent a potential pool of VPs. The results of the seen area analysis, photo documentation, and recommended VP locations will be presented to the Recreation TWG. The goal of the meeting will be to agree on three or four VPs to be used for photo simulation development. The selected VPs will be considered representative of the potential visual impact of the project features.

Subtask 2 will begin following the completion of Subtask 1 and will take one month to complete.

Subtask 3: Visual Simulation

ArcInfo will be used to model the visibility from the selected VPs of all the Project features listed in Section 1.1.2 above, except for Slab Creek Reservoir.. The ArcInfo output will be three-dimensional mesh images of the simulated terrain and project features seen from the VP camera locations (an example of the output is shown at the bottom of the figure shown below). Project features modeled will be shown in separate colors so they can be distinguished. This three dimensional imaging can be super imposed on a camera view from the VP to show the degree of visibility of the Project. The ArcInfo 3-dimensional modeling will accurately locate and scale the Project features to the camera view. This information will portray what portion of Project features would be visible from a viewpoint, and give the general shape or form of the feature. From this information it can be determined which viewpoints would be significantly affected by the Project. This information would be presented to the ENF Landscape Architect for approval.

For Slab Creek Reservoir, the range of reservoir fluctuation that could occur under Project operations will be documented photographically and not modeled in ArcInfo.

Subtask 3 will begin when the VPs have been approved by the ENF Landscape Architect. This task will take one month to complete. The results of Subtask 3 will be presented to the ENF Landscape Architect for approval. The schedule for Slab Creek may take longer and will be dependent on the Water Balance Model analysis being completed. After which, the reservoir will be photographed opportunistically as the reservoir levels of concern occur under current Project operations.

Subtask 4: Photo Simulation

For those viewpoints where the visual effect of the Project will be substantially adverse, photo simulations from the viewpoints would be developed to determine the degree of visual impact in terms of visual contrast based on form, line, color and texture. Electronic versions of viewpoint photographs will be edited using photo editing software, such as Adobe PhotoShop, to illustrate the color and texture of the features that could be seen based on the 3-dimensional modeling.

Subtask 4 will begin following the ENF Landscape Architect's approval of the Subtask 3 work. If photo simulations are needed to further analyze the Project affects, the production of each simulation will be one to two weeks per simulation.

Subtask 5: Community Outreach

During the preparation of the photo simulations under Subtask 4, SMUD will begin community outreach regarding the visual effect of the Project. SMUD will publish articles or notices in local newspapers, such as the "Mosquito Byte" for the Swansborough subdivision, and post notices on site. The notices will describe the visual study and invite interested parties to participate in a community open house(s) about the visual effect of the Project. The meeting would be held after the photo simulations have been completed and reviewed by the TWG. At the open house(s) the study methodology and results will be presented and discussed. A summary of the public feedback and any further actions on the study as a result of the community outreach open house(s) will be presented to the TWG for discussion of further actions.

Subtask 5 will begin approximately one month prior to the completion of Subtask 4. Public notices would be physically posted at least 2 weeks before, and published in local newspapers within 7 to 14 days before, the date of each open house.

11.6.9 Analysis

The visual assessment of the Project from the VPs may identify areas where the Project features could result in substantially adverse visual effects. The degree of visual contrast will be evaluated against the applicable VQO definitions. If it is determined the Project will not meet the ENFLMP designated VQOs this will be documented and potential measures proposed that would reduce or eliminate the adverse visual effects. If a reduction of the visual quality objectives can not be mitigated, a plan amendment may be necessary.

11.6.10 Study Output

Study results will be presented to the Recreation and Aesthetics Technical Working Group (TWG) in 2004. The study output will be a written report with graphics that includes issue question(s) addressed, objectives, study area, methods, analysis, results, discussion, and conclusions. The results section of the study output will include graphics from the seen area analysis, Arc-Info 3-D modeling, viewpoint map and views, and photo simulations. The report will be prepared in a format that allows the information to be inserted directly into the Licensee's application and will include any recommended PM&Es.

11.6.11 TWG and Plenary Endorsement

The Recreation TWG endorsed an earlier version of this Study Plan on December 10, 2003 with the caveat that the Study Plan be reviewed and approved by the Eldorado National Forest (ENF) Landscape Architect and Placerville District Ranger. This version of the Study Plan reflects the comments and approval of the Study Plan by the ENF Landscape Architect and Placerville District Ranger.

The Plenary Group approved this plan on February 4, 2004. The participants at the meeting who said they could "live with" the plan were Taxpayers Association of El Dorado County, Friends of El Dorado County, USFS, American River Recreation Association & Camp Lotus, El Dorado County Water Agency, Pacific Gas & Electric Company, SMUD, El Dorado County, El Dorado Irrigation District, NPS, SWRCB, USBLM, City of Sacramento, CDFG, and FOR. None of the participants at the meeting said they could not "live with" this study plan.

11.6.12 Literature Cited

Bass, R, Herson, A., Bogdan, K. 1999. CEQA Dekbook. A step-by-step guide on how to comply with the California Environmental Quality Act. Solano Press Books, Point Arena, California.

Goodavish, M. Draft EIS, Visual Resource Report, South Lindenberg Timber Sale EIS, Tongass National Forest, Contract No. 53-0109-3-00382. Prepared by EA Engineering, Science, and Technology, Lafayette, California for the Tongass National Forest, Petersburg Ranger District. May 1996.

SMUD. 2003a. Iowa Hill Pumped Storage Development Project Description, Draft Revision 1. November 2003.

SMUD. 2003b. Upper American River Project, FERC Project No. 2101. Scoping Document 1 and Notice of Preparation. August 8, 2003.

USDA (United States Department of Agriculture) Forest Service. 1988. Eldorado National Forest. Land and resource management plan. USDA Forest Service, Pacific Southwest Region, San Francisco, CA.

USDA Forest Service. 1974. National Forest Landscape Management, Volume 2, Chapter 1, The Visual Management System, Agriculture Handbook Number 462.

Example Figure.
ArcInfo Seen Area Analysis and Three Dimensional Modeling From the South Lindenberg Timber Sale EIS.