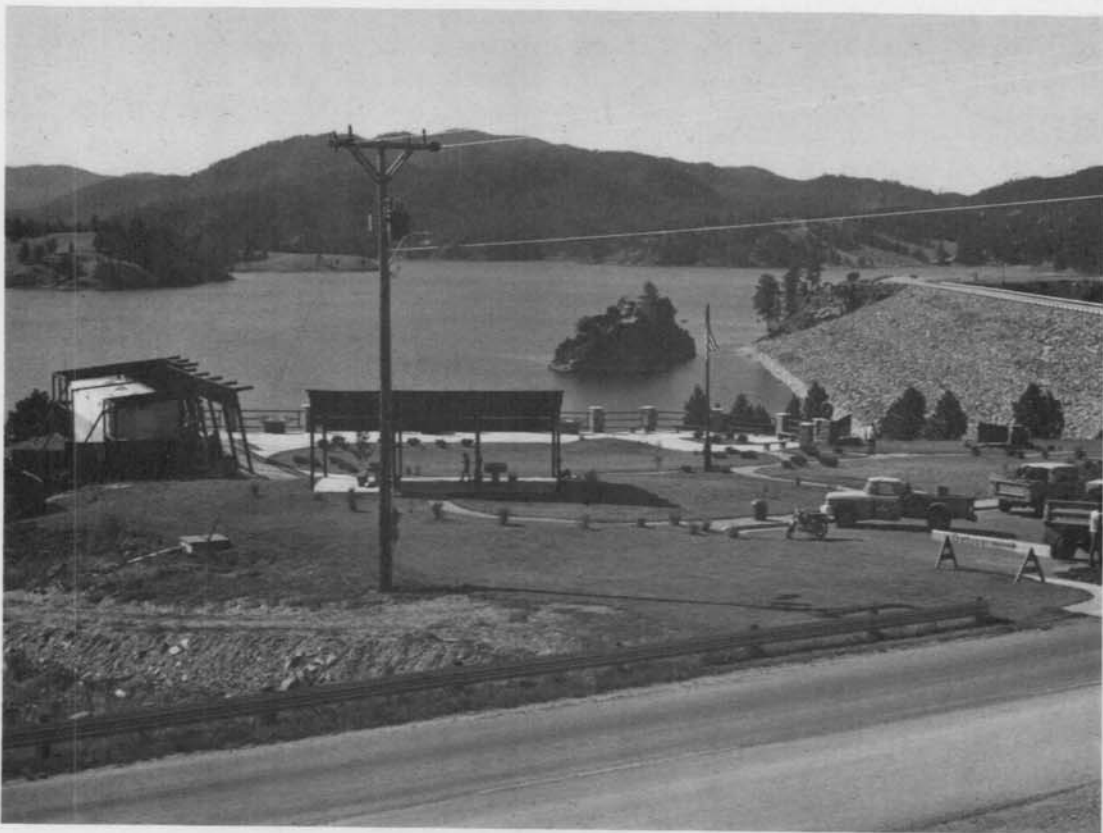


United States Department of the Interior, Bureau of Reclamation

# IRRIGATION OPERATION AND MAINTENANCE

BULLETIN NO. 68

April, May, June 1969



**In This Issue:**

**An Improved Appearance Program**

The Irrigation Operation and Maintenance bulletin is published quarterly, for the benefit of irrigation project people. Its principal purpose is to serve as a medium of exchanging operation and maintenance information. It is hoped that the material herein, prepared specifically for this bulletin by the Office of Chief Engineer, will show that significant accomplishments have been made resulting from the implementation of the Improved Appearance Criteria in design, construction, and operation and maintenance programs,

\* \* \* \* \*

Division of Irrigation Operations  
Office of Chief Engineer  
Denver, Colorado



COVER PHOTOGRAPH:

This shows the National Forest Service visitation center near the right abutment of Pactola Dam and Reservoir constructed by the Bureau of Reclamation in the Black Hills of South Dakota.

Photo CP-494-64050

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
DIVISION OF IRRIGATION OPERATIONS  
Denver, Colorado 80225

IRRIGATION O&M BULLETIN NO. 68  
April, May, June 1969

CONTENTS

	<u>Page</u>
AN IMPROVED APPEARANCE PROGRAM	
Introduction .....	1
Accomplishments .....	1
Headquarters and Storage Areas .....	1
Construction Scars .....	7
Vista Houses, Shelters, and Picnic Facilities .....	11
Helpful Assistance .....	11
Guidelines .....	20
Buildings .....	20
Road Structures .....	20
Utility Structures .....	24
Hydraulic Structures .....	24
Power Structures .....	24
Fish Structures .....	26
Informational Structures .....	26
Water-oriented Structures .....	26
Landscaping .....	26
Construction Areas .....	27
Paint .....	28

## AN IMPROVED APPEARANCE PROGRAM

### Introduction

The one aim in the improvement of a project's appearance should be the preservation of the natural beauty of the community and locale in which the works are situated so as to enhance the enjoyment thereof by the public.

Enhancement and protection of the natural beauty of areas surrounding our projects have always been an integral part of the Bureau of Reclamation activities. However, inception of the Federal Government's "Improved Appearance Program" has added new interest and encouragement for those who were not impressed with the need and importance of stressing this phase of the reclamation program. Consideration of aesthetics as well as functional use of project facilities now is made as a matter of routine, rather than through special effort.

In addition, a general cleanup, fixup, paintup campaign is in progress on many previously constructed projects. Much of this is being done as routine maintenance with but little if any additional cost. To report what is being done and suggestions that may be of use to others in their efforts to improve appearances of their facilities is the purpose of this issue of the bulletin.

### Accomplishments

#### Headquarters and Storage Areas

Weed control, landscaping, and general cleanup of storage yards and service areas alone has greatly enhanced the appearance of many of our project facilities. Buildings, including residences as well as offices, are being repaired and painted with emphasis on pleasing appearance and blending with surroundings. As a bonus on one project, 19 tons of unsightly scrap iron and old batteries were removed and sold from a storage yard.

Many unsightly buildings left from construction activities have been removed or remodeled and painted. Photograph 1 is a view of a building that was used as a generator building at Hungry Horse Government Camp during preconstruction, and Photograph 2 shows the same much improved area, after the generator building had been torn down and the area leveled. The original warehouse along a railroad siding at Black Canyon Reservoir, Photograph 3, seldom was used to receive shipments after construction in the area was completed and was in need of major repairs. It had become a catch-all, and was also an eyesore. With a new warehouse near the dam and powerplant, the railroad warehouse was declared surplus and advertised for sale. When no bids were received, the irrigation district removed it for salvage materials. The improved appearance

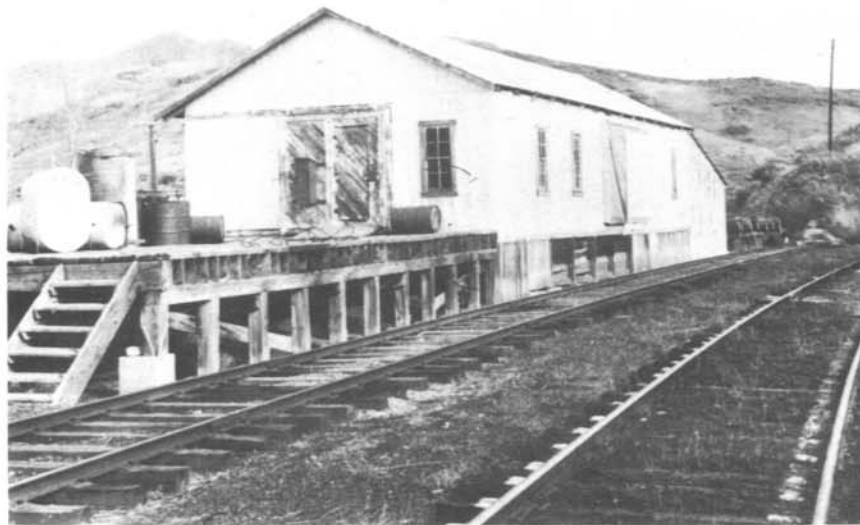


Photograph 1 - P447-D-64048



Photograph 2 - P447-D-64049

of the area after removal of the warehouse is shown in Photograph 4.



Photograph 3 - P3-D-64038



Photograph 4 - P3-D-64039



Photograph 5 - P17-D-64040



Photograph 6 - P17-D-64041

Damtender and ditchrider residences and headquarter areas in particular have been repaired, repainted, and otherwise improved. Photographs 5 and 6 show the same area before and after the foundation of a house at Minidoka Dam had been removed and the area made ready for grass seeding.





Photograph 7 - CP469-D-64064



Photograph 8 - CP469-D-64065

In addition to the adjacent yards and storage areas, Photographs 7 and 8 show the same area much improved, after an old fence was taken down and a new chain link fence erected on the street side entrance to the Bureau warehouse and laboratory facilities at Huron, South Dakota.

Modern sheet metal buildings have been found economical for replacement of old wooden structures and these can be easily blended with natural features in the area. Inexpensive landscaping is possible because of the low profile of these metal structures.



Photographs 9 and 10, illustrate appearance improvement made by rehabilitating the pumphouse at Drainage Pumping Plant "C" on the Klamath Project. The upper photograph shows an unsightly structure badly in need of maintenance. The lower photograph shows the pump- ing plant with its appearance and aesthetics of the area greatly improved.



Photograph 9 - P12-D-64044



Photograph 10 - P12-D-64045

## Construction Scars

Construction scars have been removed around many structures and reservoirs have been cleared of tree trunks with pleasing results. Photographs 11 and 12 are of an area before and after the work was done.



Photograph 11 - CP33-D-64036



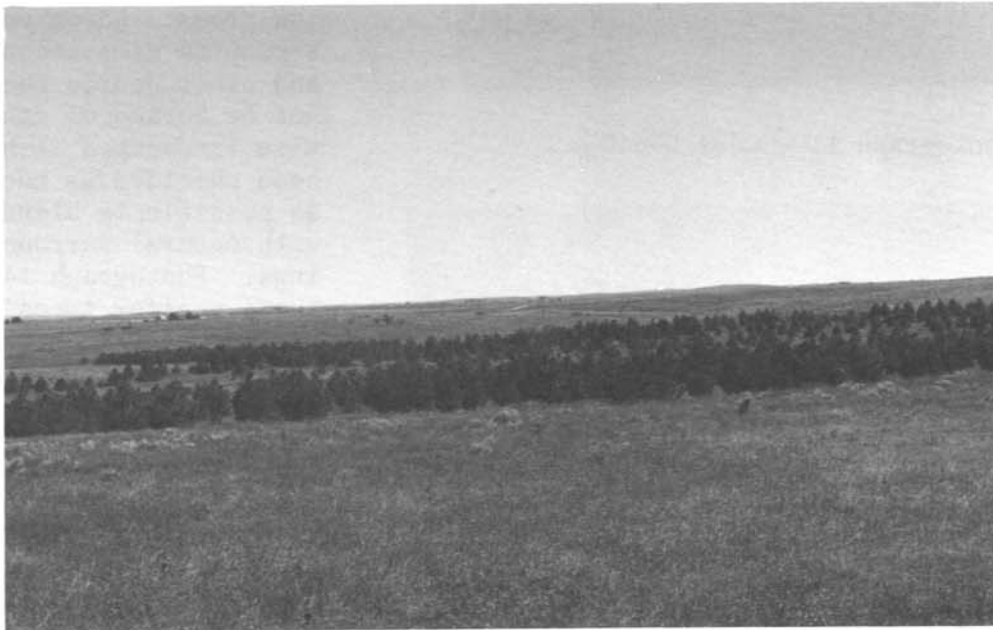
Photograph 12 - CP33-D-64037

On one large canal a spoil pile, Photograph 13, will be sold and removed for aesthetic improvement. Removal of the spoil pile will greatly improve the appearance of the canal bank and adjacent area.

Borrow areas have been filled and landscaped with plantings of grass and trees, the placement of native rock, and the draining of low areas. Where construction excavation and other debris cannot be buried or otherwise landscaped it has been shielded as much as possible to blend with natural surroundings. Photograph 14, shows conifer trees planted on the north side of Angostura Reservoir, in South Dakota. Planting and maintenance is by the South Dakota Game, Fish and Parks Department which administers the lands for recreation and wildlife. Photograph 15, shows how alfalfa and grass have restored and enhanced the beauty of the unlined auxiliary spillway for the James Diversion Dam, and will minimize water erosion and provide wildlife habitat.



Photograph 13 - CP454-D-64067



Photograph 14 - P454-D-64066

Seeding and sodding with native grasses, shrubs, etc., in some areas, can be an inexpensive and easily accomplished manner of quickly improving appearance.

Photograph 16 looking upstream on the Contra Costa Canal, at Tracy, California, illustrates a typical cooperative landscaping program. On adjacent property, owners were granted permission to plant and maintain

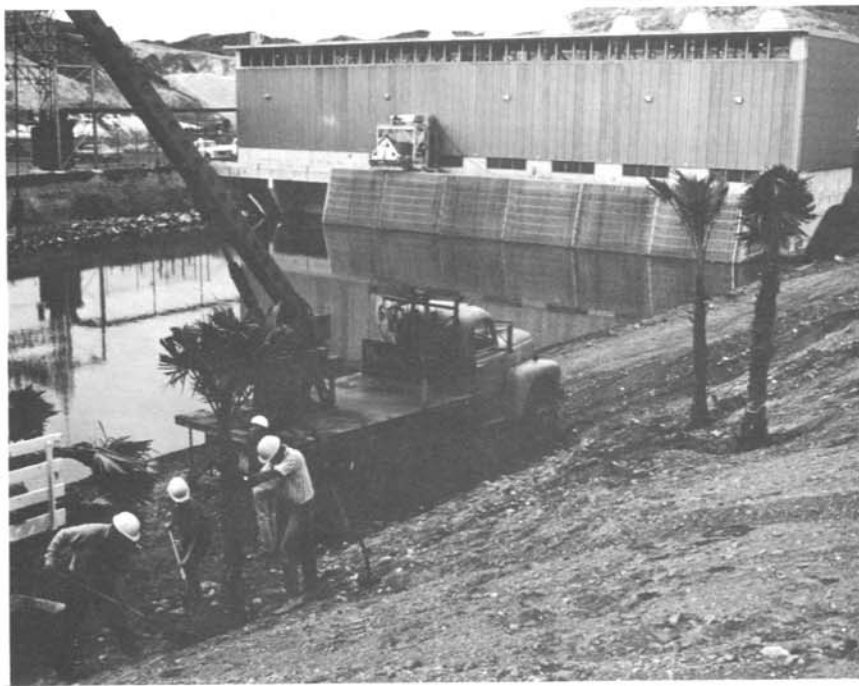


Photograph 15 - CP660-D-64053



Photograph 16 - CP285-D-64054

shrubs on the canal embankment. Photograph 17 shows workman landscaping channel banks between the Colorado River and Senator Wash Pumping-Generating Plant and Photographs 18 and 19, show evergreen tree plantings along the driveway entrance to the Watertown Substation and Watertown Power System Operations Office area at Watertown, South Dakota. One region has used the practice of sodding and seeding extensively to restore retired farmland, borrow areas, waste disposal areas, and to cover downstream slopes of dams and the slopes of embankments.



Photograph 17 - CP57-D-64062



Photograph 18 - CP466-D-64063



Photograph 19 - CP466-D-64051

Vista Houses, Shelters, and Recreation Facilities

Shelter and picnic facilities can be provided at natural vista points, Photograph 20 is a view of the Judge Carr Memorial Terrace, at Whiskeytown Dam, Central Valley Project, Sacramento, California. An original wooden pit-toilet used by tourists and



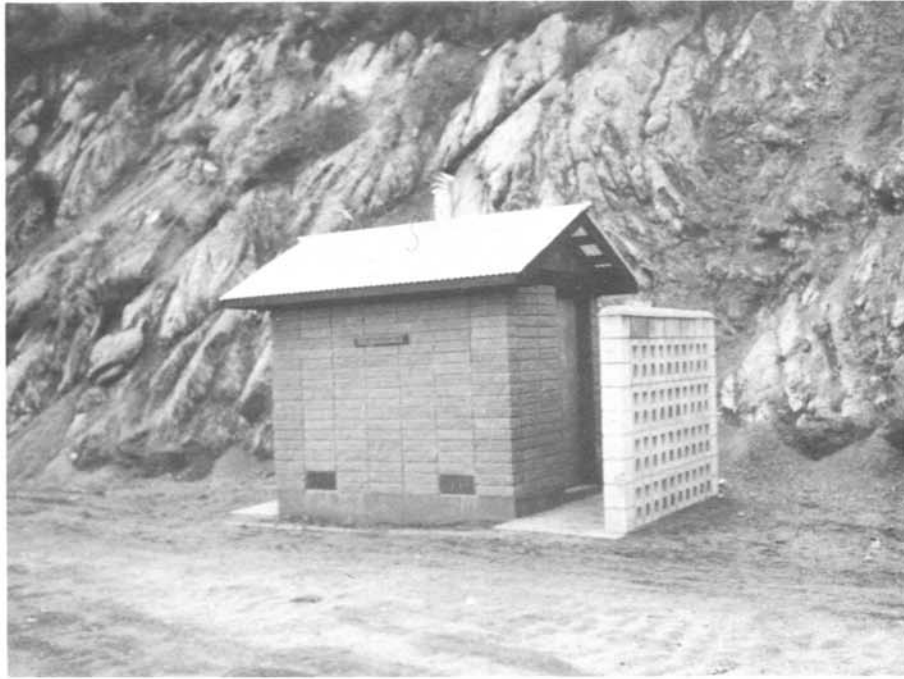
Photograph 20 - CP285-D-64052

fishermen in the vicinity of a dam, had deteriorated beyond economical and logical repair, and was replaced by the more durable and attractive facility shown in Photograph 21.

Helpful Assistance

In some areas the assignment of Job Corps personnel to improved appearance work has been possible and has been a most worthwhile and constructive way of employing these people, where practical travel distances from their



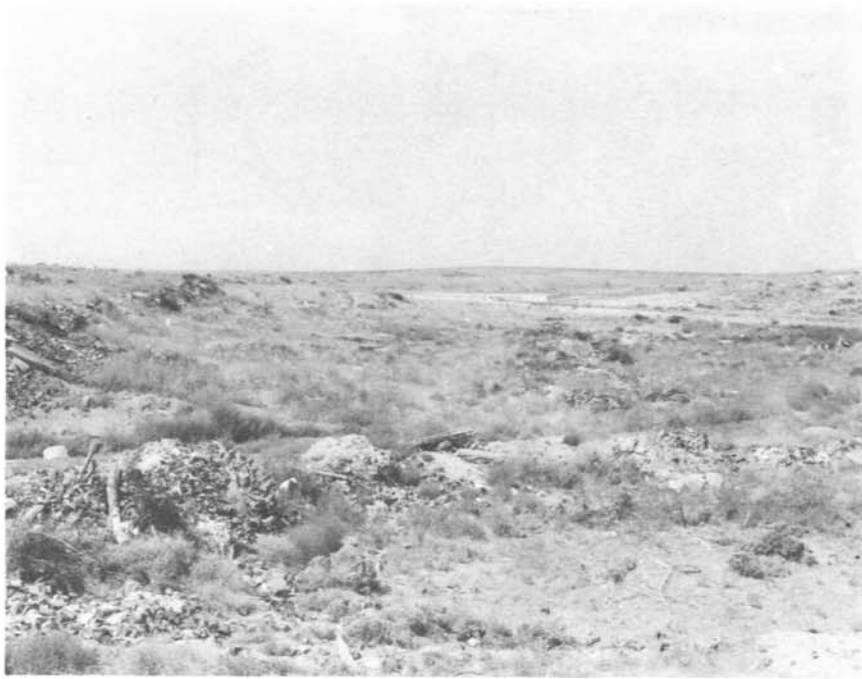


Photograph 21 - P4-102-923

camps permit. As an example, an embankment had gradually deteriorated since the days it was a CCC Camp. This was a natural for a nearby Job Corps Camp to develop as a recreation area and certainly an outstanding beautification program. Reclamation officials recommended the piping of a lateral through the area and steepening the slope of the shoreline with the National Park Service being responsible for the overall and detail plans for the area. Brush was cleaned away from the shoreline, slope of shoreline steepened and sanded, and a new concrete boat ramp constructed. This now will be one of the most improved and outstanding developments in this area.

On many of our projects the interest of the employees living in the camps and administrative areas has contributed to the development of some very beautiful surrounding areas. Beautification Committees of many communities also have played an important part in assisting us in the planning and accomplishment of improved appearance programs where project facilities have become an integral part of the community area or that adjacent to or surrounding it. Photograph 22 shows trash and junk strewn on public land within boundaries of an irrigation district. Photograph 23 shows the same area after trash had been buried and area seeded to crested wheat grass. The appearance of the site of a trash dump on another project, Photograph 24, was improved considerably after it was cleaned and leveled as shown in Photograph 25. These same committees and others have installed new informational signs, planted shrubbery, installed flagstone paving in areas of constant use instead of concrete walks, and have undertaken rather extensive improvement of





Photograph 22 - P17-D-64042



Photograph 23 - P17-D-64043



Photograph 24 - P222-D-64046



Photograph 25 - P222-D-64047



Photograph 26 - CP57-D-64060

canal headwork and other similar sites for parks and recreation areas, as shown in Photographs 26, 27, 28, and 29.



Photograph 27 - CP57-D-64061

A particularly impressive accomplishment in many communities has been the replacement of open irrigation ditches or drains alongside streets and roads with pipe to reduce weeds, and to widen the streets to enhance these residential areas. Such an improvement is illustrated in views of an area to the west of the main entrance gate to a Bureau division headquarters. Photograph 30 is of the unsightly open drain between a chain link security fence and the road. Photograph 31 shows the improved appearance resulting from the elimination of the open drain. Beefwood trees will be planted adjacent to the



Photograph 28 - P699-D-64055



Photograph 29 - CP699-D-64056



Photograph 30 - CP214-D-64025



Photograph 31 - CP214-D-64023



Photograph 32 - P214-D-64022

directional and informational signs with more emphasis towards eye appeal and color are evident. Contacts can be made with historical societies, county recreation committees or groups, or even county administrative organizations for cooperation.

The Bureau of Reclamation has received many favorable comments from the general public on aesthetic improvements made as a direct result of the implementation of the Improved Appearance Program.

fence to further improve the appearance of the area. Photograph 32 shows another similar area with a few of some 600 one-year-old beefwood trees that had been planted. The trees serve both as a windbreak and a screen planting. Note the use of lath and chicken wire to protect the young trees from rabbits, and the shingles to provide wind protection.

Industry also has cooperated. One lumber company suspended use of their sawdust burner, Photographs 33 and 34, eliminating smoke and sawdust problems. The company now hauls the sawdust elsewhere by truck for disposal and tourists no longer must see a cloud of smoke in viewing Grand Coulee Dam.

Help from some states adjacent to highways is developing. Many states are very conscious of the need for beautification. Development of these viewpoints towards



Photograph 33 - P222-D-64029



Photograph 34 - P222-D-64030



## Guidelines

As a general rule for improved appearance, manmade structures should blend and harmonize with their environment. The suggestions presented here are intended to be used as guidelines in this effort for different type facilities.

### Buildings

For sun shelters, visitor centers, comfort stations maintenance buildings, administrative quarters, entrance stations, substation buildings and powerplants, including the interior, fixtures and equipment, employ low profile structures generally using native structural and/or finish materials whenever possible. Repaint buildings when called for in maintenance schedules using architecturally approved color schemes. Use earth tones for this work rather than pastels, as the former generally assist in harmonizing with natural environments. Avoid harsh lighting.

Design buildings to fit the ground rather than shaping the ground to fit the building. Avoid locations that silhouette the structures on the skyline. The pumphouse shown in Photographs 35 and 36 was designed to be mostly underground when completed so as not to restrict the view of surrounding area from a nearby highway.

Picnic shelters, Job Corps buildings, and similar structures should be properly oriented for sun and wind protection and colored to harmonize with the environment. Plant around the structure to provide transition in form between the structure and the ground and to provide shade. Design structures to fit the ground rather than shape the ground to fit the structure.

### Road Structures

The suggestions under this topic apply equally well to parking areas, substation paved areas, maintenance areas, foot and vehicular bridges, highways, access roads, scenic roads, and vista point turnouts. Carefully locate road grades and alignments to follow the contour of the land whenever possible. Minimize cuts and fills. Employ Bureau of Public Roads grade and landscape standards. Provide turnouts and overlooks which incorporate safety with excellence of views.

Control contractor removal and disposal of vegetative cover. Require repairs of damage and scars to natural roadside features. Spoil piles west of a switchyard and under 230-kilovolt transmission line on right of way, Photograph 37, were leveled and seeded with grass as in Photograph 38. Replace topsoil in borrow areas, leaving it smooth and even, and blending it with the terrain. Seed exposed cuts and fills, or provide suitable low-growing cover, and provide adequate drainage.



Photograph 35 - P222-D-64031



Photograph 36 - P222-D-64032



Photograph 37 - P447-D-64033



Photograph 38 - P447-D-64034

Obliterate temporary roads by restoring to the original slopes. Round the tops of slopes and reseed or plant ground cover where possible, replacing trees and shrubs along the right-of-way. Clean up approach roads, reshape existing low-standard roads, and provide proper drainage. Remove weeds and resurface roads where necessary.

Design bridges to blend with other facilities and the environment. If possible keep bridge rails or parapet walls below eye level of automobile passengers, permitting unobstructed vision. Paint bridges earth tone colors.

The road as shown in Photograph 39 presents a very pleasing appearance. This was accomplished by relocation of a powerline. The powerline was relocated parallel to highway but at a higher elevation.

Where highways are to be relocated in conjunction with other agencies, the Bureau of Reclamation now requires that the Chief Engineer be advised in the early stages of negotiations as to what specific measures are being proposed for the improvement of appearance of the relocated facilities together with the estimated amount such measures will add to the cost of the relocated project.



Photograph 39 - P569-D-64035

### Utility Structures

Locate, design, and color pumphouses and water and sewage treatment plants to recede into their surroundings. Use adequate screening and control spray field or other effluent outfall to avoid watershed contamination. These suggestions include water and sewage treatment plants, oxidation ponds, lift stations, incinerators, and maintenance and chlorinator buildings.

Maintain oxidation ponds devoid of plant material at flow line, screen and properly fence these ponds from public view, install sewage lift stations in underground vaults where possible, and screen with plant material when above ground. Locate incinerators unobtrusively but generally related to maintenance facilities. Maintenance buildings should be painted with earth colored paints and the present extensive use of aluminum pigments minimized.

### Hydraulic Structures

There are innumerable ways to improve the appearance of dams, pumping stations, penstocks, surge tanks, canals, storage ponds, detention reservoirs, spillways, diversion tunnels, siltation ponds, boat docks, boat harbors, water storage tanks, siphons, levees, existing waste banks, and like facilities. Modify external appearance of dams and powerplants; i.e., texture and finish, by seeding and planting shallow-rooted shrubbery on downstream slopes of earth-fill dams in those areas where such treatment can be applied with satisfactory results. Canal treatment should include acquisition of additional right-of-way for proper excess material disposal and consider bankline treatment and waste disposal in low areas or on hillsides where the line of the hill may be smoothly extended on lower cost right-of-way. Planting and seeding of slopes, flattening canal wastebank slopes as they approach highways, rounding inside and outside top edges, and seeding for erosion control will enhance appearance.

Penstocks, surge tanks, pumping stations, water storage tanks, etc., should receive paints having earth colors that will blend with the adjacent terrain.

Ponds and reservoirs should be maintained debris and litter free. Access should be managed to preserve scenic and recreation values, siltation ponds should be planned for and converted to recreation use upon completion of their function, boat docks and harbors should be functionally and aesthetically located, designed to avoid debris accumulations related to shoreline development.

### Power Structures

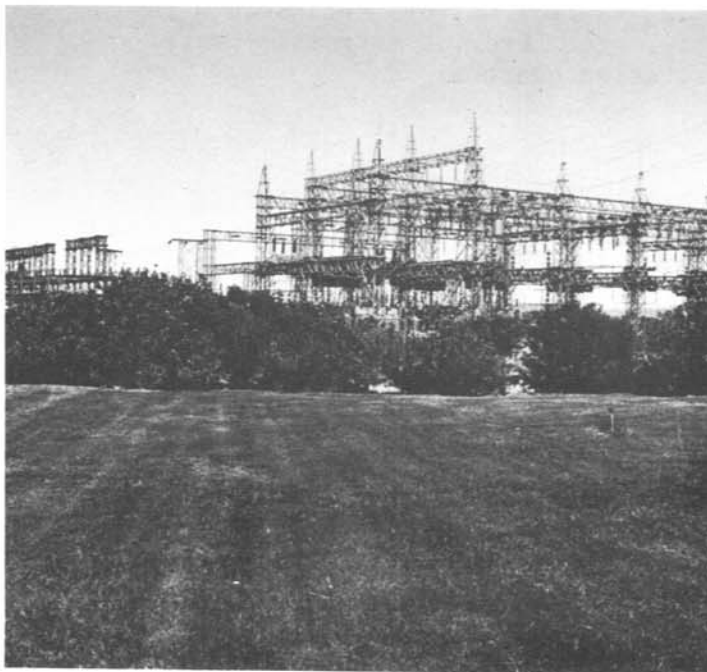
Transmission lines should follow contours when possible. Structures can be screened with trees, ground rises, and evergreen shrubs on rights-of-way at highway intersections or in recreation areas. Consider the use of underground powerlines in recreation

areas or in areas of outstanding view. Where needed, plant growth should be controlled with selective herbicides. Work with nature in determining locations and locate alignments diagonally across a wooded hill. Over unforested areas no special treatment is needed. Consider either widely separated or parallel location of new lines. Use common corridors.

Completely avoid location of transmission lines in major areas of high amenity value even if a longer route results. Other things being equal, choose the most direct route, reduce angle towers, use tree and hill backgrounds in preference to sky backgrounds, cross ridges in a saddle, but otherwise use the ridge as an opaque background. Prefer moderately open valleys with woods where tower height is reduced and view of lines are broken by trees. Avoid existing or proposed interstate highways or state primary highways. Use self-supporting steel towers for approach spans and where it would improve overall appearances.

During construction of transmission lines, confine contractors to designated access roads, such as those that eventually will be required for operation and maintenance. Avoid linear clearing, blend clearing with the topography, and reseed scars.

When line replacement is necessary, remove or camouflage unneeded foundations. Avoid views of installations from principal highways. Remove cut timber and slash from right-of-way; develop and use new tower configurations such as with tubular steel or pre-stressed concrete poles. When feasible use stand-off insulators in lieu of crossarms and strings of insulators.



Photograph 40 - CP214-D-64026

Switchyards and substations should be tastefully screened with trees and shrubs such as that shown in Photograph 40, with the objective of visually breaking up the installation rather than solidly screening it. Select locations away from areas of public travel wherever possible, considering both basic function for power delivery and the avoidance of obstructing public view toward scenic or recreation areas. Replace wood poles with simplified steel structures where both exist. Reduce



the busy appearance of the installation by not employing multi-membered trusses. Provide screening panels, reduce silhouettes, simplify incoming and outgoing transmission line arrangements, and use color coding to set off the features of the installation. Improve yard surfaces and repair eroded cut and fill banks. Avoid harsh lighting.

### Fish Structures

Provide an attractive, well-landscaped setting for the fish facility such as fish hatchery, ladders, laboratories, maintenance facilities, and their administrative quarters. Design circulation to properly separate fish truck movements from visitors and permit visitors ample room to view operations. Provide adequate safety protection to visitors and operators. Properly relate facilities to other adjacent recreation facilities. Provide adequate visitor parking facilities, well separated from the fish installation.

### Informational Structures

Develop an interpretive program in conjunction with improved appearance effort to provide the public with educational information regarding the construction, operation, purpose, and function of our projects and facilities. This applies to signs, interpretive facilities, and flags. Signs should be designed to blend in and harmonize with buildings in the locality and the landscape. Avoid stereotyped patterns for sign designs. Provide roadside turnouts, landscaping protective railing where needed, and interpretive facilities, i.e., dioramas, aluminum relief descriptions mounted on pedestals, scale models, visitor centers with sequential pictures of the construction story, etc. Provide attractive settings for flagpoles near administrative quarters.

### Water-oriented Structures

Provide finished structures, well landscaped, but of simplified maintenance for boat storage and other water-oriented buildings along the shoreline. Provide adequate shoreline protection from water and wind erosion.

### Landscaping

Provide sound land use and proper site planning including drainage, recognition of the land forms and natural features, safe and simplified road circulation, proper utility locations and screening, all with the objective of presenting a functional installation in a pleasing setting. Reseed scarred areas, plant trees and shrubs to further improve appearance.

Consider the use of approved plant materials that can withstand periodic inundation in mudflats of reservoir shorelines exposed by annual drawdowns. To prevent wind erosion, use windbreaks utilizing conifers and evergreens. Use trees and shrubs to break



up large parking areas. Plant with native plant materials where semiarid conditions exist. Dispose of or conceal waste materials. Use good ground cover on areas too steep or shady for lawns. Plant shrubs and trees which provide food and cover for wildlife and avoid unnecessary drainage of marshes and swamps.

Design fences to compliment the landscape, avoiding the use of chain link and other steel fence when possible. Provide proper pruning of plants along trail roads and in other public-use areas. Remove dead or diseased plant material. Use controlled grazing. If farming is permitted, use contour farming, diversion terraces, strip cropping, grassed waterways, crop rotation.

#### Construction Areas

This topic includes borrow areas, construction camps, quarry sites, construction sites, roads, etc. Areas cleared for construction should be kept to a minimum compatible with safe construction and installation requirements. Clearing and grubbing should consist of clearing the designated areas of all trees, down timber, snags, brush, and other vegetation, rubbish and all other objectionable material, and should include grubbing stumps, roots, and matted roots, and disposing of all spoils material resulting from the clearing and grubbing. Prune damaged tree limbs and paint pruned surface black to prevent insect infestation.

Within the construction right-of-way, fence off localized areas where trees, rocks, outcroppings, and other natural features fall within the right-of-way and must be preserved to minimize the damage to natural features. Obliterate equipment tracks and other construction marks by handraking, brooming, or other satisfactory methods. Where applicable, plant materials including trees, shrubs, ground cover, and other vegetation should be replaced at the contractor's expense.

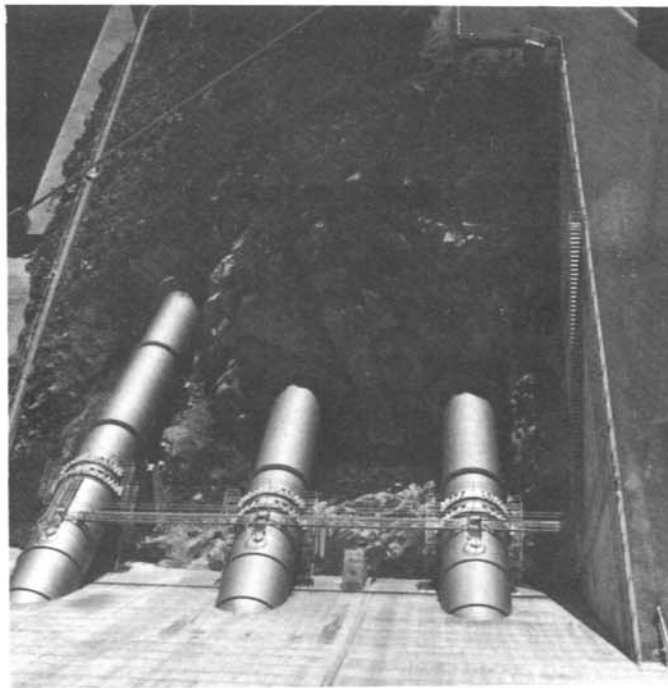
During construction require spark arrestors in areas of potential forest or grassfire hazard. Adjust all ground surfaces to fit new construction within the site limits and provide adequate nonerosive area drainage. Scatter excavated rock over adjacent terrain rather than leaving a windrow along the trench. Construction campsites should be restored as nearly as possible to their original condition and character. Require the contractor to dismantle and remove all abandoned or useless equipment, supplies, and personal property. Restore old road alinements to original ground forms, remove drainage structures, and restore natural drainage.

Quarries or other rock excavations should be controlled to present a neat appearance. Methods such as presplitting should be employed. Loose rock should be scaled off and consideration given to controlling erosion of shale banks.

## Paint

Paint can quickly change the appearance of any structure and with the use of the right shades and colors, a most pleasing appearance can be the result. Routine maintenance, such as painting, need not be considered extra expense. More frequently than one would think a change in color alone can accomplish wonders when the routine maintenance painting job is being done.

The pumping plant on the Arbuckle Project in Oklahoma was designed and built to present an attractive appearance. This appearance also was greatly enhanced by the color of paint used. The plant was painted a cream-beige color with olive-green trim and enclosed with a chain link fence. With the green seeded slope of Arbuckle Dam as a background, the plant presents a very pleasant appearance.



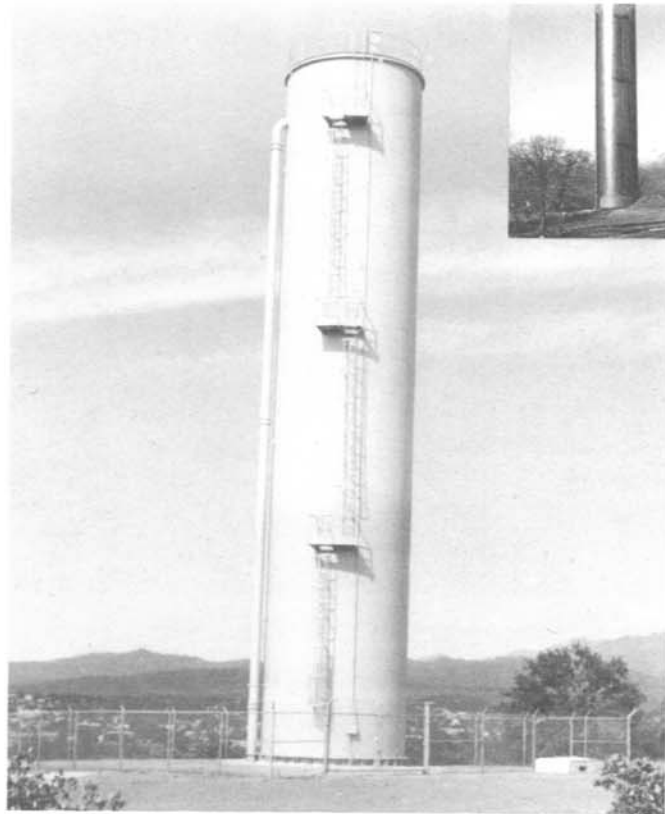
Photograph 41 - CP485-D-64057

The exposed penstock sections shown in Photograph 41, are painted a metallic green instead of the customary aluminum. Many favorable comments have been received from the general public.

Two large water tanks shown in Photograph 42, were painted a light pastel color to help blend into their surroundings. Photograph 43, shows a view of a surge tank located on the bluffs above one of our western cities. The tank, 20 feet in diameter by 110 feet high was primed with red lead in preparation for the aluminum color usually specified. Comments by local residents resulted in the tank being painted with three shades of blue which become progressively lighter towards the top of the tank.



Photograph 42 - CP485-D-64058



Photograph 43 - CP859-D-64059

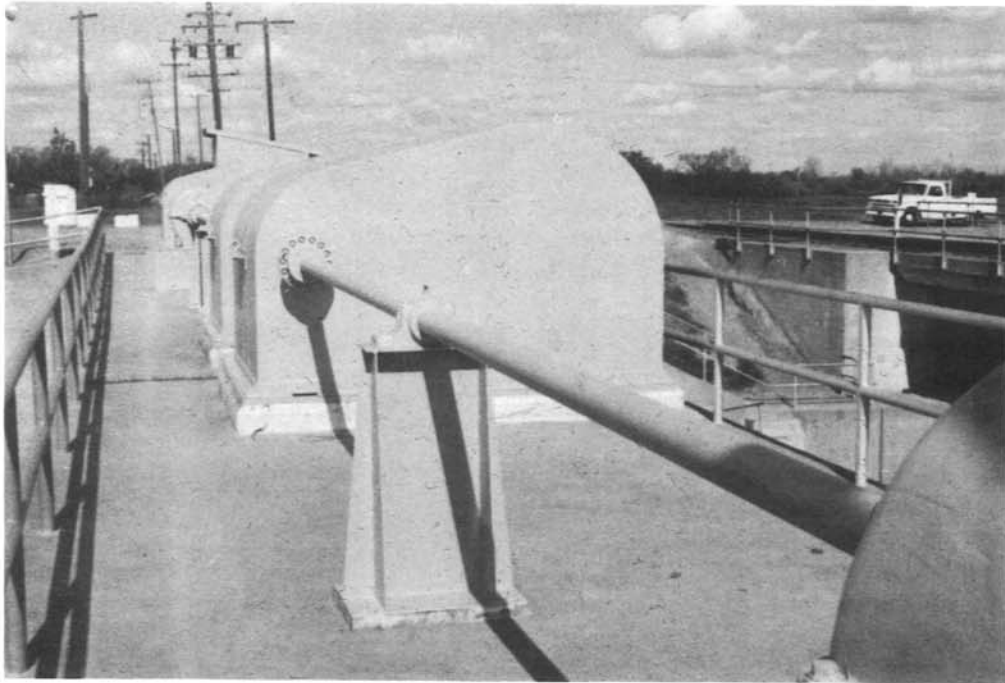
Photographs 44, 45, and 46, show a floodgate structure deck. They are shown to illustrate the color scheme used to paint the cable drum covers, railing, light standards, and other features. A light pastel green or aqua color was used for the cable drum covers. The railing and light standards were painted an old rose. This color scheme is to be used when equipment, structures, buildings, and related facilities at this particular facility require repainting.

Use less drab, uninteresting aluminum and light pearl gray colors and more livelier colors for locations such as those described above. Focal safety yellow, strange greens, russets, grayed blues, browns, white, black, etc., are suggested. The appearance of metal parts, buildings, and machinery for an entire canal and reservoir system can be given a big lift by routinely repainting with an attractive color scheme.

A side benefit to the use of the pastel shades of paint is the reduction of eye strain caused by the glare of the sunlight shining on a standard aluminum color.



Photograph 44 - CP214-D-64024



Photograph 45 - CP124-D-64028



Photograph 46 - CP214-D-64027

The Bureau stands ready to assist in choosing the proper coating materials and in developing appropriate color designs. Also, 3- by 5-inch color chips of Federal Standard No. 595 are available in complete sets at a price of \$15.00 from G.S.A. Business Service Center, Region 3, Washington, D.C. 20407. Smaller chips 1 inch by 1 inch square are available at \$2.25 a set.

\* \* \* \* \*