



**COLORADO**  
**Division of Water Resources**  
Department of Natural Resources  
Dam Safety

September 9, 2019

David Kuntz  
Overland Ditch & Reservoir Company  
28444 Redlands Mesa Road  
Hotchkiss, CO 81419  
[overlandditch@gmail.com](mailto:overlandditch@gmail.com)

VIA EMAIL

When replying, please refer to:  
**OVERLAND #1 DAM, DAMID 400422**  
**Water Division 4, Water District 40**

**SUBJECT:** Engineer's Inspection Report

Dear Mr. Kuntz,

On July 25, 2019, our office inspected Overland #1 Dam in accordance with Section 37-87-107 of the Colorado Revised Statutes, which assigns the State Engineer responsibility to determine the amount of water which is safe to impound in the reservoirs of all dams in the state of Colorado. Enclosed is a copy of the Engineer's Inspection Report for your use, which includes an owner's signature block on page 3 to acknowledge your receipt of the report. Please sign the signature page and return a copy to the Division 4 office via mail or email.

Conditions observed during the dam safety inspection resulted in an overall rating of Conditionally Satisfactory with a recommended safe storage level of *Conditional Full Storage*, indicating that the dam may be used to full capacity provided certain conditions are met. Specifically, the maintenance, repair, and/or monitoring items listed on page 3 of the inspection report are actions required to improve the safety of the dam.

If you have any questions concerning this inspection report or any other dam safety related matters, please do not hesitate to contact me in the Montrose office at (970) 249-6622.

Sincerely,



Jason Ward, PhD, PE  
Dam Safety Engineer

Enc: Engineer's Inspection Report

ec: Bill McCormick, Chief, Colorado Dam Safety  
Doug Christner, District 40 Water Commissioner  
Bruce Marvin, Western Engineers, [westeng23@gmail.com](mailto:westeng23@gmail.com)



# ENGINEER'S INSPECTION REPORT

INSPECTOR: JPW

OFFICE OF THE STATE ENGINEER - DIVISION OF WATER RESOURCES - DAM SAFETY BRANCH

1313 SHERMAN STREET, ROOM 818, DENVER, CO 80203, (303) 866-3581

DAM NAME: OVERLAND #1	T: 110S R: 0920W S: 22	COUNTY: DELTA	DATE OF INSPECTION: 7/25/2019
DAM ID: 400422 YRCompl: 1987	DAM HEIGHT(FT): 60.0	SPILLWAY WIDTH(FT): 75.0	PREVIOUS INSPECTION: 7/23/2018
CLASS: High hazard	DAM LENGTH(FT): 3200.0	SPILLWAY CAPACITY(CFS): 4367.0	NORMAL STORAGE (AF): 5828.0
DIV: 4 WD: 40	CRESTWIDTH(FT): 20.0	FREEBOARD (FT): 6.0	SURFACE AREA(AC): 252.0
EAP: 8/4/2012	CRESTELEV(FT): 9897.0	DRAINAGE AREA (AC.): 6200.0	OUTLET INSPECTED: 9/4/2009

CURRENT RESTRICTION: -- NONE --

OWNER: OVERLAND DITCH & RESERVOIR COMPANY	OWNER REP.: DAVID KUNTZ
ADDRESS: 28444 REDLANDS MESA RD.	CONTACT NAME: DAVID KUNTZ
HOTCHKISS CO 81419-0000	CONTACT PHONE: (970) 640-7851X

INSPECTION PARTY : Jason Ward; Doug Christner	Shellie Gies, Wyatt Wilson	Bruce Marvin
REPRESENTING : CO Dam Safety: DWR	Owners	Owner's Engineer

FIELD CONDITIONS OBSERVED	WATER LEVEL: BELOW DAM CREST approx 7.0 FT. Below Spillway approx 1.0 FT.	GAGE ROD READING 41.25
	GROUND MOISTURE CONDITION: <input type="checkbox"/> DRY <input checked="" type="checkbox"/> WET <input type="checkbox"/> SNOWCOVER OTHER recent rain	

DIRECTIONS: MARK AN X FOR CONDITIONS FOUND AND UNDERLINE WORDS THAT APPLY

## UPSTREAM SLOPE

PROBLEMS NOTED ☒ (0) NONE ☐ (1) RIPRAP - MISSING, SPARSE, DISPLACED, WEATHERED ☐ (2) WAVE EROSION - WITH SCARPS

☐ (3) CRACKS WITH DISPLACEMENT ☐ (4) SINKHOLE ☐ (5) APPEARS TOO STEEP ☐ (6) DEPRESSIONS OR BULGES ☐ (7) SLIDES

☐ (8) CONCRETE FACING - HOLES, CRACKS, DISPLACED, UNDERMINED ☐ (9) OTHER

**Only freeboard portion of upstream slopes observed at this near full reservoir level. Riprap coverage on main portion of embankment slopes appears adequate to resist wave erosion. No signs of instability of other safety concerns on upstream slopes of both dams.**

CONDITIONS OBSERVED: ☒ Good ☐ Acceptable ☐ Poor

## CREST

PROBLEMS NOTED ☐ (10) NONE ☒ (11) RUTS OR PUDDLES ☐ (12) EROSION ☐ (13) CRACKS - WITH DISPLACEMENT ☐ (14) SINKHOLES

☐ (15) NOT WIDE ENOUGH ☐ (16) LOW AREA ☐ (17) MISALIGNMENT ☐ (18) IMPROPER SURFACE DRAINAGE ☐ (19) OTHER

### Main Dam:

**(11) Numerous ruts along far right end of dam as observed over recent past years. (11) Numerous small (12-inch diameter) to medium sized (4-ft plus) potholes periodic along main portion of embankment crest. All observed shallow (<4") and not a significant safety concern at this time. Drainage varies, but no adverse erosion paths observed.**

### Auxiliary Dam:

**Crest is rough and uneven, but generally unchanged from recent past inspections. Crest has benefitted from restricted access and Owner is encourage to keep gate closed and locked to prohibit public access.**

**Split rating with POOR conditions along right wing dike, but ACCEPTABLE conditions along main portion of both dams.**

CONDITIONS OBSERVED: ☐ Good ☒ Acceptable ☒ Poor

## DOWNSTREAM SLOPE

PROBLEMS NOTED ☐ (20) NONE ☐ (21) LIVESTOCK DAMAGE ☐ (22) EROSION OR GULLIES ☐ (23) CRACKS - WITH DISPLACEMENT ☐ (24) SINKHOLE

☐ (25) APPEARS TOO STEEP ☒ (26) DEPRESSIONS OR BULGES ☐ (27) SLIDE ☐ (28) SOFT AREAS ☐ (29) OTHER

### Main Dam:

**Good conditions observed all along Main dam downstream slope. Past surface erosion areas seemed to have self-healed and good grass cover appears to resist surface drainage erosion. Slope is uniform with near as-constructed condition.**

### Auxiliary Dam:

**Surface and slope inclination varies with few areas of bulge (26). However, all uneven areas appear historic with no evidence of movement, sloughing, cracking, or other signs of slope instability.**

CONDITIONS OBSERVED: ☒ Good ☐ Acceptable ☐ Poor

## SEEPAGE

PROBLEMS NOTED ☐ (30) NONE ☐ (31) SATURATED EMBANKMENT AREA ☐ (32) SEEPAGE EXITS ON EMBANKMENT  
☐ (33) SEEPAGE EXITS AT POINT SOURCE ☒ (34) SEEPAGE AREA AT TOE ☐ (35) FLOW ADJACENT TO OUTLET ☐ (36) SEEPAGE INCREASED / MUDDY  
DRAIN OUTFALLS SEEN ☐ No ☒ Yes Show location of drains on sketch and indicate amount and quality of discharge. ☐ (37) FLOW INCREASED / MUDDY ☐ (38) DRAIN DRY / OBSTRUCTED  
☐ (39) OTHER

### Main Dam:

**All seepage appears contained to engineered drains. No apparent free seepage on embankment slope or along toe of dam.**

### Auxiliary Dam:

**(34) Seepage appears to occur fairly consistently all along and beyond dam toe. No evidence of embankment slope seepage. Conditions appear consistent with past observations along dam toe at full or near full reservoir levels.**

CONDITIONS OBSERVED: ☐ Good ☒ Acceptable ☐ Poor

## OUTLET

PROBLEMS NOTED ☒ (40) NONE ☐ (41) NO OUTLET FOUND ☐ (42) POOR OPERATING ACCESS ☐ (43) INOPERABLE  
☐ (44) UPSTREAM OR DOWNSTREAM STRUCTURE DETERIORATED (45) OUTLET OPERATED DURING INSPECTION ☐ YES ☒ NO  
INTERIOR INSPECTED ☒ (120) NO ☐ (121) YES ☐ (46) CONDUIT DETERIORATED OR COLLAPSED ☐ (47) JOINTS DISPLACED ☐ (48) VALVE LEAKAGE  
☐ (49) OTHER

**Outlet discharging during inspection with no problems observed. No known problems with outlet works operation and performance.**

CONDITIONS OBSERVED: ☒ Good ☐ Acceptable ☐ Poor

## SPILLWAY

PROBLEMS NOTED ☐ (50) NONE ☐ (51) NO EMERGENCY SPILLWAY FOUND ☐ (52) EROSION WITH BACKCUTTING ☐ (53) CRACK - WITH DISPLACEMENT  
☐ (54) APPEARS TO BE STRUCTURALLY INADEQUATE ☐ (55) APPEARS TOO SMALL ☐ (56) INADEQUATE FREEBOARD ☐ (57) FLOW OBSTRUCTED  
☐ (58) CONCRETE DETERIORATED / UNDERMINED ☒ (59) OTHER obstructed drain

**(59) Stilling basin submerged during inspection due to obstructed drain.**

**All exposed concrete appears in acceptable condition with no obvious signs of advanced deterioration or structural instability.**

**Owner reported reservoir flowed a maximum of 0.85 ft over spillway crest sill during Spring 2019 runoff. No observed problems and flow was reportedly uniform across sill.**

**Spillway condition acceptable, but repair of obstructed stilling basin drain judged as a critical maintenance item for the spillway to remain in a safe condition.**

CONDITIONS OBSERVED: ☐ Good ☒ Acceptable ☐ Poor

## MONITORING

EXISTING INSTRUMENTATION FOUND ☐ (110) NONE ☒ (111) GAGE ROD ☒ (112) PIEZOMETERS ☐ (113) SEEPAGE WEIRS / FLUMES  
☒ (114) SURVEY MONUMENTS ☒ (115) OTHER drain outfalls

MONITORING OF INSTRUMENTATION ☒ (116) NO ☐ (117) YES PERIODIC INSPECTIONS BY: ☒ (118) OWNER ☐ (119) ENGINEER

**(111) Upper end of gage rod exposed at this near full reservoir level appears acceptable. However, known skewed and disconnected portions at lower levels. Gage rod accuracy is in question and labeling varies in condition.**

**(112)(115) Piezometer and seepage monitoring reportedly occurring periodically, but no seepage monitoring data reported for 2017 or 2018.**

**(114) Survey monuments exist, but unknown condition and status of last known survey.**

**Owner retained a professional engineer to inventory, repair, and report status of all dam safety instrumentation. However, no reporting provided to CO Dam Safety for past 2-years since kick-off meeting in 2017.**

**Monitoring rating downgraded to POOR due to no reporting since 2016. See Overall Conditions for additional discussion.**

CONDITIONS OBSERVED: ☐ Good ☐ Acceptable ☒ Poor

## MAINTENANCE AND REPAIRS

PROBLEMS NOTED ☐ (60) NONE ☐ (61) ACCESS ROAD NEEDS MAINTENANCE ☐ (62) LIVESTOCK DAMAGE  
☒ (63) BRUSH ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE ☒ (64) TREES ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE  
☐ (65) RODENT ACTIVITY ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE ☐ (66) DETERIORATED CONCRETE - FACING, OUTLET SPILLWAY  
☐ (67) GATE AND OPERATING MECHANISM NEED MAINTENANCE ☒ (68) OTHER (68a) Crest grading; (68b) Spillway drain

**(63)(64) Medium-sized brush and small pines should be removed from all embankment surfaces, particularly from upstream slope of Auxiliary Dam.**

**(68a) Repair rut damage and grade right end of Main dam crest. Mild grading and filling in of potholes needed on remainder of crest. Grade crest with slight inclination to upstream slope for drainage; do not crown center.**

**(68b) Repair spillway stilling basin drain prior to Winter 2019/20 shutdown.**

CONDITIONS OBSERVED: ☐ Good ☒ Acceptable ☐ Poor

Go to next page for Overall Conditions and Items Requiring Actions

## OVERALL CONDITIONS

The priority action item for the owners of Overland Dam remains to complete the instrumentation evaluation and long-term monitoring program ongoing for the last 2-years. The owner's engineer indicated that the inventory, evaluation, and repairs to all instrumentation is nearly complete with report completion anticipated by late 2019. Implementation of the monitoring program should begin in 2020.

Several maintenance items have been deferred for several years and should be completed to ensure the safety of the dam. Worsening conditions may result in additional requirements, including requiring engineering oversight to compete repairs. All maintenance items listed below should be completed as part of normal operation and maintenance of the dam.

Based on results of the inspection and recent file review, a Conditionally Satisfactory rating is provided with Full Storage of the reservoir allowed if the action items listed below are completed.

Based on this Safety Inspection and recent file review, the overall condition is determined to be:

☐ (71) SATISFACTORY

☒ (72) CONDITIONALLY SATISFACTORY

☐ (73) UNSATISFACTORY

## ITEMS REQUIRING ACTION BY OWNER TO IMPROVE THE SAFETY OF THE DAM

### MAINTENANCE - ORDINARY REPAIR - MONITORING

☐ LUBRICATE AND OPERATE OUTLET GATES THROUGH FULL CYCLE

7/25/2019 - as part of standard operating procedure for the dam.

☐ CLEAR TREES AND/OR BRUSH FROM

7/25/2019 - all embankment surfaces, particularly from upstream slope of Auxiliary Dam.

☐ GRADE CREST TO A UNIFORM ELEVATION WITH DRAINAGE TO THE UPSTREAM SLOPE

7/25/2019 - along right end of Main Dam and fill potholes along remainder of dam crest.

☐ MONITOR

7/25/2019 - Continue piezometer and seepage monitoring as agreed upon frequency until otherwise directed by forthcoming long-term monitoring plan.

### ENGINEERING - EMPLOY AN ENGINEER EXPERIENCED IN DESIGN AND CONSTRUCTION OF DAMS TO

☐ PREPARE PLANS AND SPECIFICATIONS FOR REHABILITATION OF THE DAM

7/25/2019 - for replacement of gage rod (if concrete stem wall installation or other installation requiring embankment excavation).

☐ SET UP A MONITORING SYSTEM INCLUDING WORK SHEETS, REDUCED DATA AND GRAPHED RESULTS

7/25/2019 - inventory and evaluate all instrumentation with preparation of a long-term monitoring program.

☐ PERFORM AN INTERNAL INSPECTION OF THE OUTLET

7/25/2019 - per CO Dam Safety Rules and Regulations 10-year inspection frequency for high hazard dams.

### EMERGENCY ACTION PLAN

☐ UPDATE EXISTING EMERGENCY ACTION PLAN

7/25/2019 - Update and distribute with assistance from CO Dam Safety

The State Engineer, by providing this dam safety inspection report, does not assume responsibility for any unsafe condition of the subject dam. The sole responsibility for the safety of this dam rests with the reservoir owner or operator, who should take every step necessary to prevent damages caused by leakage or overflow of waters from the reservoir or floods resulting from a failure of the dam.

## SAFE STORAGE LEVEL: RECOMMENDED AS A RESULT OF THIS INSPECTION

☐ (101) FULL STORAGE

☒ (102) CONDITIONAL FULL STORAGE

☐ (103) RECOMMENDED RESTRICTION

☐ (104) CONTINUE EXISTING RESTRICTION

REASON FOR RESTRICTION

ACTIONS REQUIRED FOR CONDITIONAL FULL STORAGE OR CONTINUED STORAGE AT THE RESTRICTED LEVEL

Complete all new and outstanding action items listed above and in past recent inspection reports. Emphasis must be placed on completing monitoring instrumentation evaluation and establishing long-term monitoring plan.

Engineer's  
Signature

INSPECTED BY

Owner's  
Signature

OWNER/OWNER'S REPRESENTATIVE

DATE: / /

## GUIDELINES FOR DETERMINING CONDITIONS

### CONDITIONS OBSERVED - APPLIES TO UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, OUTLET, SPILLWAY

#### GOOD

In general, this part of the structure has a near new appearance, and conditions observed in this area do not appear to threaten the safety of the dam.

#### ACCEPTABLE

Although general cross-section is maintained, surfaces may be irregular, eroded, rutted, spalled, or otherwise not in new condition. Conditions in this area do not currently appear to threaten the safety of the dam.

#### POOR

Conditions observed in this area appear to threaten the safety of the dam.

### CONDITIONS OBSERVED - APPLIES TO SEEPAGE

#### GOOD

No evidence of uncontrolled seepage. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions do not appear to threaten the safety of the dam.

#### ACCEPTABLE

Some seepage exists at areas other than the drain outfalls, or other designed drains. No unexplained increase in seepage. All seepage is clear. Seepage conditions observed do not currently appear to threaten the safety of the dam.

#### POOR

Seepage conditions observed appear to threaten the safety of the dam. Examples:  
1) Designed drain or seepage flows have increased without increase in reservoir level.  
2) Drain or seepage flows contain sediment, i.e., muddy water or particles in jar samples.  
3) Widespread seepage, concentrated seepage, or ponding appears to threaten the safety of the dam.

### CONDITIONS OBSERVED - APPLIES TO MONITORING

#### GOOD

Monitoring includes movement surveys and leakage measurements for all dams, and piezometer readings for High hazard dams. Instrumentation is in reliable, working condition. A plan for monitoring the instrumentation and analyzing results by the owner's engineer is in effect. Periodic inspections by owner's engineer.

#### ACCEPTABLE

Monitoring includes movement surveys and leakage measurements for High and Significant hazard dams; leakage measurements for Low hazard dams. Instrumentation is in serviceable condition. A plan for monitoring instrumentation is in effect by owner. Periodic inspections by owner or representative. OR, NO MONITORING REQUIRED.

#### POOR

All instrumentation and monitoring described under "ACCEPTABLE" here for each class of dam, are not provided, or required periodic readings are not being made or unexplained changes in readings are not reacted to by the owner.

### CONDITIONS OBSERVED - APPLIES TO MAINTENANCE AND REPAIR

#### GOOD

Dam appears to receive effective on-going maintenance and repair, and only a few minor items may need to be addressed.

#### ACCEPTABLE

Dam appears to receive maintenance, but some maintenance items need to be addressed. No major repairs are required.

#### POOR

Dam does not appear to receive adequate maintenance. One or more items needing maintenance or repair has begun to threaten the safety of the dam.

### OVERALL CONDITIONS

#### SATISFACTORY

The safety inspection indicates no conditions that appear to threaten the safety of the dam, and the dam is expected to perform satisfactorily under all design loading conditions. Most of the required monitoring is being performed.

#### CONDITIONALLY SATISFACTORY

The safety inspection indicates symptoms of structural distress (seepage, evidence of minor displacements, etc.), which, if conditions worsen, could lead to the failure of the dam. Essential monitoring, inspection, and maintenance must be performed as a requirement for continued full storage in the reservoir.

#### UNSATISFACTORY

The safety inspection indicates definite signs of structural distress (excessive seepage, cracks, slides, sinkholes, severe deterioration, etc.), which could lead to the failure of the dam if the reservoir is used to full capacity. The dam is judged unsafe for full storage of water.

### SAFE STORAGE LEVEL

#### FULL STORAGE

Dam may be used to full capacity with no conditions attached.

#### CONDITIONAL FULL STORAGE

Dam may be used to full storage if certain monitoring, maintenance, or operational conditions are met.

#### RESTRICTION

Dam may not be used to full capacity, but must be operated at some reduced level in the interest of public safety.

### HAZARD CLASSIFICATION OF DAMS

#### High hazard

Loss of human life is expected in the event of failure of the dam, while the reservoir is at the high water line.

#### Significant hazard

Significant damage to improved property is expected in the event of failure of the dam while the reservoir is at the high water line, but no loss of human life is expected.

#### Low hazard

Loss of human life is not expected, and damage to improved property is expected to be small, in the event of failure of the dam while the reservoir is at high water line.

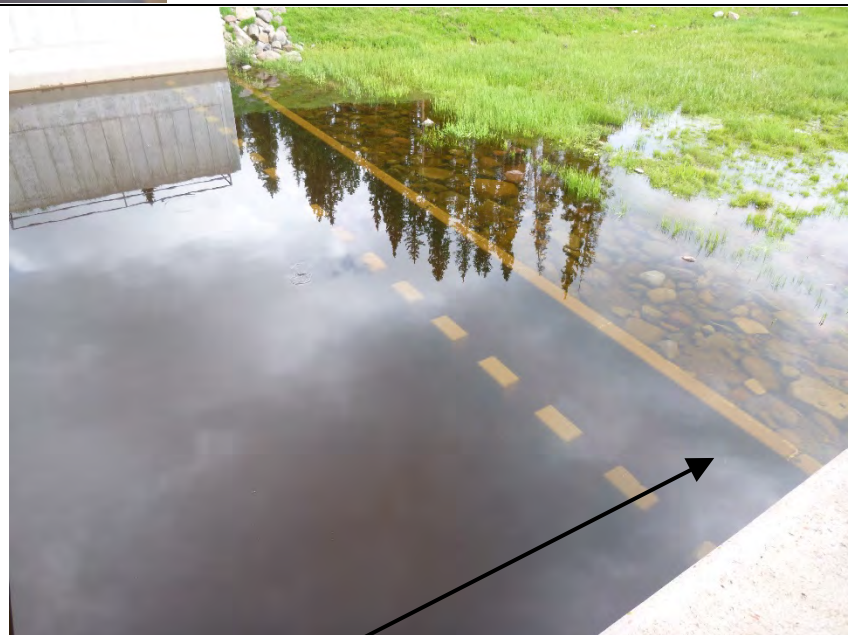
NPH hazard - No loss of life or damage to improved property, or loss of downstream resource is expected in the event of failure of the dam while the reservoir is at the high water line.





Spillway stilling basin

Stilling basin baffle blocks and downstream weir.  
 Arrow indicates approx. location of submerged  
 and obstructed drain.



Downstream outfall of stilling basin drain flowing  
 less than half full.





Typical piezometer casing and tube.

Typical view along dam crest near maximum section.



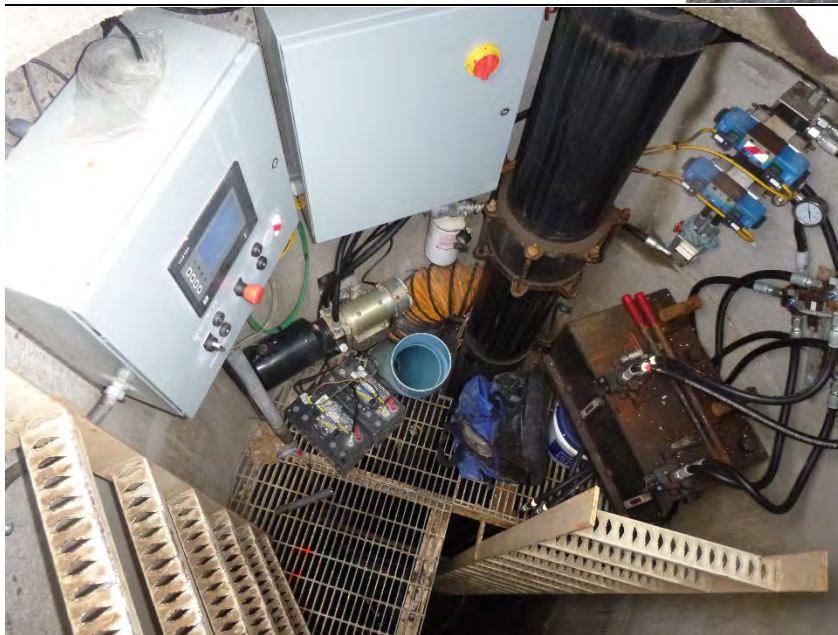
Overall view of downstream slope near maximum section.





Maximum section along outlet works alignment.

Close-up of outlet structure.



Outlet valve controls located in vault on crest of dam.





Right downstream slope.



Toe drain outfalls.



Dam crest along far right end of dam.





Reservoir gage rod on upstream slope.

Typical view along downstream slope of  
Auxiliary dam.



Typical view along upstream slope of Auxiliary  
Dam.