Emergency Action Plan (EAP)

West Panguitch Irrigation

(Panguitch Lake)

Dam No. UT00238

Garfield County, Utah

Reviewed and Updated:

_____	_____
President, West Panguitch Irrigation	*Sheriff, Garfield County, UT*
_____	_____
Date	*Date*

Copy ___ of___

Contents

Basic EAP Data....2
EAP Overview....3
Roles and Responsibilities....4
The Five-step EAP Process
Step 1 Event Detection....5
Step 2 Emergency Level Determination....6
Guidance for Determining the Emergency Level....7
Examples of Emergency Situations....8
Step 3 Notification and Communication....10
Notification Charts....12
Other Emergency Services Contacts....16
Step 4 Expected Actions....17
Step 5 Termination....20
Maintenance—EAP Review and Revision....21
Record of Holders of Control Copies of this EAP....22
Record of Revisions and Updates Made to EAP....23
Concurrences....24
Appendices—Forms, Glossary, Maps, and Supporting Data....25
Appendix A
Appendix A–1 Contact Checklist....26
Appendix A–2 Unusual or Emergency Event Log Form....27
Appendix A–3 Dam Emergency Situation Report Form....28
Appendix A–4 Glossary of Terms....29
Appendix B
Appendix B–1 Resources Available....32
Appendix B–2 Location and Vicinity Maps....33
Appendix B–3 Watershed Project Map....34
Appendix B–4 Evacuation Map....35
Appendix B–5 Residents/Businesses/Highways at Risk....36
Appendix B–6 Breach Analysis and Inundation....37
Appendix B–7 Profile of Principal Spillway....46
Appendix B–8 Reservoir Elevation-area-volume and Spillway Capacity Data....47
Appendix B–9 National Inventory of Dams (NID) Data....48

Basic EAP Data

Purpose

The purpose of this EAP is to reduce the risk of human life loss and injury and minimize property damage during an unusual or emergency event at Panguitch Lake Dam No. UT00238.

Potential Impacted Area

See *Evacuation Map* tab (Appendix B–4) and *People at Risk* tab (Appendix B–5) for the locations of the following roads, tourists, residents and businesses that may be flooded if the dam should fail and the estimated time for the flood wave to travel from the dam to these locations:

Directions to dam (See *Location and Vicinity Map*; Appendix B–2.)

Panguitch Lake Dam can be accessed by traveling south from Panguitch UT on Highway 143 for apx 16 miles. Turn right at the lake and take the dirt road to the Dam. Keys to the lock on the gate can be obtained from the West Panguitch Irrigation Water Master (Shea Hatch), President (Mac Hatch) or the Garfield County Sheriff (Danny Perkins).

An alternate route to the dam would be to travel south from Panguitch on Highway 89 to the Mammoth Creek Road. Turn right on the mammoth creek road and go to highway 143. Turn right on Highway 143 and travel north to the Dam.

Roles and Responsibilities

Dam Operator's Representative (Water Master)

- As soon as an emergency event is observed or reported, immediately determine the emergency level (see *Emergency Levels* tab).
  - Level 1: unusual event, slowly developing
  - Level 2: potential dam failure situation, rapidly developing
  - Level 3: dam failure appears imminent or is in progress
- Immediately notify the personnel in the order shown on the notification chart for the appropriate level (see *Notification Charts* tab).
- Provide updates of the situation to the police/sheriff dispatcher to assist them in making timely and accurate decisions regarding warnings and evacuations.
- Provide leadership to assure the EAP is reviewed and updated annually and copies of the revised EAP are distributed to all who received copies of the original EAP.

Incident Commander (Garfield County Sheriff)

- Serve as the primary contact person responsible for coordination of all emergency actions.
- When a Level 2 situation occurs: Prepare emergency management personnel for possible evacuations that may be needed if a Level 3 situation occurs.
- When a Level 3 situation occurs:
  - Initiate warnings and order evacuation of people at risk downstream of the dam.
  - Notify local emergency management services to carry out the evacuation of people and close roads within the evacuation area (see *Evacuation Map* tab).
- Decide when to terminate the emergency.
- Participate in an annual review and update of the EAP.

Emergency Management Services (Garfield County Emergency Manager)

- Maintain communication with media.
- When a Level 2 situation occurs:
  - Prepare emergency management personnel for possible evacuations that may be needed if a Level 3 situation occurs.
  - Alert the public as appropriate.
- When a Level 3 situation occurs:
  - Alert the public.
  - Immediately close roads and evacuate people within the evacuation area (see *Evacuation Map* tab).
- Participate in an annual review and update of the EAP.

Dam Operator's Technical Representatives

- Advise the dam operator of the emergency level determination, if time permits.
- Advise the dam operator of remedial actions to take if Level 2 event occurs, if time permits.

Step 1

Event Detection

The Five-step EAP Process

Step 1 Event Detection

This step describes the detection of an unusual or emergency event and provides information to assist the dam operator in determining the appropriate emergency level for the event.

Unusual or emergency events may be detected by:

- Observations at or near the dam by government personnel (local, state, or Federal), landowners, visitors to the dam, or the public
- Evaluation of instrumentation data
- Earthquakes felt or reported in the vicinity of the dam
- Forewarning of conditions that may cause an unusual event or emergency event at the dam (for example, a severe weather or flash flood forecast)

See *Guidance for Determining the Emergency Level* table on page 9 for assistance in evaluating specific events to determine if they are unusual or potential emergency situations.

Step 2

Emergency Level Determination

Step 2 Emergency Level Determination

After an unusual or emergency event is detected or reported, the Dam Owner or the Dam Operator's Technical Representative is responsible for classifying the event into one of the following three emergency levels:

Emergency Level 1—Nonemergency, unusual event, slowly developing:
This situation is not normal but has not yet threatened the operation or structural integrity of the dam, but possibly could if it continues to develop. The Dam Operator's Technical Representative should be contacted to investigate the situation and recommend actions to take. State Dam Safety officials should also be contacted to report the conditions of the dam and the remedial actions that are to be taken. The condition of the dam should be closely monitored, especially during storm events, to detect any development of a potential or imminent dam failure situation. The Sheriff should be informed if it is determined that the conditions may possibly develop into a worse condition that may require emergency actions.

Emergency Level 2—Potential dam failure situation, rapidly developing:
This situation may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure. The Sheriff should be notified of this emergency situation and placed on alert. The dam operator should closely monitor the condition of the dam and periodically report the status of the situation to the Sheriff. If the dam condition worsens and failure becomes imminent, the Sheriff must be notified immediately of the change in the emergency level to evacuate the people at risk downstream.

If time permits, The Dam Operator's Technical Representative should be contacted to evaluate the situation and recommend remedial actions to prevent failure of the dam. The dam operator should initiate remedial repairs (note local resources that may be available—see Appendix B–1). Time available to employ remedial actions may be hours or days.

This emergency level is also applicable when flow through the earth spillway has or is expected to result in flooding of downstream areas and people near the channel could be endangered. Emergency services should be on alert to initiate evacuations or road closures if the flooding increases.

Emergency Level 3—Urgent; dam failure appears imminent or is in progress:
This is an extremely urgent situation when a dam failure is occurring or obviously is about to occur and cannot be prevented. Flash flooding will occur downstream of the dam. This situation is also applicable when flow through the earth spillway is causing downstream flooding of people and roads. The Sheriff should be contacted immediately so emergency services can begin evacuations of all at-risk people and close roads as needed (see *Evacuation Map* tab).

Guidance for Determining the Emergency Level

Event	Situation	Emergency level*
Embankment overtopping	Reservoir level is 1 foot below the top of the dam	1
	Water from the reservoir is flowing over the top of the dam	1
Seepage	New seepage areas in or near the dam	1
	New seepage areas with cloudy discharge or increasing flow rate	2
	Seepage with discharge greater than 10 gallons per minute	3
Sinkholes	Observation of new sinkhole in reservoir area or on embankment	2
	Rapidly enlarging sinkhole	3
Embankment cracking	New cracks in the embankment greater than ¼-inch wide without seepage	1
	Cracks in the embankment with seepage	2
Embankment movement	Visual movement/slippage of the embankment slope	1
	Sudden or rapidly proceeding slides of the embankment slopes	3
Instruments	Instrumentation readings beyond predetermined values	1
Earthquake	Measurable earthquake felt or reported on or within 50 miles of the dam	1
	Earthquake resulting in visible damage to the dam or appurtenances	2
	Earthquake resulting in uncontrolled release of water from the dam	3
Security threat	Verified bomb threat that, if carried out, could result in damage to the dam	2
	Detonated bomb that has resulted in damage to the dam or appurtenances	3
Sabotage/ vandalism	Damage to dam or appurtenance with no impacts to the functioning of the dam	1
	Modification to the dam or appurtenances that could adversely impact the functioning of the dam	1
	Damage to dam or appurtenances that has resulted in seepage flow	2
	Damage to dam or appurtenances that has resulted in uncontrolled water release	3

* Emergency Level 1: Nonemergency; unusual event, slowly developing
* Emergency Level 2: Potential dam failure situation, rapidly developing
* Emergency Level 3: Urgent; dam failure appears imminent or is in progress

Examples of Emergency Situations

The following are examples of conditions that usually constitute an emergency situation that may occur at a dam. Adverse or unusual conditions that can cause the failure of a dam are typically related to aging or design and construction oversights. Extreme weather events that exceed the original designed conditions can cause significant flow through the auxiliary spillway or overtopping of the embankment. However, accidental or intentional damage to the dam may also result in emergency conditions. The conditions have been grouped to identify the most likely emergency-level condition. The groupings are provided as guidance only. Not all emergency conditions may be listed, and the dam operator is urged to use conservative judgment in determining whether a specific condition should be defined as an emergency situation at the dam.

Pre-existing conditions on this dam: There have been small seepage areas near the last 2 feet added to the dam in 1942. This is monitored continuously and has not changed or increased.

Dam Spillway Over Flows

Emergency Level 2—Potential dam failure situation; rapidly developing:

1. Significant erosion or headcutting of the spillway is occurring, but the rate does not appear to threaten an imminent breach of the spillway crest that would result in an uncontrolled release of the reservoir.
2. Flow over the dam is causing or is expected to cause flooding that could threaten people, homes, and/or roads downstream from the dam.

Emergency Level 3—Urgent; dam failure appears imminent or is in progress:

1. Significant erosion or headcutting of the spillway/dam is occurring at a rapid rate, and a breach of the control section appears imminent.
2. Flow over the dam is causing flooding that is threatening people, homes, and/or roads downstream from the dam.

Dam Overtopping

1. **Emergency Level 1—Nonemergency, unusual event, slowly developing:**

Excessive water flowing into Panguitch Lake and lake is rising with outlet gate completely open

Emergency Level 2— Potential dam failure situation, rapidly developing:

1. The reservoir level is within 1 foot from the top of the dam.

Emergency Level 3—Urgent; dam failure appears imminent or is in progress:

1. The reservoir level has exceeded the top of the dam, and flow is occurring over the embankment.

Seepage and Sinkholes

Emergency Level 2—Potential dam failure situation; rapidly developing:

1. Cloudy seepage or soil deposits are observed at seepage exit points or from internal drain outlet pipes.
2. New or increased areas of wet or muddy soils are present on the downstream slope, abutment, and/or foundation of the dam, and there is an easily detectable and unusual increase in volume of downstream seepage.
3. Significant new or enlarging sinkhole(s) near the dam or settlement of the dam is observed.
4. Reservoir level is falling without apparent causes.
5. The following known dam defects are or will soon be inundated by a rise in the reservoir:
   - Sinkhole(s) located on the upstream slope, crest, abutment, and/or foundation of the dam; or
   - Transverse cracks extending through the dam, abutments, or foundation.

Emergency Level 3—Urgent; dam failure appears imminent or is in progress:

1. Rapidly increasing cloudy seepage or soil deposits at seepage exit points to the extent that failure appears imminent or is in progress.
2. Rapid increase in volume of downstream seepage to the extent that failure appears imminent or is in progress.
3. Water flowing out of holes in the downstream slope, abutment, and/or foundation of the dam to the extent that failure appears imminent or is in progress.
4. Whirlpools or other evidence exists indicating that the reservoir is draining rapidly through the dam or foundation.
5. Rapidly enlarging sinkhole(s) are forming on the dam or abutments to the extent that failure appears imminent or is in progress.
6. Rapidly increasing flow through crack(s) eroding materials to the extent that failure appears imminent or is in progress.

Embankment Movement and Cracking

Emergency Level 2—Potential dam failure situation; rapidly developing:

1. Settlement of the crest, slopes, abutments and/or foundation of the dam that may eventually result in breaching of the dam.
2. Significant increase in length, width, or offset of cracks in the crest, slopes, abutments, and/or foundation of the dam that may eventually result in breaching of the dam.

Emergency Level 3—Urgent; dam failure appears imminent or is in progress:

1. Sudden or rapidly proceeding slides, settlement, or cracking of the embankment crest, slopes, abutments, and/or foundation, and breaching of the dam appears imminent or is in progress.

Step 3

Notification & Communication

Step 3 Notification and Communication

Notification

After the emergency level has been determined, the people on the following notification charts for the appropriate emergency level shall be notified immediately.

Communication

Emergency Level 1—Nonemergency, unusual event; slowly developing:
West Panguitch Irrigation Company should contact the Dam Operator's Technical Representative. Describe the situation, and request technical assistance on next steps to take. West Panguitch Irrigation Company should also contact the Utah Division of Water Rights Dam Safety Section and describe the situation.

Emergency Level 2—Emergency event, potential dam failure situation; rapidly developing:
The following message may be used to help describe the emergency situation to the Garfield County Sheriff or Garfield County Emergency Manager:

"This is _____Identify yourself; name, position)_____.

We have an emergency condition at Panguitch Lake Dam

We have activated the Emergency Action Plan for this dam and are currently under Emergency Level 2.

We are implementing predetermined actions to respond to a rapidly developing situation that could result in dam failure.

Please prepare to evacuate the area along low-lying portions of Panguitch Creek.

Reference the evacuation map in your copy of the Emergency Action Plan.

We will advise you when the situation is resolved or if the situation gets worse.

I can be contacted at the following number _____. If you cannot reach me, please call the following alternative number _____."

Emergency Level 3—Urgent event; dam failure appears imminent or is in progress:
The Sheriff should be contacted immediately and the area evacuated (see *Evacuation Map* tab). The following actions should be taken:

1. Call the Sheriff's dispatch center. Be sure to say, "This is an emergency." They will call other authorities and the media and begin the evacuation. The following message may be used to help describe the emergency situation to the Garfield County Sheriff or Garfield County Emergency Manager

   "This is an emergency. This is _____Identify yourself; name, position)_____.

   Panguitch Lake Dam is failing. The downstream area must be evacuated immediately. Repeat, Panguitch Lake Dam is failing; evacuate the area along low-lying portions of Panguitch Creek.

   We have activated the Emergency Action Plan for this dam and are currently under Emergency Level 3. Reference the evacuation map in your copy of the Emergency Action Plan.

   I can be contacted at the following number _____. If you cannot reach me, please call the following alternative number_____."

2. Do whatever is necessary to bring people in immediate danger (anyone on the dam, downstream from the dam, boating on the reservoir, or evacuees) to safety if directed by the Sheriff.
3. Keep in frequent contact with the Sheriff and emergency services to keep them up-to-date on the condition of the dam. They will tell you how you can help handle the emergency.
4. If all means of communication are lost: (1) try to find out why, (2) try to get to another radio or telephone that works, or (3) get someone else to try to re-establish communications. If these means fail, handle the immediate problems as well as you can, and periodically try to re-establish contact with the Sheriff and emergency services.

The following prescripted message may be used as a guide for the Garfield County Sheriff or Garfield County Emergency Manager

Attention: This is an emergency message from the Sheriff. Listen carefully. Your life may depend on immediate action.

Panguitch Lake Dam, is failing. Repeat. Panguitch Lake Dam, is failing.

If you are in or near this area, proceed immediately to high ground away from the valley. Do not travel on Highway 143 south of Panguitch or return to your home to recover your possessions. You cannot outrun or drive away from the flood wave. Proceed immediately to high ground away from the valley.

Repeat message.

Emergency Level 1 Notifications

Nonemergency
Unusual event; slowly developing

Agency / Organization	Principal contact	Address	Office telephone number	Alternate telephone numbers
Dam Operator's Technical Representative	Brad Price RG&B Engineering	Provo Utah	801-374-5771	801-319-0539 (C)
Asst. State Engineer/Dam Safety UT Division of Water Rights	Everett Taylor	1594 West North Temple Salt Lake City, UT 84114-6300	Tel: 801/538-7376	801-698-2377 (C)

Dam Tender
Gabe Owens
435-289-8998

↓

West Panguitch President
Allen Henrie
435 616-8588

↓

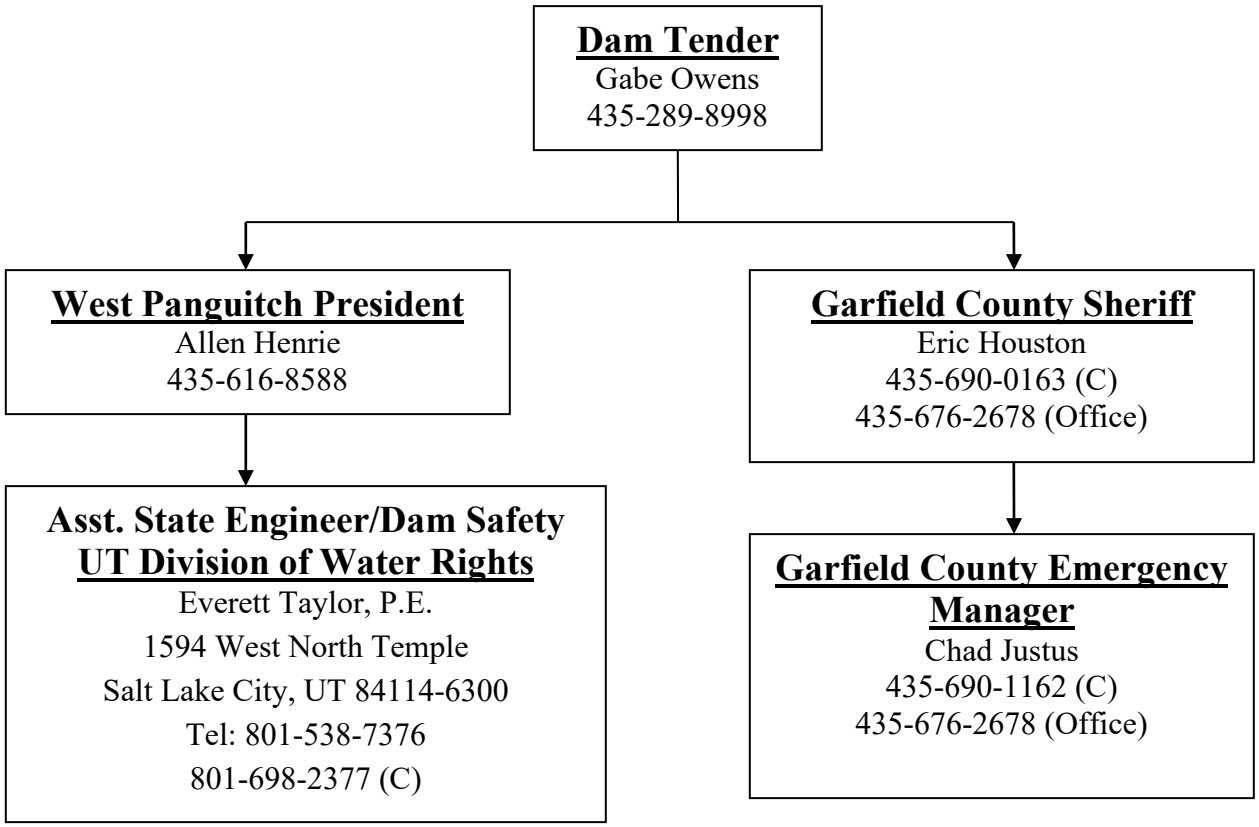
Dam Operator's Technical Representative
Brad Price
801-374-5771
801-319-0539 (c)

Asst. State Engineer/Dam Safety
UT Division of Water Rights
Everett Taylor
1594 West North Temple
Salt Lake City, UT 84114-6300
Tel: 801-538-7376
801-698-2377(C)

Emergency Level 2 Notifications

Emergency event, potential dam failure
Situation; rapidly developing

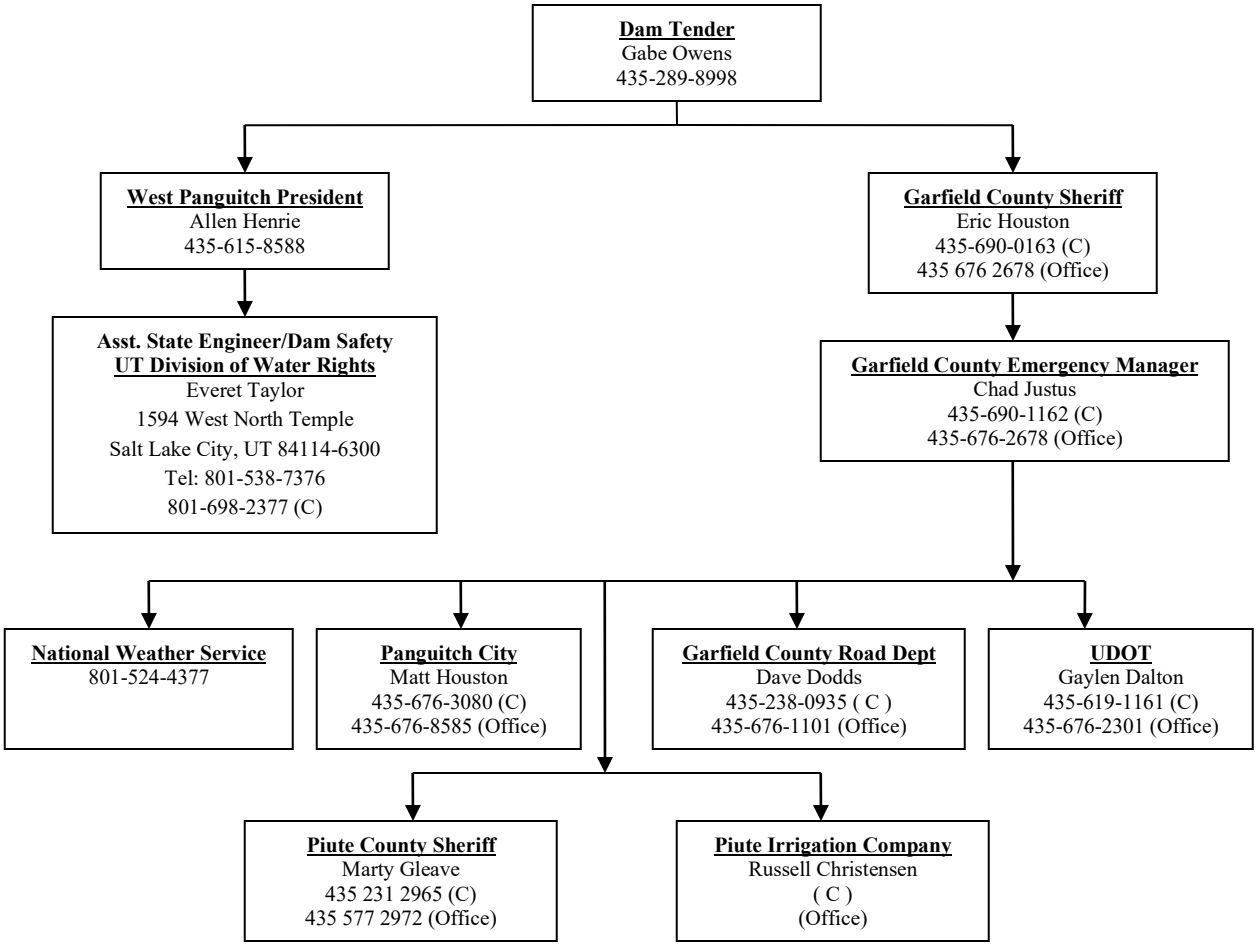
Agency / Organization	Principal contact	Address	Office telephone number	Alternate telephone numbers
Garfield County Sheriff	Eric Houston	375 North 700 West PO Box 370 Panguitch Utah	435-676-2678	435-690-0163 (C)
Garfield County Emergency Manager	Chad Justus	375 North 700 West PO Box 370 Panguitch Utah	435-676-2678	435-690-1162 (C)
Dam Operator's Technical Representative	Brad Price RG&B Engineering	Provo Utah	801-374-5771	801-319-0539 (C)
Asst. State Engineer/Dam Safety UT Division of Water Rights	Everett Taylor, P.E.	1594 West North Temple Salt Lake City, UT 84114-6300	801/538-7376	801-698-2377 (C)



Emergency Level 3 Notifications

Urgent event, dam failure appears Imminent or is in progress

Agency / Organization	Principal contact	Address	Office telephone number	Alternate telephone numbers
Garfield County Sheriff	Eric Houston	375 North 700 West PO Box 370 Panguitch Utah	435 676 2678	435 690-0163 (C)
Garfield County Emergency Manager	Chad Justus	375 North 700 West PO Box 370 Panguitch Utah	435 676 2678	435 690-1162 (C)
National Weather Service *Colorado Basin River Forecast Center* (CBRFC)		2242 W North Temple Salt Lake City, *UT* 84116	801-524-5130	
Asst. State Engineer/Dam Safety UT Division of Water Rights	Everett Taylor	1594 West North Temple Salt Lake City, UT 84114-6300	801-538-7376	801-698-2377(C)
Panguitch City	Matt Houston	25 S 200 E Panguitch UT	435-676-8585	435-676-3080 (C)
Garfield County Road Department	Dave Dodds	55 South Main Panguitch, UT	435-676-1101	435-238-0935 (C)
Utah Department of Transportation	Gaylen Dalton Shed Foreman	South Hwy 143 Panguitch UT	435-676-2301	435-619-1161 (C)
Piute Irrigation & Reservoir Company	Russell Christensen	Richfield UT		
Piute County Sheriff	Marty Gleave	Junction Ut	435 577 2972	435 231 2965 (C)
Dam Operator's Technical Representative	Brad Price RG&B Engineering	Provo Utah	801-374-5771	801-319-0539 (C)


Dam Tender
Gabe Owens
435-289-8998
West Panguitch President
Allen Henrie
435-615-8588
Garfield County Sheriff
Eric Houston
435-690-0163 (C)
435 676 2678 (Office)
Asst. State Engineer/Dam Safety
UT Division of Water Rights
Everet Taylor
1594 West North Temple
Salt Lake City, UT 84114-6300
Tel: 801-538-7376
801-698-2377 (C)
Garfield County Emergency Manager
Chad Justus
435-690-1162 (C)
435-676-2678 (Office)
National Weather Service
801-524-4377
Panguitch City
Matt Houston
435-676-3080 (C)
435-676-8585 (Office)
Garfield County Road Dept
Dave Dodds
435-238-0935 (C)
435-676-1101 (Office)
UDOT
Gaylen Dalton
435-619-1161 (C)
435-676-2301 (Office)
Piute County Sheriff
Marty Gleave
435 231 2965 (C)
435 577 2972 (Office)
Piute Irrigation Company
Russell Christensen
(C)
(Office)

Emergency Service Contact List

Agency / Organization	Principal contact	Address	Office telephone number	Alternate telephone numbers
Garfield County Sheriff	Eric Houston	375 North 700 West PO Box 370 Panguitch Utah	435-676-2678	435-690-0163 (C)
Garfield County Emergency Manager	Chad Justus	375 North 700 West PO Box 370 Panguitch Utah	435-676-2678	435-690-1162(C)
National Weather Service *Colorado Basin River Forecast Center* (CBRFC)		2242 W North Temple Salt Lake City, *UT* 84116	801-524-5130	
Asst. State Engineer/Dam Safety UT Division of Water Rights	Everett Taylor	1594 West North Temple Salt Lake City, UT 84114-6300	Tel: 801-538-7376	801-698-2377 (C)
Panguitch City	Matt Houston	25 S 200 E Panguitch UT	435-676-8585	435-676-3080 (C)
Garfield County Road Department	Dave Dodds	55 South Main Panguitch, UT	435-676-3101	435-238-0935 (C)
Utah Department of Transportation	Gaylen Dalton Shed Foreman	South Hwy 143 Panguitch UT	435-676-2301	435-619-1161 (C)
Piute Irrigation & Reservoir Company	Russell Christensen	Richfield UT		
Piute County Sheriff	Marty Gleave	Junction Ut	435-577-2972	435-231-2965 (C)

Step 4

Expected Actions

Step 4 Expected Actions

If the police or Sheriff receives a 911 call regarding observations of an unusual or emergency event at the dam, they should immediately contact the Water Master or Board President. After the Board President determines the emergency level, the following actions should be taken. If time permits, the Dam Operator's technical representatives and Dam Safety should be contacted.

Emergency Level 1—Nonemergency, unusual event; slowly developing:

A. The Water Master should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also, check the reservoir area, abutments, and downstream channel for signs of changing conditions. If increased seepage, erosion, cracking, or settlement is observed, immediately report the observed conditions to the Dam Operator's Technical Representative and the Utah Division of Water Rights Dam Safety Section/Assistant State Engineer; refer to the emergency level table on page 11 for guidance in determining the appropriate event level for the new condition and recommended actions.

B. Record all contacts that were made on the *Contact Checklist* (Appendix A–1). Record all information, observations, and actions taken on the *Event Log Form* (Appendix A–2). Note the time of changing conditions. Document the situation with photographs and video, if possible.

C. The Water Master should contact the Dam Operator's Technical Representative and request technical staff to investigate the situation and recommend corrective actions.

Emergency Level 2—Potential dam failure situation; rapidly developing:

A. The Water Master should contact the Dam Operator's Technical Representative to report the situation and, if time permits, request technical staff to investigate the situation and recommend corrective actions.

B. The Water Master should contact the Sheriff to inform him/her that the EAP has been activated and if current conditions get worse, an emergency situation may require evacuation. Preparations should be made for possible road closures and evacuations.

C. Provide updates to the Sheriff and emergency services personnel to assist them in making timely decisions concerning the need for warnings, road closures, and evacuations.

D. If time permits, the Water Master should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also, check the reservoir area, abutments, and downstream channel for signs of changing conditions. If piping, increased seepage, erosion, cracking, or settlement are observed, immediately report the observed conditions to the Dam Operator's Technical Representative; refer to the emergency level table for guidance in determining the appropriate event level for the new condition and recommended actions.

E. Record all contacts that were made on the *Contact Checklist* (Appendix A–1). Record all information, observations, and actions taken on the *Event Log Form* (Appendix A–2). Note the time of changing conditions. Document the situation with photographs and video, if possible.

F. If time permits, the following emergency remedial actions should be taken as appropriate.

Emergency Level 2—Potential dam failure situation; rapidly developing—continued:

Emergency remedial actions

If time permits, the following emergency remedial actions should be considered for Emergency Level 2 conditions. Immediate implementation of these remedial actions may delay, moderate, or prevent the failure of the dam. Several of the listed adverse or unusual conditions may be apparent at the dam at the same time, requiring implementation of several modes of remedial actions. Close monitoring of the dam must be maintained to confirm the success of any remedial action taken at the dam. Time permitting, any remedial action should be developed through consultation with the Dam Operator's Technical Representative. See *Resources Available* (Appendix B–1) for sources of equipment and materials to assist with remedial actions.

Seepage and sinkholes

1. Open the gate to lower the reservoir level as rapidly as possible to a level that stops or decreases the seepage to a nonerosive velocity. If the gate is damaged or blocked, pumping or siphoning may be required.

   Continue lowering the water level until the seepage stops.
2. If the entrance to the seepage origination point is observed in the reservoir (possible whirlpool) and is accessible, attempt to reduce the flow by plugging the entrance with readily available materials such as hay bales, bentonite, soil or rockfill, or plastic sheeting.
3. Cover the seepage exit area(s) with several feet of sand/gravel to hold fine-grained embankment or foundation materials in place. Alternatively, construct sandbag or other types of ring dikes around seepage exit areas to retain a pool of water, providing backpressure and reducing the erosive nature of the seepage.
4. Prevent vehicles and equipment from driving between the seepage exit points and the embankment to avoid potential loss from the collapse of an underground void.

Embankment movement

1. Open gate and lower the reservoir to a safe level at a rate commensurate with the urgency and severity of the condition of the slide or slump. If the gate is damaged or blocked, pumping or siphoning may be required.
2. Repair settlement of the crest by placing sandbags or earth and rockfill materials in the damaged area to restore freeboard.
3. Stabilize slides by placing a soil or rockfill buttress against the toe of the slide.

Earthquake

1. Immediately conduct a general overall visual inspection of the dam.
2. Perform a field survey to determine if there has been any settlement and movement of the dam embankment, spillway, and low-level outlet works.
3. Drain the reservoir, if required.

Emergency Level 3—Urgent; dam failure appears imminent or is in progress:

A. The Water Master shall immediately contact the Sheriff and others shown on the notification chart.

B. The Sheriff shall lead the efforts to carry out warnings, close roads, and evacuate people at risk downstream from the dam (see *Evacuation Map* tab).

C. Emergency management services personnel shall alert the public and immediately evacuate at-risk people and close roads as necessary.

D. The Water Master shall maintain continuous communication and provide the Sheriff with updates of the situation to assist him/her in making timely decisions concerning warnings and evacuations.

E. The Water Master should record all contacts that were made on the *Contact Checklist* (Appendix A–1). Record all information, observations, and actions taken on the *Event Log Form* (Appendix A–2). Note the time of changing conditions. Document the situation with photographs and video, if possible.

F. Advise people monitoring the dam to follow safe procedures. Everyone should stay away from any of the failing structures or slopes and out of the potential breach inundation areas.

Step 5

Termination

Step 5 Termination

Whenever the EAP has been activated, an emergency level has been declared, all EAP actions have been completed, and the emergency is over, the EAP operations must eventually be terminated and follow-up procedures completed.

Termination responsibilities

The Sheriff is responsible for terminating EAP operations and relaying this decision to the Water Master and Board President. It is then the responsibility of each person to notify the same group of contacts that were notified during the original event notification process to inform those people that the event has been terminated.

Prior to termination of an Emergency Level 3 event that has not caused actual dam failure, the State Dam Safety Officer will inspect the dam or require the inspection of the dam to determine whether any damage has occurred that could potentially result in loss of life, injury, or property damage. If it is determined that conditions do not pose a threat to people or property, the Sheriff will be advised to terminate EAP operations as described above.

The Water Master shall assure that the *Dam Safety Emergency Situation Report* (Appendix A–3) is completed to document the emergency event and all actions that were taken. The West Panguitch Irrigation Company shall distribute copies of the completed report to the Utah Division of Water Rights Dam Safety Section Assistant State Engineer.

Maintenance—EAP Review and Revision

EAP annual review

The West Panguitch Irrigation Company Board of Directors will review and, if needed, update the EAP at least once each year. The EAP annual review will include the following:

- Calling all contacts on the three notification charts in the EAP to verify that the phone numbers and persons in the specified positions are current. The EAP will be revised if any of the contacts have changed.
- Contacting the local law enforcement agency to verify the phone numbers and persons in the specified positions. In addition, Water Master will ask if the person contacted knows where the EAP is kept and if responsibilities described in the EAP are understood.
- Calling the locally available resources to verify that the phone numbers, addresses, and services are current.

Revisions

The West Panguitch Irrigation Company Board of Directors are responsible for updating the EAP document. The EAP document held by the West Panguitch Irrigation Company is the master document. When revisions occur, the West Panguitch Irrigation Company will provide the revised pages and a revised revision summary page to all the EAP document holders. The document holders are responsible for revising outdated copies of the respective document whenever revisions are received. Outdated pages shall be immediately discarded to avoid any confusion with the revisions.

EAP periodic test

The West Panguitch Irrigation Company will host and facilitate a periodic test of the EAP at least once every 5 years.

The periodic test will consist of a meeting, including a tabletop exercise. Attendance should include the West Panguitch Irrigation Company Water Master and Board President, at least one representative of the local law enforcement agency, and others with key responsibilities listed in the EAP. At the discretion of the West Panguitch Irrigation Company, other organizations that may be involved with an unusual or emergency event at the dam are encouraged to participate. Before the tabletop exercise begins, meeting participants will visit the dam during the periodic test to familiarize themselves with the dam site.

The tabletop exercise will begin with the facilitator presenting a scenario of an unusual or emergency event at the dam. The scenario will be developed prior to the exercise. Once the scenario has been presented, the participants will discuss the responses and actions that they would take to address and resolve the scenario. The narrator will control the discussion, ensuring realistic responses and developing the scenario throughout the exercise. West Panguitch Irrigation Company should complete an event log as they would during an actual event.

After the tabletop exercise, the five sections of the EAP will be reviewed and discussed. Mutual aid agreements and other emergency procedures can be discussed. The Conservation District will prepare a written summary of the periodic test and revise the EAP, as necessary.

Record of Holders of Control Copies of this EAP

Copy Number	Organization	Person receiving copy
1	West Panguitch Irrigation & Reservoir Company – Water Master	Gabe Owens
2	West Panguitch Irrigation & Reservoir Company – President	Allen Henrie
3	West Panguitch Irrigation & Reservoir Company – Secretary	Denise Dastrup
4	Utah Division of Water Rights Dam Safety 1594 West North Temple Salt Lake City, UT 84114-6300	Everett Taylor
5	Garfield County Sheriff's Department 375 North 700 West PO Box 370 Panguitch Utah	Eric Houston
6	Garfield County Emergency Manager 375 North 700 West PO Box 370 Panguitch Utah	Chad Justus
7	Dixie National Forest District Ranger 1789 North wedge wood lane 84721 Cedar City Utah, 84720	Veronica Magnuson
8		

Record of Revisions and Updates Made to EAP

Revision Number	Date	Revisions made	By whom
1	5/15/2014	Updated new water master and Panguitch City contact	Mac Hatch
2	7/24/2024	Updated contacts	Denise Dastrup

Concurrences

By my signature, I acknowledge that I, or my representative, have reviewed this plan and concur with the tasks and responsibilities assigned herein for me and my organization.

1._____

_

Signature	*Organization*	*Date*
Allen Henrie, President	West Panguitch Irrigation Company	

2._____

_

Signature	*Organization*	*Date*
Gabe Owens, Water Master	West Panguitch Irrigation Company	

3._____

_

Signature	*Organization*	*Date*
Denise Dastrup, Secretary	West Panguitch Irrigation Company	

4._____

Signature	*Organization*	*Date*
Eric Houston, Sheriff	Garfield County Sheriff Department	

5._____

_

Signature	*Organization*	*Date*
Chad Justus, Emergency Manager	Garfield County	

6._____

_

Signature	*Organization*	*Date*
Everett Taylor, Asst. State Engineer/Dam Safety	UT Division of Water Rights	

7._____

_

Signature	*Organization*	*Date*
Veronica Magnason, District Ranger	Dixie National Forest	

Appendices—Forms, Glossary, Maps, and Supporting Data

Appendix A

A–1 Contact Checklist

A–2 Unusual or Emergency Event Log Form

A–3 Dam Emergency Situation Report Form

A–4 Glossary of Terms

Appendix B

B–1 Resources Available

B–2 Location and Vicinity Maps

B–3 Watershed Project Map

B–4 Evacuation Map

B–5 Residents/Businesses/Highways at Risk

B–6 Plan View of Dam

B–7 Profile of Principal Spillway

B–8 Reservoir Elevation-Area-Volume and Spillway Capacity Data

B–9 National Inventory of Dams (NID) Data

Appendix A–1

Contact Checklist

Panguitch Lake, Dam No. UT00238

Panguitch Lake, UT Date _____

The following contacts should be made immediately after the emergency level is determined (see pages 7–10 for guidance to determine the appropriate emergency level for a specific situation). The person making the contacts should initial and record the time of the call and who was notified for each contact made. See the *Notification Charts* tab for critical contact information and *Emer. Services Contacts* tab for contact information for other possible emergency services.

Emergency Level 1 (see page 12)	**Person Contacted**	**Time Contacted**	**Contacted by**
___ Asst. State Engineer / Dam Safety	_____	_____	_____
Emergency Level 2 (see page 13)	**Person Contacted**	**Time Contacted**	**Contacted by**
____ Asst. State Engineer / Dam Safety	_____	_____	_____
____ Garfield County Sheriff	_____	_____	_____
____ Garfield County Emergency Manager	_____	_____	_____

Emergency Level 3 (see page 14)	**Person Contacted**	**Time Contacted**	**Contacted by**
_____ Asst. State Engineer / Dam Safety	_____	_____	_____
____ Garfield County Sheriff	_____	_____	_____
____ Garfield County Emergency Manager	_____	_____	_____
_____ National Weather Service *Colorado Basin River Forecast Center* (CBRFC)	_____	_____	_____
____ Garfield County Road Department	_____	_____	_____
____ Utah Department of Transportation	_____	_____	_____
____ Panguitch City	_____	_____	_____
____ Piute Irrigation & Reservoir Company	_____	_____	_____
____ Piute County Sheriff	_____	_____	_____

Appendix A–2

Unusual or Emergency Event Log

(to be completed during the emergency)

Dam name: Panguitch Lake, Dam No. UT00238 County: Garfield County

When and how was the event detected?

_____

_____

Weather conditions: _____

_____

General description of the emergency situation:

_____

_____

_____

Emergency level determination: _____ Made by: _____

Actions and Event Progression

Date	Time	Action/event progression	Taken by

Report prepared by: _____ Date: _____

Appendix A–3

Dam Emergency Situation Report

(to be completed following the termination of the emergency)

Dam name: Panguitch Lake Dam

Dam ID.: UT00238

Dam location: 16 Miles South Of Panguitch (*City*) Garfield County (*County*) Panguitch Creek (*Stream/River*)

Date: Time:

Weather conditions: _____

General description of emergency situation:

_____

_____

Area(s) of dam affected:

_____

_____

Extent of dam damage: _____

Possible cause(s): _____

Effect on dam's operation: _____

Initial reservoir elevation: _____ Time: _____

Maximum reservoir elevation: _____ Time: _____

Final reservoir elevation: _____ Time: _____

Description of area flooded downstream/damages/injuries/loss of life: _____

_____

_____

Other data and comments:

_____

Observer's name and telephone number: _____

Report prepared by: _____ Date: _____

Appendix A–4
Glossary of Terms

Abutment	That part of the valleyside against which the dam is constructed. The left and right abutments of dams are defined with the observer looking downstream from the dam.
Acre-foot	A unit of volumetric measure that would cover 1 acre to a depth of 1 foot. One acre-foot is equal to 43,560 cubic feet or 325,850 gallons.
Berm	A nearly horizontal step (bench) in the upstream or downstream sloping face of the dam.
Boil	A disruption of the soil surface due to water discharging from below the surface. Eroded soil may be deposited in the form of a ring (miniature volcano) around the disruption.
Breach	An opening through the dam that allows draining of the reservoir. A controlled breach is an intentionally constructed opening. An uncontrolled breach is an unintended failure of the dam.
Conduit	A closed channel (round pipe or rectangular box) that conveys water through, around, or under the dam.
Control section	A usually level segment in the profile of an open channel spillway above which water in the reservoir discharges through the spillway.
Cross section	A slice through the dam showing elevation vertically and direction of natural water flow horizontally from left to right. Also, a slice through a spillway showing elevation vertically and left and right sides of the spillway looking downstream.
Dam	An artificial barrier generally constructed across a watercourse for the purpose of impounding or diverting water.
Dam failure	The uncontrolled release of a dam's impounded water.
Dam Operator	The person(s) or unit(s) of government with responsibility for the operation and maintenance of dam.
Drain, toe or foundation, or blanket	A water collection system of sand and gravel and typically pipes along the downstream portion of the dam to collect seepage and convey it to a safe outlet.
Drainage area (watershed)	The geographic area on which rainfall flows into the dam.
Drawdown	The lowering or releasing of the water level in a reservoir over time or the volume lowered or released over a particular period of time.

Emergency	A condition that develops unexpectedly, endangers the structural integrity of the dam and/or downstream human life and property, and requires immediate action.
Emergency Action Plan (EAP)	A formal document identifying potential emergency conditions that may occur at the dam and specifying preplanned actions to minimize potential failure of the dam or minimize failure consequences including loss of life, property damage, and environmental impacts.
Evacuation map	A map showing the geographic area downstream of a dam that should be evacuated if it is threatened to be flooded by a breach of the dam or other large discharge.
Filter	The layers of sand and gravel in a drain that allow seepage through an embankment to discharge into the drain without eroding the embankment soil.
Freeboard	Vertical distance between a stated water level in the reservoir and the top of dam.
Gate, slide or sluice, or regulating	An operable, watertight valve to manage the discharge of water from the dam.
Groin	The area along the intersection of the face of a dam and the abutment.
Hazard classification	A system that categorizes dams (high, significant, or low) according to the degree of their potential to create adverse incremental consequences such as loss of life, property damage, or environmental impacts of a failure or misoperation of a dam.
Height, dam	The vertical distance between the lowest point along the top of the dam and the lowest point at the downstream toe, which usually occurs in the bed of the outlet channel.
Hydrograph, inflow or outflow, or breach	A graphical representation of either the flow rate or flow depth at a specific point above or below the dam over time for a specific flood occurrence.
Incident Commander	The highest predetermined official available at the scene of an emergency situation.
Instrumentation	An arrangement of devices installed into or near dams that provide measurements to evaluate the structural behavior and other performance parameters of the dam and appurtenant structures.
Inundation area or map	The geographic area downstream of the dam that would be flooded by a breach of the dam or other large discharge.

Notification	To immediately inform appropriate individuals, organizations, or agencies about a potentially emergency situation so they can initiate appropriate actions.
Outlet works (principal spillway)	An appurtenant structure that provides for controlled passage of normal water flows through the dam.
Piping	The progressive destruction of an embankment or embankment foundation by internal erosion of the soil by seepage flows.
Probable Maximum Precipitation (PMP) or Flood (PMF)	The theoretically greatest precipitation or resulting flood that is meteorologically feasible for a given duration over a specific drainage area at a particular geographical location.
Reservoir	The body of water impounded or potentially impounded by the dam.
Riprap	A layer of large rock, precast blocks, bags of cement, or other suitable material, generally placed on an embankment or along a watercourse as protection against wave action, erosion, or scour.
Risk	A measure of the likelihood and severity of an adverse consequence.
Seepage	The natural movement of water through the embankment, foundation, or abutments of the dam.
Slide	The movement of a mass of earth down a slope on the embankment or abutment of the dam.
Spillway (auxiliary or emergency)	The appurtenant structure that provides the controlled conveyance of excess water through, over, or around the dam.
Spillway capacity	The maximum discharge the spillway can safely convey with the reservoir at the maximum design elevation.
Spillway crest	The lowest level at which reservoir water can flow into the spillway.
Tailwater	The body of water immediately downstream of the embankment at a specific point in time.
Toe of dam	The junction of the upstream or downstream face of an embankment with the ground surface.
Top of dam (crest of dam)	The elevation of the uppermost surface of an embankment which can safely impound water behind the dam.

Appendix B–1
Resources Available

Locally available equipment, labor, and materials:
Garfield County Road Dept has the following resources that can be utilized in the event of an emergency:

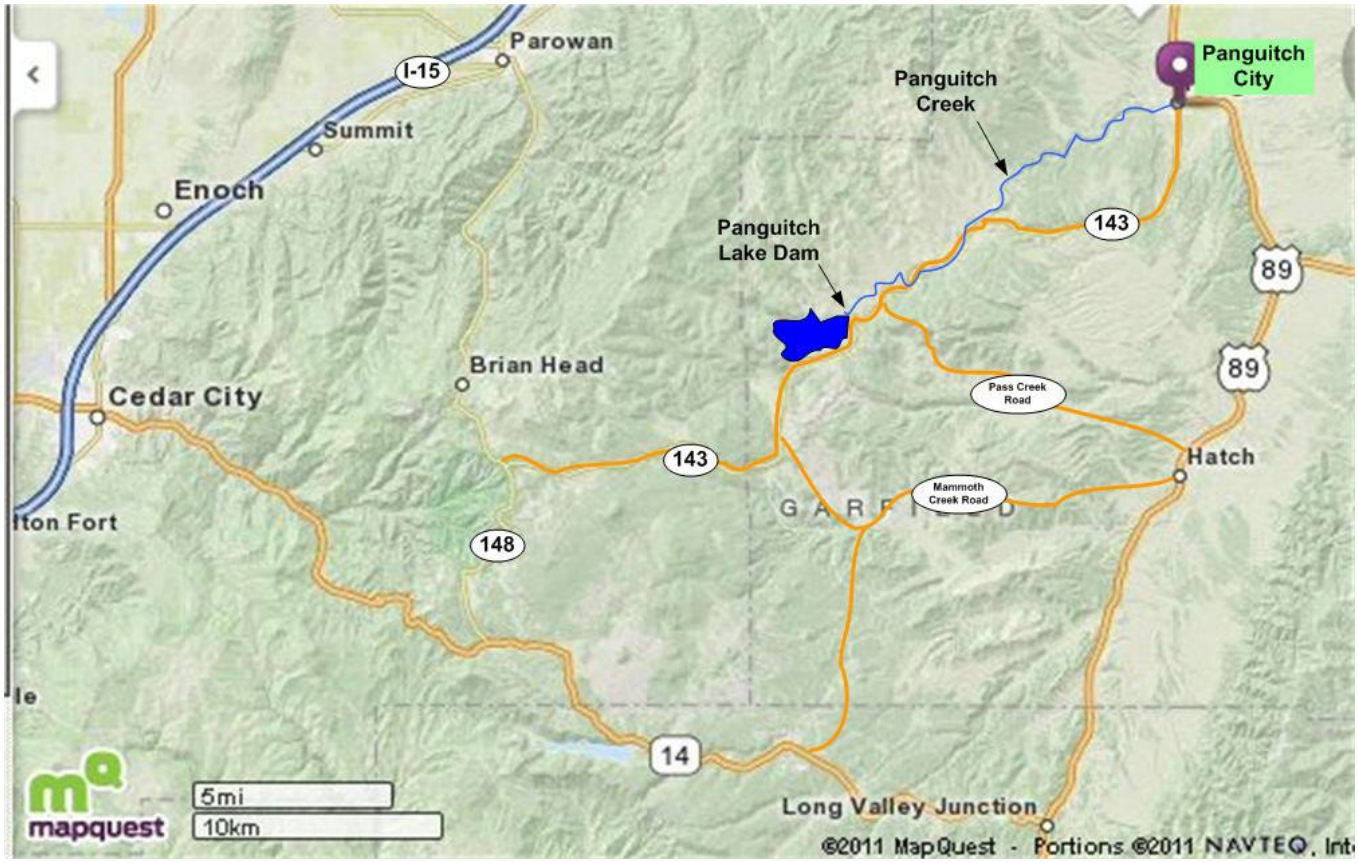
- One Front End Loader
- One Back Hoe
- One Track Hoe
- One Grader
- Two Dump Trucks
- a sand borrow pit
- a clay borrow pit

Contact the Garfield County Road Department—see *Emer. Services Contacts* tab.

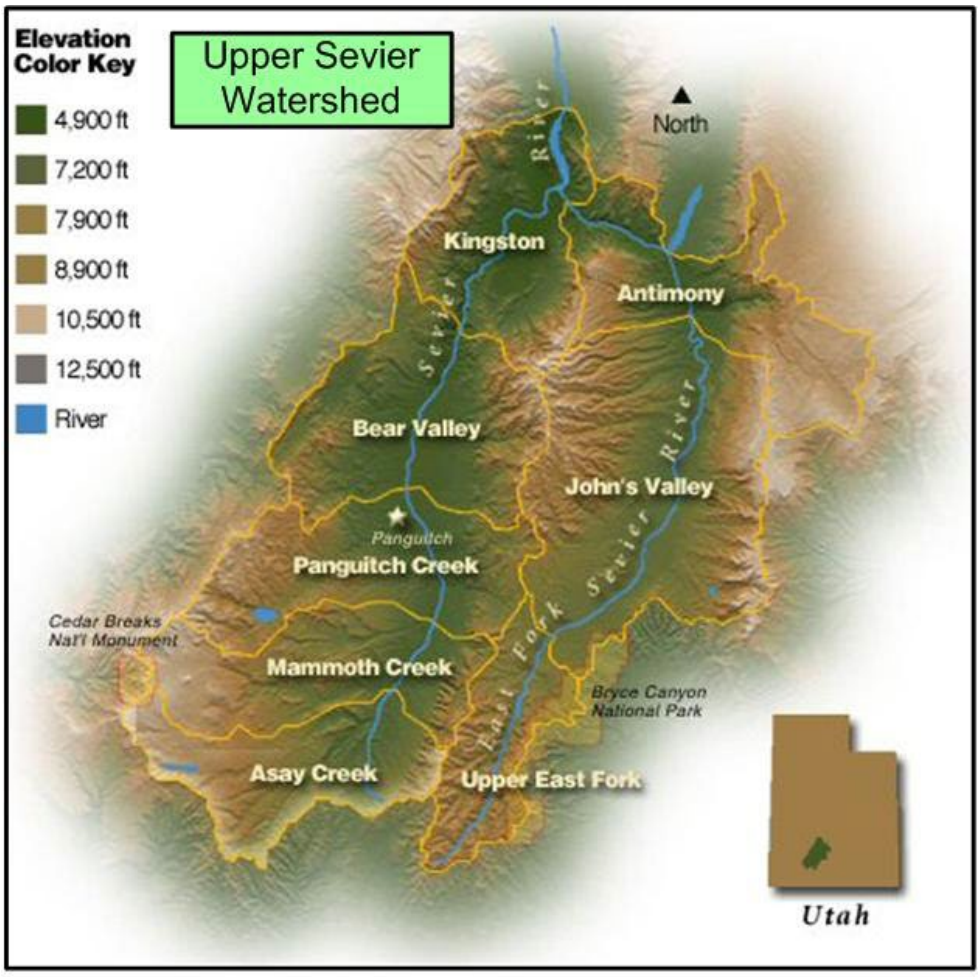
Other locally available resources include:

Heavy equipment service and rental	**Sand and gravel supply**	**Ready-mix concrete supply**
Wheeler Machinery 451 North Lund Hwy Cedar City, UT 435 586 6323	Western Rock Products 1759 North Bull Dog Rd Cedar City, UT 435 865 6465	Garfield County Ready Mix 105 North Kodachrome Dr. Cannonville UT 435 679 8512
Garfield County Road Dept 55 South Main Panguitch, UT 435 616 1101	Sun Rock 1970 North Bull Dog Rd Cedar City, UT 435 865 6998	Western Rock Products 1759 North Bull Dog Rd Cedar City, UT 435 865 6465
Pumps	**Diving contractor**	**Sand bags**
Robinson Rentals 1440 North Main Cedar City, UT 435 586 0222	Cross Marine 90 South Center Street, American Fork, UT - (801) 763-1223	Garfield County Road Dept 55 South Main Panguitch, UT 435 616 1101

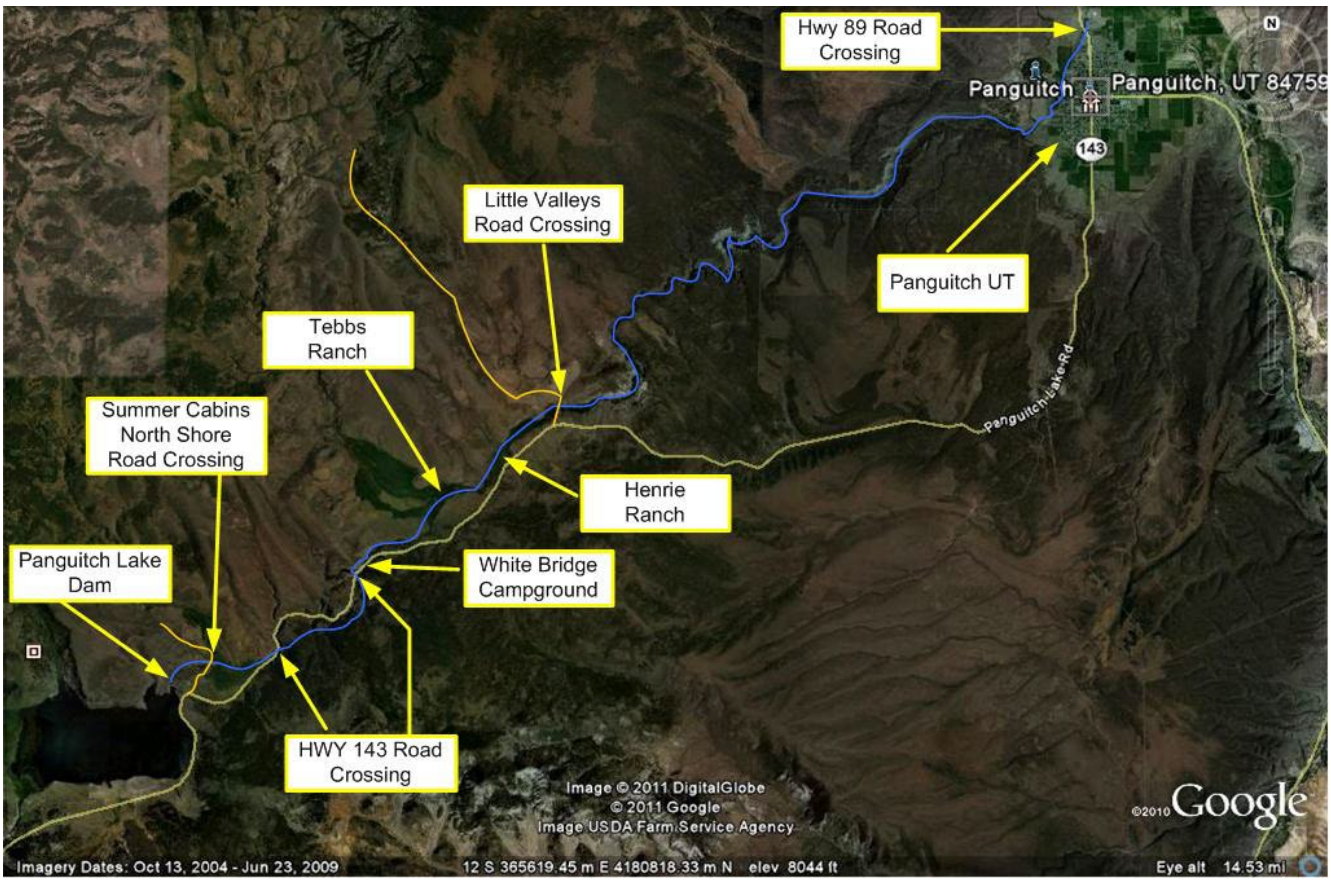
Appendix B–2
Location and Vicinity Maps



Appendix B–3
Upper Sevier Watershed Project Map



Appendix B–4
Evacuation Map



Appendix B–5
Residents/Businesses/Highways at Risk

A major flood caused by a sudden breach of the dam is estimated to inundate summer cabins, Ranchs, Panguitch City, Two Highways and Two County Roads. These locations (marked on the evacuation map) are located North of Panguitch Lake Dam.

	Location			Distance downstream from dam (miles)	Travel time** (hr)	Max water depth
	Summer Cabins North Shore Road Crossing			.5	.44	12.77
	1st Highway Crossing			1.5	.5* Estimate	
	White Bridge Camp Ground – 2nd Highway Crossing			3.4	.62	20.51
	Tebbs Ranch			4.5	.81	25.97
	Henrie Ranch			5.3	.9* Estimate	
	Little Valleys Road Crossing			6.4	1.1* Estimate	
	Panguitch City			15	1.88	18.17
	Highway 89 Road Crossing			16.5	2.24	12.28

* See Appendix B–4.

** Estimated time for breach wave (peak) to travel from dam to downstream locations

Basis for computation of evacuation area and flooding depths

Breach inundation study completed by US Forest Service - 7/29/1982

Appendix B–6
Breach Analysis and Inundation Study Letter
From The State Of Utah

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Robert L. Morgan
State Engineer

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

1636 West North Temple, Suite 220
Salt Lake City, Utah 84116-3156
801-538-7240
801-538-7315 (Fax)

March 23, 1993

Mr J Merle Prince
West Panguitch Irrigation Company
P O Box 441
Panguitch UT 84759

RE: Panguitch Reservoir Inundation Study

Dear Sir:

We have reviewed the Breech Analysis and Inundation Study of Panguitch Lake prepared by the Dixie National Forest. The study was done using the National Weather Service Program SMPDBK (Simplified Dam Break) which is a nomograph derivative of the more complex NWS-DAMBRK model. Although this model (SMPDBK) is simplistic and intended for preliminary comparisons, it does yield conservative results. The use of this conservative model with the conservative assumptions yields a large conservative inundation zone which should generate a safe evacuation zone. The use of the model and your inundation study is therefore acceptable and should be included in your EAP document. If you are interested in a more accurate, less conservative definition of the potential flood limits, we would recommend using the DAMBRK or HEC I model. We have enclosed a graph of a comparative study we performed this winter on the major flood routing models.

If you have any questions or comments, please feel free to contact Matt Lindon (538-7372) or myself at this office.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
State Engineer

RLM/mcl/sh

BREACH ANALYSIS RECORD SHEET

Name of Dam: PANGUITCH LAKE DAM
Inventory Number: 1017
Classification: HIGH
Stream: PANGUITCH CREEK
Forest: DIXIE N.F.
Quad: PANGUITCH LAKE 15' QUAD ; PANGUITCH 7½' QUAD
FIVEMILE RIDGE 7½' QUAD
Number of Runs to Complete: 10
Man-hours Needed to Complete: 9
Estimated Computer Time Cost: $ 48.50
Inundation Map Completed: Yes ✓ No ____
Date Analysis Completed: 7/29/82
Date Sent to Forest:
Remarks:

BECAUSE OF THE ADVERSE SLOPE CHANGES, THIS ANALYSIS IS IN FOUR PARTS. EACH PART IS SEPERATED BY INPUT HYDROGRAPHS FROM THE LAST HYDROGRAPH IN THE PRECEEDING PART.

AT MILE 8.2 THERE ARE TWO DIFFERENT DEPTHS. EACH ONE IS ON A DEFFERENT RUN, ONE BEING SUPERCRITICAL WITH HIGH MANNING VALUES CAUSING POOLING OF WATER. THE OTHER DEPTH IS CALCULATED FROM A SUPERCRITICAL RUN WITH SMALL MANNINGS.

Profile:

Mile D/S	Max Q (cfs)	Max Depth	Time (hrs)	Feature
0.5	147285	12.77'	0.44	
3.4	141613	20.61'	0.62	
4.5	135721	25.97'	0.81	
7.3	107674	43.87'	1.37	
8.2	100520	25.99'	1.56	
9.8	99095	38.33'	1.60	

Signed: Paul Davidson

BREACH ANALYSIS RECORD SHEET

Name of Dam: PANGUITCH LAKE DAM
Inventory Number: 1017
Classification: HIGH
Stream:
Forest: DIXIE NF.
Quad:

Number of Runs to Complete:
Man-hours Needed to Complete:
Estimated Computer Time Cost:
Inundation Map Completed: Yes ✓ No
Date Analysis Completed:
Date Sent to Forest:
Remarks:

Profile: Page 2 of PANGUITCH LAKE

Mile D/S	Max Q	Max Depth	Time	Feature
13.1	97364	16.73'	1.72	
14.6	96511	17.54'	1.79	
15.0	95097	18.17'	1.88	
16.1	93330	13.64'	2.15	
16.5	92409	12.28'	2.24	

Signed: Paul Davidson

- 26 -

Dam: PANGUITCH LAKE DAM Stream: Panguitch Creek
Forest: DIXIE N.F.

Height: 25 Storage: 19800
Type of Construction: Gravity

Base Elev: 8190 Drainage Area: 4.5
Top Elev: 8215 Reservoir Length: 4.8
Spillway Elev: 8208 & Width 25
Top Length: 270
Elev. of Breach: (Ca.) 8190 (PMF)

Reservoir:	Dam Width	Surface Area
Elev: 8215.0		1584.0
" 8210.8		1320
" 8206.7		1056
" 8202.5		792
" 8198.3		528
" 8194.2		264
" 8190.0		0

Top width of Breach: (b.w.)	270	(PMF)
Bottom " " " :	" 270	"
Side Slopes RISE/RUN:	" 1:0	"
Time of Breach :	" 0.4	"
Turbine Flow :	"	"
PMF :	N/A	"

CROSS SECTION DATA

COMPUTATION SHEET

PANGUITCH LAKE DAM PP. # 1

Subject

Top WIDTHS across Section

MILES D/S OF DAM	STREAM #1 (ELEV.)	#2	#3	#4	#5	ELEVATION / WIDTH	FEET DROP PER MILE
						220	
0.5	8080 / 0	8160 / 4400					82.8
3.4	7840 / 0	7920 / 1960					72.7
4.5	7760 / 0	7800 / 2120					50.0
5.3	7720 / 0	7760 / 1400					44.4
6.2	7680 / 0	7720 / 1380					36.4
7.3	7640 / 0	7680 / 580					44.4
8.2	7600 / 0	7620 / 120	7640 / 180	7660 / 260	7680 / 320		285.7
8.9	7400 / 0	7420 / 140	7440 / 240	7460 / 320	7480 / 400		222.2
9.8	7200 / 0	7220 / 60	7240 / 80	7260 / 100	7280 / 180		111.1
11.6	7000 / 0	7020 / 380	7040 / 480	7060 / 560	7080 / 1040		110.0

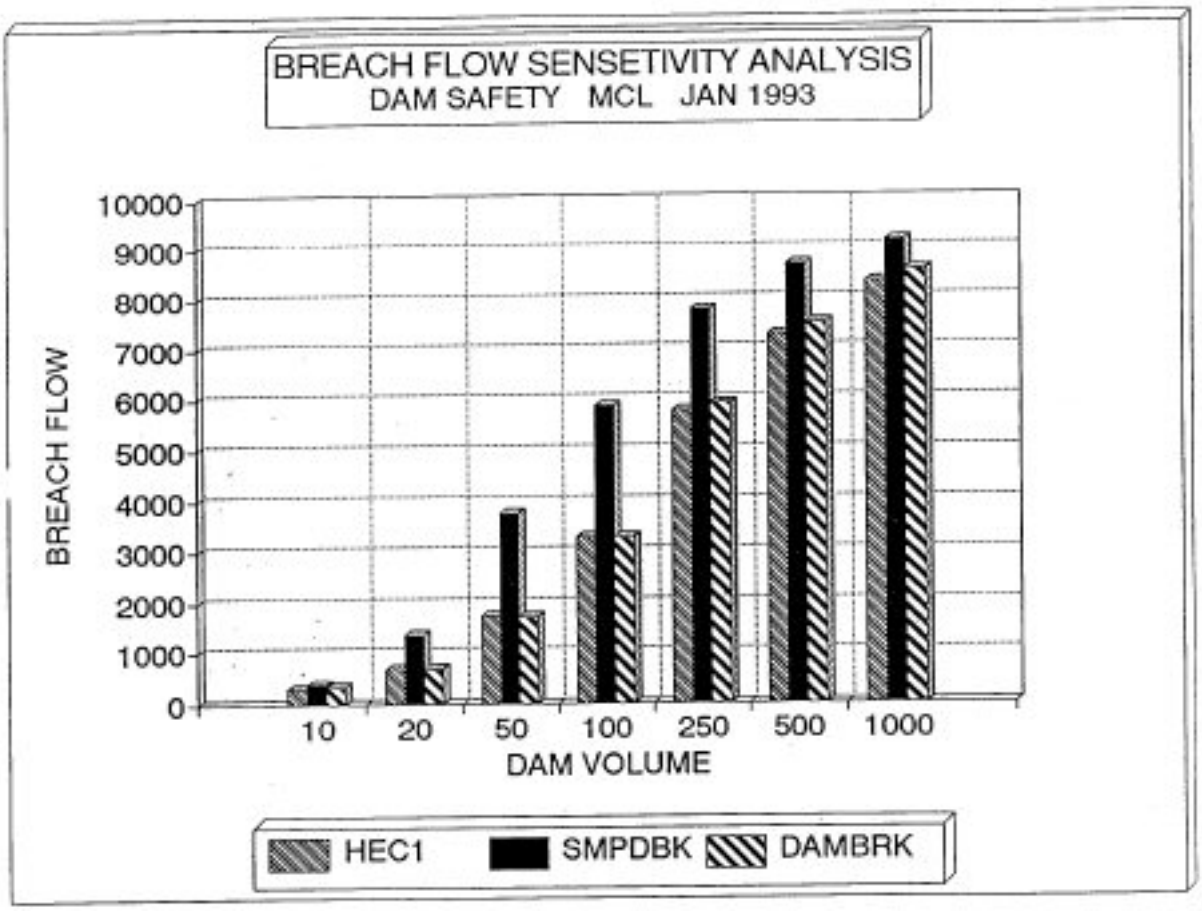
CROSS SECTION DATA

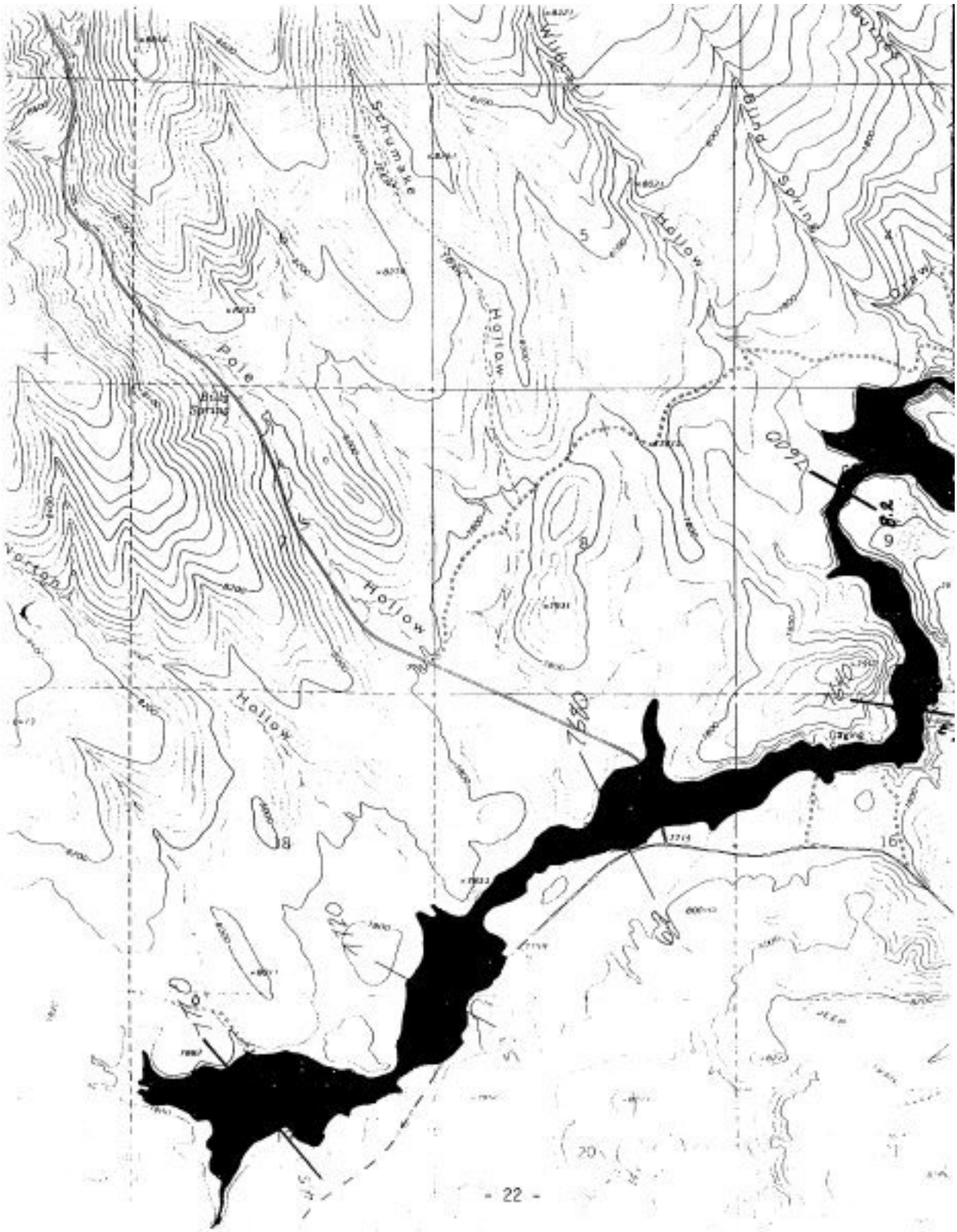
COMPUTATION SHEET

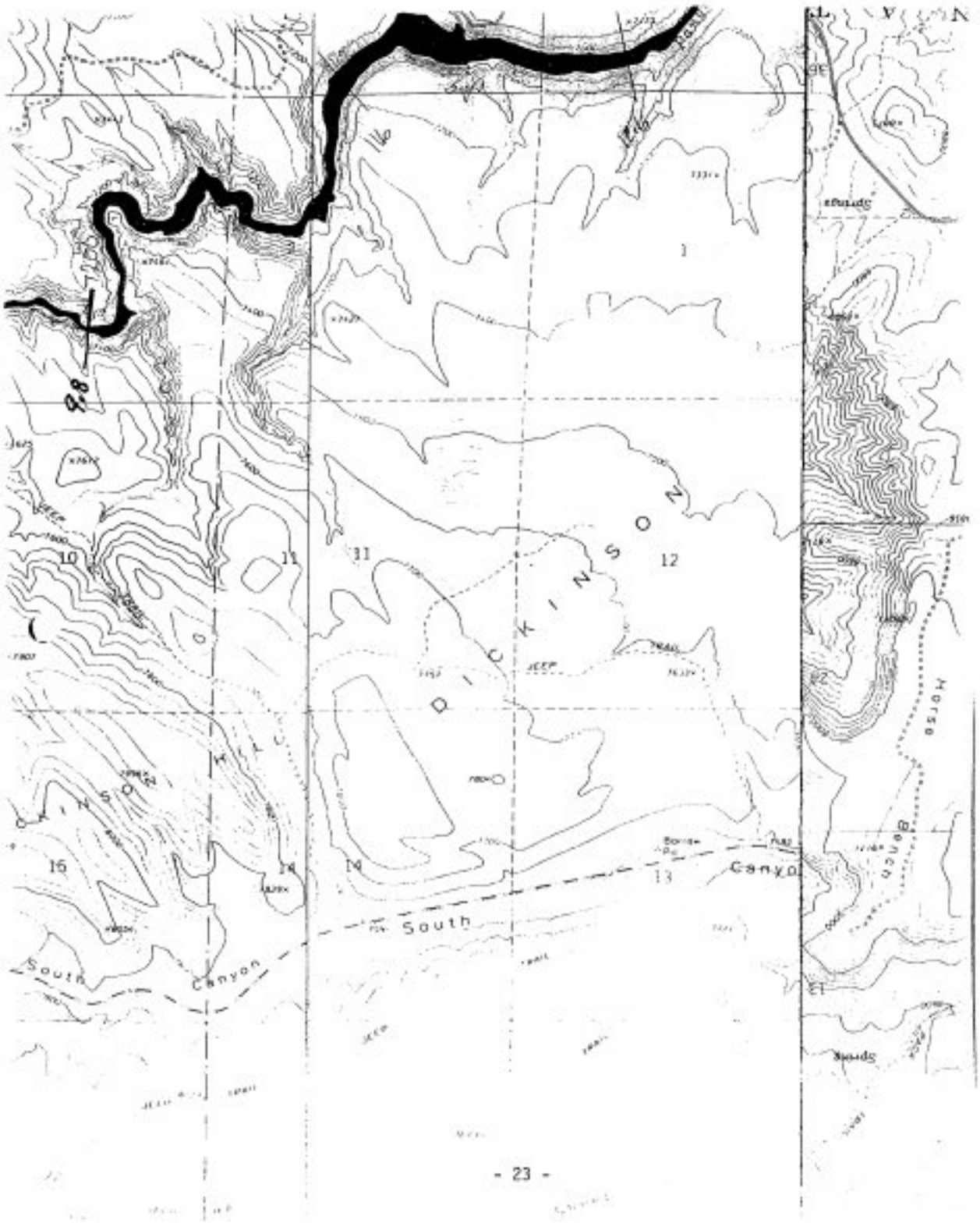
PANGUITCH LAKE DAM PP. # 2

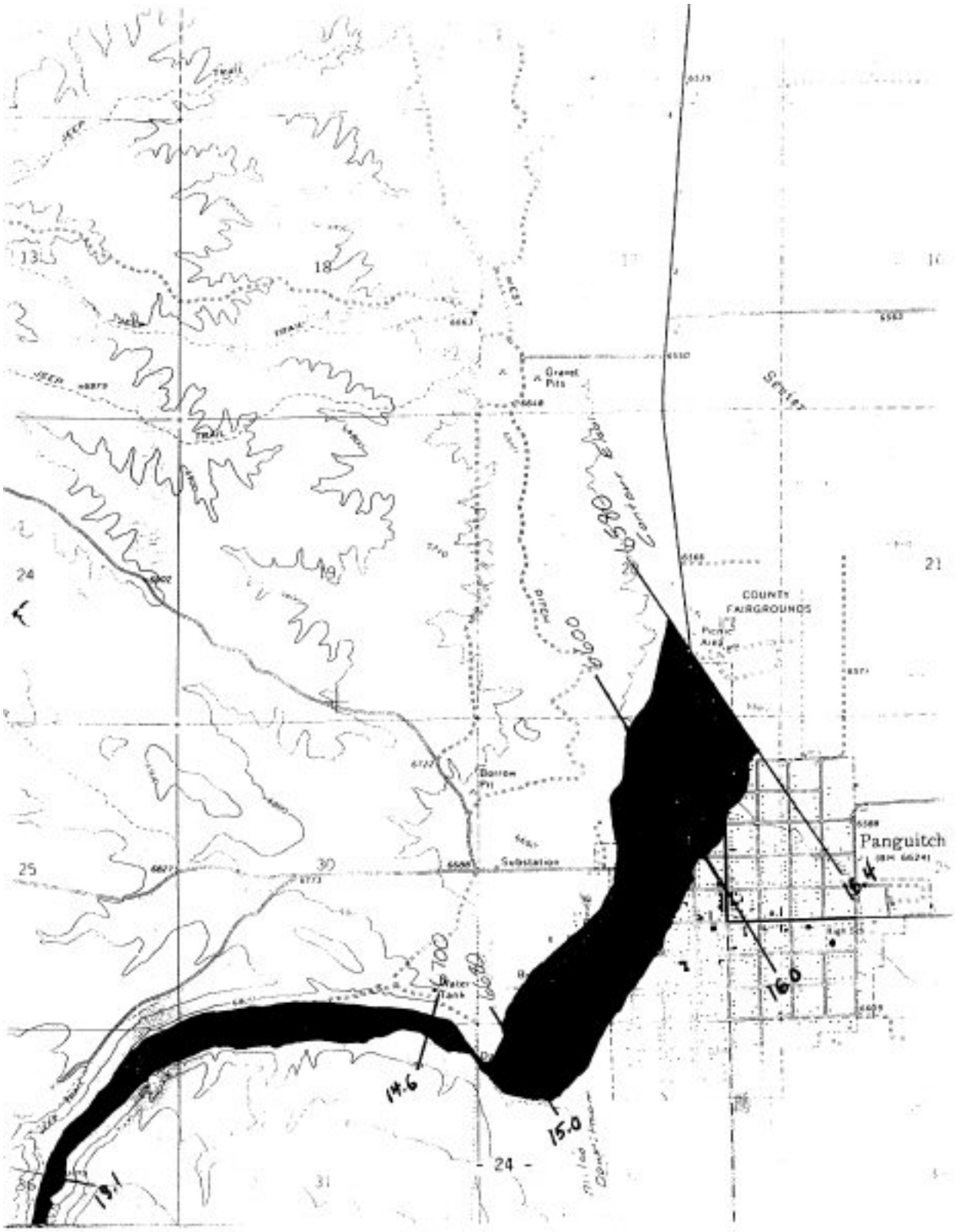
Subject:

MILES D/S OF DAM	Top Widths across Section: STREAM #1 (BANK)	#2	#3	#4	#5	ELEVATION / WIDTH	FEET DROP PER MILE
						100.0	
* 12.6	6900 / 0	6920 / 200	6940 / 280	6960 / 360	6980 / 440		160.0
13.1	6820 / 0	6840 / 400	6860 / 520	6880 / 620	6900 / 710		80.0
14.6	6700 / 0	6720 / 480	6740 / 560	6760 / 660	6780 / 920		50.0
15.0	6680 / 0	6700 / 1760	6720 / 2400				80.0
16.0	6600 / 0	6620 / 4480	6640 / 9800				50.0
16.4	6580 / 0	6600 / 5680	6620 / 13800				
			- 29 -				

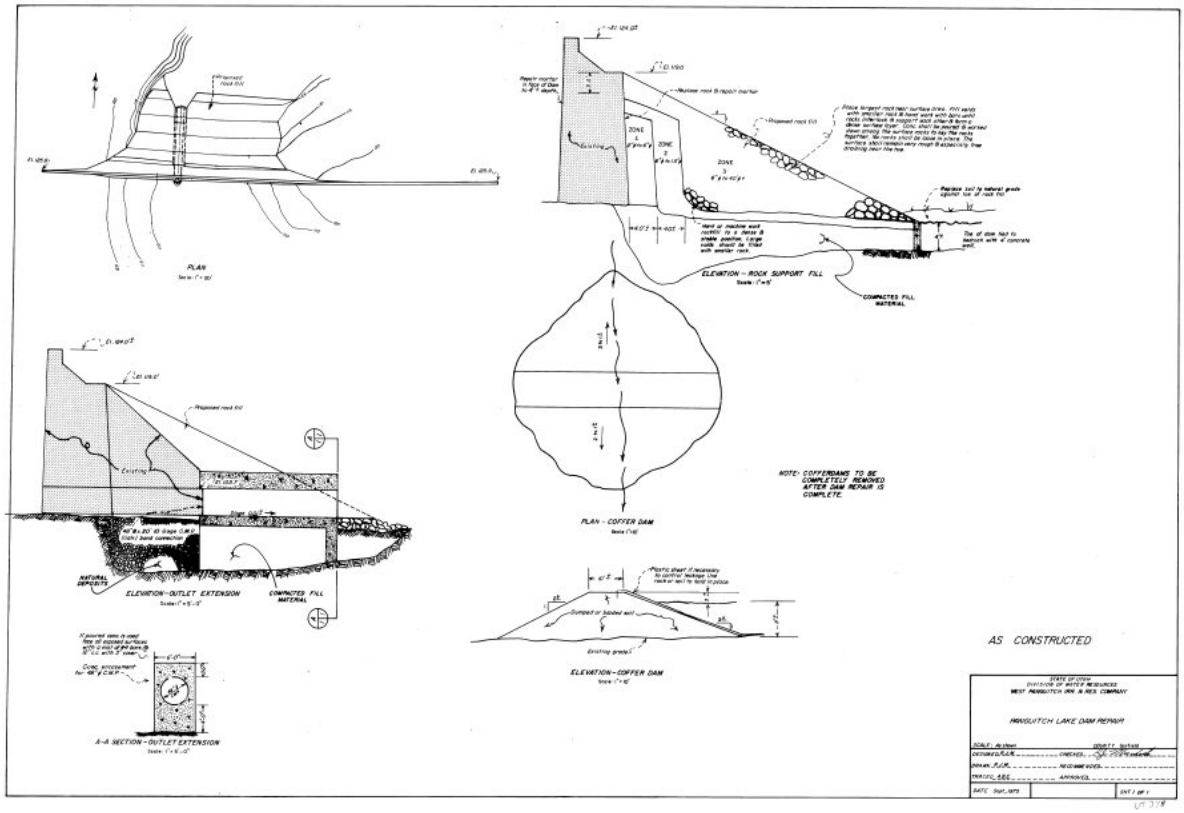

BREACH FLOW SENSETIVITY ANALYSIS
DAM SAFETY MCL JAN 1993
BREACH FLOW
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
10
20
50
100
250
500
1000
DAM VOLUME
HEC1
SMPDBK
DAMBRK


Hollow
Hollow
Hollow
Pole
Spring
Hollow
Spring
Hollow
7640
7720
- 22 -


D I C K I N S O N
South
Canyon
Horse
Canyon
- 23 -


Gravel Pits
COUNTY FAIRGROUNDS
Panguitch
Borrow Pit
Substation
Water Tank
Canal
Ditch
Trail
Jeep
14.6
15.0
15.1
16.0
15.4

Appendix B–7
Profile of Principal Spillway



Appendix B–8
Reservoir Elevation-area-volume
Panguitch Lake Dam
UT 00238

Reservoir Elevation-area-volume

Elevation	Lake Height	Surface Area Acres	Reservoir Volume Acre Feet
8184	0		
8185	1	600	400
8186	2	600	1000
8187	3	640	1600
8188	4	700	2,600
8189	5	730	3,225
8190	6	800	4,000
8191	7	800	4,800
8192	8	900	5,800
8193	9	900	6,600
8194	10	900	7,600
8195	11	1,000	8,600
8196	12	1,000	9,500
8197	13	1,000	10,600
8198	14	1,020	11,600
8199	15	1,030	12,750
8200	16	1,100	13,800
8201	17	1,100	15,000
8202	18	1,150	16,200
8203	19	1,150	17,400
8204	20	1,150	18,600
8205	21	1,160	19,800
8206	22	1,210	20,800
8207	23	1,210	22,200
8208	24	1,234	23,550

Appendix B–9
Dam Data

Basic Information:

Dam Number:	UT00238
Dam Name:	PANGUITCH LAKE
Dam Type Category:	Inspected Dams greater than 20 Acft
Hazard Rating:	HIGH
Owner:	WEST PANGUITCH IRRIGATION & RESERVOIR
Agent:	MAC HATCH
Address:	P.O. BOX 441 PANGUITCH, UT 84759
Telephone:	(435) 691-0848
Year Completed:	1872

Dam Modification History:
1942

Dam Operator: West Panguitch Irrigation & Reservoir Company

Location Information

Easting UTM:	356642.9 Meters, Zone 12, NAD27
Northing UTM:	4176344.25 Meters, Zone 12, NAD27
PLS Location:	NESW Section 34, 35S 7W, SL
County:	Garfield
WR Area:	61
Regional Office:	Richfield
Tributary Stream:	PANGUITCH CREEK
Maximum Outlet Discharge:	300 Cfs

Emergency Information

First Downstream Town: PANGUITCH Distance: 16 Miles

Hydraulic and Structural Information

Outlet Length:	42 Feet
Outlet Construction:	Corrugated Metal Pipe
Outlet Control Location:	At a point along conduit
Maximum Dam Breach Flow:	13000 Cfs
Drainage Basin Area:	45.7 Sq. Miles
Outlet Diameter:	48 Inches

Spillway Type:

Emergency Spillway Type:	Dam Crest is Spillway
Spillway Maximum Discharge:	Unknown Cfs
Dam Crest Length:	265 Feet
Dam Crest Width:	2 Feet
Reservoir Storage at Dam Crest:	23550 Acft
Dam Crest Elevation:	8208 Feet MSL
Reservoir Area at Spillway Crest:	1234 Acres

Reservoir Storage at Spillway Crest: 23550 Acft

Hydraulic Height:	24 Feet
Structural Height:	28 Feet