

JANICE K. BREWER
Governor



HERBERT R. GUENTHER
Director

ARIZONA DEPARTMENT OF WATER RESOURCES

3550 North Central Avenue, Second Floor
PHOENIX, ARIZONA 85012-2105
(602) 771-8500

February 24, 2010

Mr. Kent Pace, President
Magma Flood Control District
3850 East Baseline Road Ste 114
Mesa, Arizona 85206

**Subject: Magma Dam (11.05)
January 8, 2009 Dam Safety Inspection Report
Notice of Safety Deficiency**

Dear Mr. Pace:

Enclosed for your information and action is a copy of the Arizona Department of Water Resources (Department) report of the most recent inspection conducted by Chuck Merritt on February 17, 2010 on the above listed dam. Along with the enclosed invoice, please remit payment in the amount of \$142 to:

Peggy Beckett
Arizona Department of Water Resources
Surface Water Division
3550 North Central Avenue
Phoenix, Arizona 85012

In compliance with Arizona Revised Statutes (A.R.S.) § 41-1009, this letter notifies you of the following identified safety deficiency that must be corrected at the dam:

Embankment Cracking

The Department received the permit application for repair of the dam on June 25, 2009 and requested additional information on October 21, 2009. Thank you for your work resolving this matter.

In compliance with ARS 41-1009 the Department will send you a quarterly status letter regarding the progress made to correct the safety deficiencies. The monthly status letters will continue until the deficiency has been corrected.

Additionally, the dam safety inspection report identifies maintenance and repair action items that need to be addressed at the dam before the next scheduled inspection. Please provide the Department a schedule of when you intend to do this work and also notify us

in writing when you complete the items listed below. For additional information on how to conduct these repairs, please refer to the inspection report and/or contact the Department.

- Remove the trees growing on the embankment surfaces or near the toe of the embankment (*Refer to ADWR Safety Report items 3e, 4c and 5c*).
- Repair the cracks and holes on the dam crest (*Refer to ADWR Safety Inspection Report item 3a*).
- Install station markers on the dam crest to aid in monitoring and documenting the structural changes in the embankment surfaces (*Refer to ADWR Safety Inspection Report item 2b*).
- Repair the erosion gullies on the dam slopes and consider seeding the areas to mitigate their reoccurrence (*Refer to ADWR Safety Inspection Report items 4a and 5a*).
- Remove the rodents burrowing on the dam and fill holes with compacted fill material (*Refer to ADWR Safety Inspection Report items 3d, 4h and 5j*).
- Monitor and repair as needed the erosion occurring on the spillway training dike (*Refer to ADWR Safety Inspection Report item 14f1*).

The Department has reviewed the size and hazard potential classifications for the dam. The classifications have not changed from **intermediate** size and **high** hazard potential.

It is Department policy to review the License of Approval of each operating dam within state jurisdiction following its dam safety inspection. Based on the findings of the inspection and a review of our files, the License, issued February 4, 1986 requires no changes and remains in full force and effect.

The next inspection by the Department is tentatively scheduled for February of 2011. We will contact you in advance to arrange a mutually convenient inspection date and time. Please notify the Department promptly of any unusual or alarming condition, which may occur at the dam

If you or anyone connected this dam have any questions regarding this letter, please contact Chuck Merritt at 602 771-8654.

Sincerely,



Michael Johnson, Ph.D., P.E.
Assistant Director
Surface Water Division

Enclosures

Cc: Ms. Alisa Schiebler – Deputy Counsel, Arizona Department of Water Resources

Luana Capponi P.E. – Arizona State Land Office

Ilde Chavez – USDA, Natural Resource Conservation Service



**ARIZONA DEPARTMENT OF WATER RESOURCES
OFFICE OF WATER ENGINEERING – DAM SAFETY SECTION
DAM SAFETY INSPECTION REPORT**

Each item of the checklist should be completed. Repair is required when obvious problems are observed. Monitoring is recommended if there is a potential for a problem to occur in the future. Investigation is necessary if the reason for the observed problem is not obvious.

SID: 11.05	DAM NAME: Magma FRS	TYPE: Earth	PURPOSE: Flood Control	N O T A P P L I C A B L E	N O	Y E S	M O N I T O R	R E P A I R	I N V E S T I G A T E
CONTACT(S): Kent Pace, Manager – Magma Flood Control District			REPORT DATE: 2/18/2010						
INSPECTED BY: Chuck Merritt, P.E. <i>CM</i>			INSPECTION DATE: 2/17/2010						
REVIEWED BY: Michael Johnson, Ph.D., P.E. <i>mj</i>			DATE: 2/22/10						
DESIGN DAM CREST ELEVATION: 1627.3		DESIGN SPILLWAY CREST ELEVATION: 1,621.00							
DESIGN TOTAL FREEBOARD (FT): 6		MEASURED TOTAL FREEBOARD (FT): Did not measure							
STATUTORY DAM HEIGHT (FT): 21		STRUCTURAL HEIGHT (FT): 32							
DAM CREST LENGTH (FT): 28,900		UPSTREAM SLOPE: 3:1	DOWNSTREAM SLOPE: 2:1						
DAM CREST WIDTH (FT): 14		GPS	WATER RIGHTS: N/A						
RSRVR. AREA (AC): 860		RSRVR. STORAGE (AC-FT): 4,960	MAX. STORAGE (AC-FT): 7,700						
INFLOW DESIGN FLOOD / SAFE FLOOD-PASSING CAPACITY: Received permit application on June 25, 2009. Provided comments in October. Currently waiting for response which will include determination of required IDF.									
RESERVOIR LEVEL DURING INSPECTION: Empty (small pool in SW corner)		PHOTOS: Yes	Page 1 of 6						

COMPLIANCE CHECKLIST

1. CONDITION SUMMARY / LICENSE / EAP / NEXT INSPECTION					
a. Recorded downstream hazard: High Should hazard be revised?			X		
b. If High Hazard, estimate downstream persons-at-risk (PAR): 301+ Is there a significant increase since the last inspection? New homes are being built below the dam near the north end.			X		
c. Recorded size: Intermediate Should size be revised?			X		
d. Any safety deficiencies? Yes Describe: Embankment cracking		X		X	
e. Any Statute or Rule violations? Describe and list required action:			X		
f. Safe storage level on License: Temporary storage to sply crest for periods of flood Should level be revised?			X		
g. Any License violations? Describe and list required action:			X		
h. Date of current License: February 4, 1986 Should new License be issued?			X		
i. Date of last Emergency Action Plan revision: June 2008 Should EAP be revised?			X		
j. Any Agency Actions? Send quarterly notice of safety def. letter Describe and list required action:				X	
k. Normal inspection frequency: Annually Should inspection frequency be revised?			X		
l. Recommended date for next inspection: February 2011					

MONITORING CHECKLIST

2. INSTRUMENTATION AND MONITORING	Photo 1
a. Describe:	
<ul style="list-style-type: none"> • (11) Survey monuments on the crest. • (2) ALERT gages located U/S of the dam within the drainage area, installed in 2007 • (1) Pressure Transducer located on the inlet structure. • (1) FCDMC station located on the crest next to the primary outlet • (5) Settlement monuments located on the crest 	

DAM INSPECTION REPORT Magma Dam	Page 2 of 6	SID: 11.05	N / A	N O	Y E S	M O N.	R E P.	I N V.
INSPECTED BY: Chuck Merritt, P.E.		INSPECTION DATE: 2/17/2010						

b. Any repair or replacement required? Yes Describe: Some of the station markers are either damaged or missing. It is recommended that stationing be identified and marked on the dam crest (perhaps every 1000 feet) to make future inspections or crack investigations easier.			X			X		
c. Date of last monitoring report: Should new readings be taken and new report provided?		X						

DAM EMBANKMENT CHECKLIST

3. DAM CREST		Photos 1, 6, 7, 8,10 & 11						
a. Settlements, slides, depressions? Several areas throughout the crest where depressions/holes were observed. These appear to be related to cracks. Investigate and repair.			X			X		
b. Misalignment?		X						
c. Longitudinal/Transverse cracking? Several areas throughout the dam. See comment 3a.			X			X		
d. Animal burrows? Several areas throughout, remove & repair.			X			X		
e. Adverse Vegetation? Small trees were observed / downstream and upstream edges. Remove.			X			X		
f. Erosion?		X						
4. UPSTREAM SLOPE		Photos 11, 20, 21 & 22						
a. Erosion? Gullies and holes were observed throughout most of the structure. Repair.			X			X		
b. Inadequate ground cover? No groundcover, Owner should investigate options for seeding the slope to prevent further erosion.			X			X	X	
c. Adverse vegetation? Small trees scattered on dam surfaces. See comment 3.e.			X			X		
d. Longitudinal/Transverse cracking? Recent rains have apparently closed previously observed cracks.		X						
e. Inadequate riprap? None.		X						
f. Stone deterioration?	X							
g. Settlements, slides, depressions, bulges?		X						
h. Animal burrows? Observed in several areas. Remove & repair.			X			X		
5. DOWNSTREAM SLOPE		Photos 1, 9, 10 & 23						
a. Erosion? Large gullies and holes were observed widely scattered throughout most of the structure. Repair.			X			X		
b. Inadequate ground cover? No groundcover, Owner should investigate options for seeding the slope to prevent further erosion.			X				X	
c. Adverse vegetation? See comment 4.c.			X			X		
d. Longitudinal/Transverse cracking? See comment 4.d.		X						
e. Inadequate riprap? None.		X						
f. Stone deterioration?	X							
g. Settlements, slides, depressions, bulges?		X						
h. Soft spots or boggy areas?		X						
i. Movement at or beyond toe?		X						
j. Animal burrows? A few were observed throughout most of the structure. Remove & repair.			X			X		
6. ABUTMENT CONTACTS								
a. Erosion?		X						
b. Differential movement?		X						
c. Cracks?		X						
d. Settlements, slides, depressions, bulges?		X						
e. Seepage? Est. Left ___ gpm; Est. Right ___ gpm		X						
f. Animal burrows?		X						
7. SEEPAGE/PIPING CONTROL DESIGN FEATURE(S)								
a. Describe: None								

DAM INSPECTION REPORT Magma Dam	Page 3 of 6	SID: 11.05	N	N	Y	M	R	I
INSPECTED BY: Chuck Merritt, P.E.	INSPECTION DATE: 2/17/2010		/	N	E	O	E	N
			A	O	S	N.	P.	V.

b. Internal drains flowing? Est. Left ___ gpm; Est. Right ___ gpm	X					
c. Seepage at or beyond toe? Estimated ___ gpm		X				
e. If so, does seepage contain fines?	X					
d. Evidence of sand boils at or beyond toe?		X				

OUTLET WORKS CHECKLIST

8. APPROACH CHANNEL Photo 17

a. Describe: Very small and shallow channel immediately U/S of the inlet control structure.						
b. Eroding or backcutting?		X				
c. Sloughing?		X				
d. Restricted by vegetation?		X				
e. Obstructed with debris?		X				
f. Silted in?		X				

9. INLET STRUCTURE Photos 16 & 18

a. Describe: 10-ft. wide x 22-ft. tall metal trash rack surrounding the 39-inch RCP conduit. Invert elevation of 1,599-ft.; top of trash rack elevation is 1,621-ft. (same as emergency spillway elevation). See photo 14.						
b. Seepage into structure?		X				
c. Debris or obstructions?		X				
d. <i>If concrete</i> , do surfaces show:						
1. Spalling or Scaling? Minor, monitor.		X				
2. Cracking? Minor, monitor.		X				
3. Erosion?		X				
4. Exposed reinforcement?		X				
e. <i>If metal</i> , do surfaces show:						
1. Corrosion?		X				
2. Protective coating deficient?		X				
3. Misalignment or split seams?		X				
f. Do the joints show:						
1. Displacement or offset?		X				
2. Loss of joint material?		X				
3. Leakage?		X				
g. Are the trash racks:						
1. Broken or bent?		X				
2. Corroded or rusted?		X				
3. Obstructed?		X				
h. Operator, gates and valves:						
1. Describe: None.						
2. Date(s) last operated: Ungated.						
3. Broken or bent?		X				
4. Corroded or rusted?		X				
5. Leaking?		X				
6. Not seated properly?		X				

7. Not operational?	X					
8. Not periodically maintained?	X					

10. CONDUIT **Photos 4 & 16**

a. Describe: 136-ft. long, 39-inch diameter RCP.						
b. Seepage into conduit?		X				
c. Debris present?		X				
d. <i>If concrete</i> , do surfaces show:						
1. Spalling or scaling?		X				
2. Cracking?		X				
3. Erosion?		X				
4. Exposed reinforcement?		X				
e. <i>If metal</i> , do surfaces show:						
1. Corrosion?	X					
2. Protective coating deficient?	X					
3. Misalignment or split seams?	X					
f. Do the joints show:						
1. Displacement or offset?		X				
2. Loss of joint material?		X				
3. Leakage?		X				

11. STILLING BASIN / ENERGY DISSIPATOR **Photo 5**

a. Describe: Concrete stilling basin,						
b. Do surfaces show:						
1. Spalling or Scaling? Minor		X				
2. Cracking? Minor		X				
3. Erosion?		X				
4. Exposed reinforcement?		X				
c. Do joints show:						
1. Displacement or offset?		X				
2. Loss of joint material?		X				
3. Leakage?		X				
d. Do energy dissipaters show:						
1. Signs of deterioration?		X				
2. Covered with debris?		X				
3. Signs of inadequacy?		X				

12. OUTLET CHANNEL **Photos 1, 2, 3 & 6**

a. Describe: Unlined channel.						
b. Eroding or backcutting?		X				
c. Sloughing?		X				
d. Obstructions or restrictions? Vegetation has been removed from channel and fence since last year's inspection.		X				
e. Poorly riprapped? No riprap.	X					
f. Tailwater elevation and flow condition: Dry.						

EMERGENCY SPILLWAY CHECKLIST

13. ENTRANCE CHANNEL		Photo 7						
a. Describe Unlined channel .								
b. Eroding or backcutting?			X					
c. Sloughing?			X					
d. Restricted by vegetation?			X					
e. Obstructed with debris?			X					
f. Silted in?			X					
14. CONTROL SECTION		Photo 7						
a. Describe: Control section is an unlined, graded broad crested weir, 150-ft. wide.								
b. <i>If concrete</i> , do surfaces show:								
1. Spalling or Scaling?			X					
2. Cracking?			X					
3. Erosion?			X					
4. Exposed reinforcement?			X					
c. <i>If concrete</i> , do joints show:								
1. Displacement or offset?			X					
2. Loss of joint material?			X					
3. Leakage?			X					
f. If spillway is <i>unlined</i> :								
1. Are slopes eroding? Training dike on left (away from dam) is eroding but still functional.					X	X		
2. Are slopes sloughing?			X					
3. Is crest eroding?			X					
g. Is the control structure (i.e. weir, sill, etc.) in poor condition?			X					
15. DISCHARGE CHANNEL		Photo 7						
a. Describe: Unlined channel .								
b. Obstructions or restrictions?			X					
c. <i>If concrete</i> , do surfaces show:								
1. Spalling or Scaling?			X					
2. Cracking?			X					
3. Erosion?			X					
4. Exposed reinforcement?			X					
d. <i>If concrete</i> , do joints show:								
1. Displacement or offset?			X					
2. Loss of joint material?			X					
3. Leakage?			X					
e. If spillway is <i>unlined</i> :								
1. Are slopes eroding?			X					
2. Are slopes sloughing?			X					
3. Poorly protected w/ vegetation/riprap?			X					
16. STILLING BASIN / ENERGY DISSIPATOR								

a. Describe: None.								
b. Do surfaces show:								
1. Spalling or Scaling?	X							
2. Cracking?	X							
3. Erosion?	X							
4. Exposed reinforcement?	X							
c. Do joints show:								
1. Displacement or offset?	X							
2. Loss of joint material?	X							
3. Leakage?	X							
d. Do energy dissipaters show:								
1. Signs of deterioration?	X							
2. Covered with debris?	X							
3. Signs of inadequacy?	X							
17. OUTLET CHANNEL			Photo 7					
a. Eroding or backcutting? None.	X							
b. Sloughing?	X							
c. Obstructions or restrictions?	X							

RESERVOIR CHECKLIST

18. RESERVOIR A September 18, 2007 AMEC Geologic Characterization Report indicates a crack (parallel with the dam) located within the low flow channel. Approximately located between Sta. 270+00 and north of Sta. 160+00. Did not observe this on this inspection . Photos 17, 19 & 24								
a. High water marks? Yes, at the primary outlet.			X					
b. Erosion/Slides into pool area?		X						
c. Sediment accumulation?		X						
d. Floating debris present? Dry reservoir.	X							
e. Depressions, sinkholes or vortices? None observed.		X						
f. Low ridges/saddles allowing overflow?		X						
g. Structures below dam crest elevation?		X						

ADDITIONAL COMMENTS AND RECOMMENDATIONS:

It is understood that the Dam is currently being studied for rehabilitation work which will primarily address its geotechnical deficiencies. However, rodents, trees and brush need to be removed as indicated in this report.