

## Engineer's Inspection Task List for Montana High Hazard Dams

<b>Review and Analysis</b>			
	Task	Notes/Considerations	ARM <sup>1</sup>
<input type="checkbox"/>	Review previous inspection reports and available data on the design, construction, operation, and maintenance of the dam and its appurtenances.	Contact DNRC dam safety program for a copy of their files if needed.	<a href="#">36.14.602(1)a</a>
<input type="checkbox"/>	Review operation and maintenance procedures in Operation and Maintenance manual.	Refer to <a href="#">Operation</a> and <a href="#">Maintenance</a> Plan Requirements.	<a href="#">36.14.602(1)d</a>
<input type="checkbox"/>	Review emergency procedures contained in Emergency Action Plan.	Refer to <a href="#">Emergency Action Plan Requirements</a> .	<a href="#">36.14.602(1)d</a>
<input type="checkbox"/>	Complete an analysis of piezometric levels or other data from any instrumentation or monitoring of the dam.	Provide recommendations based on data analysis. If data is limited and the dam's condition warrants investigation, design a program for data acquisition.	<a href="#">36.14.602(1)e</a>
<input type="checkbox"/>	Review inspection procedures employed by the owner.	Does owner do a good job of their annual inspection? Could they use training or assistance? Are the owner's inspection reports helpful to you?	<a href="#">36.14.602(1)d</a>
<input type="checkbox"/>	Review maximum operating water surface elevation and amount of freeboard.	Is reservoir being operated in accordance with O&M? Is spillway being used excessively? Is freeboard adequate for the fetch in the reservoir?	<a href="#">36.14.602(1)h</a>
<input type="checkbox"/>	Evaluate the general conditions of the dam, spillways, and other appurtenances, and any other conditions that constitute or could constitute a hazard to the integrity of the structure.		<a href="#">36.14.602(1)c</a>
<input type="checkbox"/>	Include an assessment of the hydrologic and hydraulic capabilities of spillways and outlet works.	This assessment commonly references past studies and if necessary, makes recommendations for additional analysis, data collection or rehabilitation. In some cases, it may be necessary to recommend that a plan be developed, as insufficient information is available to make recommendations for action. This "plan" must not exceed a five year period. An engineer may also make a determination that additional analysis is not needed. For a hydrologic assessment, this determination can be based on a variety of items such as location of dam off-stream, low potential for loss of life, large freeboard, ability of dam to withstand overtopping and/or large routing capability of reservoir. For a structural stability assessment, this determination can be based on the configuration of the dam, lack of seepage, driving head and materials used in dam construction.	<a href="#">36.14.602(1)c</a>
<input type="checkbox"/>	Include an assessment of the structural stability of the dam.		

<b>Field Tasks</b>			
	Task	Notes/Considerations	ARM <sup>1</sup>
<input type="checkbox"/>	Conduct a visual inspection of the dam, its appurtenances, the downstream area, and all other areas affected by the structure.		<a href="#">36.14.602(1)b</a>
<input type="checkbox"/>	Conduct a visual inspection of the condition of surfaces and vegetation on the crest and slopes of the dam and area beyond the downstream toe of the dam.		<a href="#">36.14.602(1)g</a>
<input type="checkbox"/>	Review and analyze the rate and volume of seepage. Check the condition and maximum flow capability of any seepage collection system.		<a href="#">36.14.602(1)f</a>
<input type="checkbox"/>	Conduct a visual inspection of the condition of spillways and water level control structures, including all conduits exiting the dam.	At a minimum, outlet conduits should be inspected at a five year interval. Note that DNRC has an outlet inspection sled available for small diameter outlets. For inaccessible outlets, the engineer should propose alternative means for assessing outlet conduit condition.	<a href="#">36.14.602(1)i</a>

<b>Report</b>			
	Task	Notes/Considerations	ARM <sup>1</sup>
<input type="checkbox"/>	The engineer shall prepare a written report and photographic record of the inspection.		<a href="#">36.14.603(1)</a>
<input type="checkbox"/>	Include the date and findings of the inspection.		<a href="#">36.14.603(1)a</a>
<input type="checkbox"/>	Include an assessment of the conditions of the dam and reservoir based on the visual observations, available data on the design, construction, operation, and maintenance of the structure, and hydrologic, hydraulic, stability, and other evaluation.		<a href="#">36.14.603(1)a</a>
<input type="checkbox"/>	Make recommendations for any critical or emergency measures or actions.		<a href="#">36.14.603(1)b</a>
<input type="checkbox"/>	Make recommendations for corrective measures or actions relating to design, construction, operation, maintenance, and inspection of the structure.		<a href="#">36.14.603(1)c</a>
<input type="checkbox"/>	Make recommendations for time periods appropriate for implementing any necessary emergency or corrective measures or actions to improve the safety of the dam to an acceptable level.		<a href="#">36.14.603(1)d</a>
<input type="checkbox"/>	Make recommendations for additional detailed studies, investigations, and analyses.	If warranted. In cases, no additional study is necessary.	<a href="#">36.14.603(1)e</a>
<input type="checkbox"/>	Make recommendations for the safe storage level of the dam or reservoir.		<a href="#">36.14.603(1)f</a>
<input type="checkbox"/>	Make recommendations for the time of the next inspection by an engineer.		<a href="#">36.14.603(1)g</a>

<b>Administrative</b>			
	Task	Notes/Considerations	ARM <sup>1</sup>
<input type="checkbox"/>	The engineer shall deliver the report and discuss it with the owner within 60 days of the investigation.	Note, this is a good time to also provide an electronic draft of the inspection report to DNRC to review.	<a href="#">36.14.603(2)</a>
<input type="checkbox"/>	Within 90 days of the periodic inspection, the owner shall deliver a copy of the report to the department, together with a <b>statement of the owner's intent</b> in regard to any deficient or unsafe items identified by the report, and a time schedule to remedy the items.	Electronic submittals are encouraged. For large file size, please contact DNRC for assistance with file transfer.	<a href="#">36.14.603(5)</a>
<b>Other Information</b>		The owner of a high-hazard dam shall have periodic inspections conducted by a qualified engineer.	<a href="#">36.14.601(1)</a>
		Periodic inspections / report completed on a frequency of at least once every 5 years or within the period stated in the terms of an operation permit for a high- hazard dam.	<a href="#">36.14.603(2)</a>
		The frequency of periodic inspections shall be set by the department after considerations including the condition of the dam, proximity to population centers, current design technology, and type of construction  Generally the frequency is five years, unless the dam has an apparent deficiency that is being addressed in some manner (additional studies, planning for rehabilitation or under construction).	<a href="#">36.14.603(3)</a>

For more information and for Dam Safety Program Staff contact information please visit our website:

<http://dnrc.mt.gov/divisions/water/operations/dam-safety>