

**STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION**

_____)
In the Matter of:)
)
)
PROPOSED AMENDMENT)
TO 20.6.2 NMAC (Copper Rule))
_____)

No. WQCC 12-01(R)

EXHIBIT SCOTT – D-23

NEW MEXICO OFFICE OF THE STATE ENGINEER DAM SAFETY BUREAU



PROJECT SUBMITTAL CHECKLIST

The Office of the State Engineer (OSE) rules and regulations governing Dam Design, Construction and Dam Safety requires the submittal of several items to document the design of a new dam and for the investigation, alteration or repair of an existing dam (19.25.12.11 New Mexico Administrative Code). The documents are required to provide the supporting information to ensure the design is safe. The rules and regulations also require owners of high and significant hazard potential dams to submit an Operation and Maintenance Manual and Emergency Action Plan. It is required that relevant sections of the checklist accompany any document submitted for review to the OSE Dam Safety Bureau. The checklist must not be bound into the document.

The OSE Dam Safety Bureau requires reports to thoroughly document procedures and assumptions of all investigations, analysis and designs. Methodology must be discussed in detail, independent of any reference material provided or software used to perform the computations. All design coefficients must be tabulated and justified and results must be interpreted with appropriate conclusions. Any errors or warning identified by a computer program must be discussed in the report. Analysis not required by the OSE must not be submitted in the Report to the OSE. Supporting documentation such as computer input and output files must be annotated if the computer models are not used by the OSE Dam Safety Bureau. A working electronic copy of all computer models must be provided in the submittal. If the models are considered a "trade secret" please indicate this condition and the model will not be subject to the inspection of public records act.

Items in the checklist provide either a general or specific reference to the rules and regulations for dams contained in Title 19, Chapter 25, Part 12 of the New Mexico Administrative Code (19.25.12 NMAC). Providing the location and page number where each item is addressed will expedite the OSE Dam Safety Bureau review process. This checklist is not intended as an outline for your technical report and must not be used for that purpose.

A copy of the rules and regulations governing Dam Design, Construction and Dam Safety can be obtained from the OSE website at www.ose.state.nm.us/water_info_dam_safety_rules.html. A copy of this checklist document can be obtained from the OSE website at www.ose.state.nm.us/water_info_dam_safety_info.html

Any Document submitted to the OSE Dam Safety Bureau for review must be submitted in a format acceptable to the OSE. Both hard copy and electronic copy is required. Please review the OSE paper "Technical Reports for Dams" for guidance on formatting and preparation of a technical document. If additional discussion is required regarding dam design projects, please contact Elaine Pacheco, P.E., Dam Safety Bureau Chief at 505-827-6111.

Project Submittal Checklist for Dams

File No.: _____

Date: _____

Dam: _____

Owner: _____

Design Engineer: _____

Application, Fees and Detailed Plans	Submitted		Not Required	Comments
	YES	NO		
1. Correctly completed Application (19.25.12.11.A) Submit as a separate document				
2. Detailed Cost Estimate (19.25.12.11.A) Submit as a separate document				
3. Filing Fee and Plan Review Fee (19.25.12.8) Check payable to Office of the State Engineer and attached to the transmittal letter				
4. Water rights for water impounded by the dam (19.25.12.11.B) Letter from the OSE Water Right District Office				
5. Design Report (19.25.12.11.C). Design Report may be organized into multiple reports. Submit as a hard copy report(s) and electronically in Adobe pdf.				
6. Construction Drawings (19.25.12.11.D) Submit in hard copy and single file multi page TIFF				
7. Specifications for the Project (19.25.12.11.E) Submit in hard copy and electronically in Adobe pdf.				
8. Plat of Survey (19.25.12.11.F) Submit as a rolled paper copy. Do not fold.				
9. Dam Site Security (19.25.12.11.G) Submit as part of the design report or as a separate document and electronically in Adobe pdf.				
10. Instrumentation Plan (19.25.12.11.H) Submit as part of the design report or as a separate document and electronically in Adobe pdf.				
11. Operation and Maintenance Manual (19.25.12.11.I) Submit as a separate document bound in a 3 ring binder and electronically in Microsoft Word.				
12. Emergency Action Plan (19.25.12.11.J) Submit as a separate document bound in a 3 ring binder and electronically in Microsoft Word.				

Note: References in parenthesis corresponds to the appropriate rule in Dam Design, Construction and Dam Safety, Title 19, Chapter 25, Part12 of the New Mexico Administrative Code (19.25.12 NMAC)

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
1. Paper copy and Adobe PDF of final accepted Report (19.25.12.11.C)		
2. Front cover has dam name, dam owner, county and document title (19.25.12.11.C)		
3. First page behind the title page shall include the following (19.25.12.11.C):		
3.a. Dam name and county		
3.b. Engineer's certification properly completed and signed (19.25.12.12.B)		
3.c. State Engineer's certification (19.25.12.12.E)		
4. Design Report is free of errors and consistent with construction drawings (19.25.12.11.C)		
5. Hazard Potential Classification that addresses the following (19.25.12.11.C.1):		
5.a. Professional engineer's certification, signature and stamp if separate from the design report. Certification for the State Engineer (19.25.12.11.C)		
5.b. Hazard potential classification identified and based on engineer's recommendation and OSE concurrence. Future development addressed. Concurrence not required for high hazard potential classification (19.25.12.11.C.1)		
5.c. Hazard potential classification based on dam breach analysis and future development addressed. Analysis includes the following information (19.25.12.11.C.1):		
5.c.i. Description of dam breach and flood routing methodology (19.25.12.11.C.1.a)		
5.c.ii. Tabulation and justification of parameters used in the analysis (19.25.12.11.C.1.b)		
5.c.iii. Sensitivity analysis of the parameters used in the analysis (19.25.12.11.C.1.c)		
5.c.iv. Reference and version of all computer models used in the analysis (19.25.12.11.C.1.d)		
5.c.v. Appropriate data sheets, computer program input & output computations and electronic computer files. Files must be annotated if software is not used by the OSE. (19.25.12.11.C.1.e)		
5.c.vi. Table of results for the sunny day failure and failure and no failure for events up to the SDF. (19.25.12.11.C.1.f)		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
5.c.vii. Inundation maps for the sunny day failure and SDF (19.25.12.11.C.1.g)		
5. Hydrologic Analysis that addresses the following (19.25.12.11.C.2):		
6.a. Professional engineer's certification, signature and stamp if separate from the design report. Certification for the State Engineer (19.25.12.11.C)		
6.b. Topographic map of the drainage area (19.25.12.11.C.2.a)		
6.c. Description of topography, soils, vegetative cover and land treatment, if proposed (19.25.12.11.C.2.b)		
6.d. Design storm depth, duration and distribution discussed and justified (19.25.12.11.C.2.c)		
6.e. Discussion of methodology of converting rainfall to runoff independent of the software program used in the analysis (19.25.12.11.C.2.d)		
6.f. Discussion, justification and tabulation of all model input parameters independent of the software program used in the analysis (19.25.12.11.C.2.d)		
6.g. Table of reservoir area and storage capacity for each foot of elevation referenced to NAVD 88. Indicate elevation of outlet invert, spillway(s) and dam crest (19.25.12.11.C.2.g)		
6.h. Outlet and spillway rating tables including calculations (19.25.12.11.C.5)		
6.i. Plot of inflow and outflow hydrographs on the same figure (19.25.12.11.C.2.f)		
6.j. Discussion of results including peak inflow, volume of runoff, and max. reservoir level of routed hydrograph, outflow hydrograph, etc. (19.25.12.11.C.2.e)		
6.k. Computer input and output files provided including a digital copy. Files must be annotated if software is not used by the OSE. (19.25.12.11.C.2.h)		
7. Passes or contains Spillway Design Flood (SDF) (19.25.12.11.C.3)		
8. Incremental Damage Assessment if SDF criteria not met and assessment addresses the following (19.25.12.11.C.4):		
8.a. Assessment compares flood routing with dam failure and without dam failure. Items under Checklist 5.c addressed.		
8.b. Criteria for determining incremental damage documented		
8.c. Incremental damage assessment supports reduced SDF		
9. Spillway rating curve and table from spillway crest to dam crest and the following supporting information (19.25.12.11.C.5):		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
9.a. Justification of parameters used to determine spillway capacity		
9.b. Annotated computer input and output files provided including a digital copy		
10. Spillway Design that addresses the following (19.25.12.11.C.6):		
10.a. Spillway lining and erosion potential addressed (19.25.12.11.C.6.a)		
10.b. Cavitation addressed on control weirs (19.25.12.11.C.6.b)		
10.c. Discharge away from the downstream toe and abutment slopes (19.25.12.11.C.6.c)		
10.d. Accumulation of debris addressed (19.25.12.11.C.6.d)		
10.e. Energy dissipation addressed (19.25.12.11.C.6.e)		
10.f. Channel lining addresses erosion, joints, displacement, water stops, etc. (19.25.12.11.C.6.f)		
10.g. Adequate design of training dike (19.25.12.11.C.6.g)		
11. Outlet Works Capacity including the following information (19.25.12.11.C.7)		
11.a. Hydraulic calculations documented including justification of assumptions (19.25.12.11.C.7)		
11.b. Stage/discharge rating curve and table in 1-foot increments from invert to dam crest (19.25.12.11.C.7)		
11.c. Reservoir drains in 45 days for water storage or 96 hours for flood control dam (unless waiver is approved by Water Rights District Office) (19.25.12.11.C.7. a or b.)		
11.d. Annotated computer input and output files provided including a digital copy (19.25.12.11.C.7)		
12. Outlet Works Design including the following information (19.25.12.11.C.8):		
12.a. Conduit diameter greater than or equal to 18 inches (19.25.12.11.C.8.a)		
12.b. Appropriate use of metal conduits (19.25.12.11.C.8.b)		
12.c. Gate located at upstream end or includes guard gate or bulkhead (19.25.12.11.C.8.c)		
12.d. Conduit adequately vented with supporting calculations (19.25.12.11.C.8.d)		
12.e. Conduit by-pass valve if conduit ties to a downstream pipe – note exception if adequate access (19.25.12.11.C.8.d)		
12.f. Outlet operators designed to prevent damage from vandalism, weather, ice, floating debris, wave action, settlement, etc. (19.25.12.11.C.8.e)		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
12.g. Outlet operators accessible during outlet and spillway releases (19.25.12.11.C.8.e)		
12.h. Flood control dams have ungated outlet conduit (19.25.12.11.C.8.f)		
12.i. Trash racks on intake structure with appropriate grate openings (19.25.12.11.C.8.g)		
12.j. Energy dissipation addressed at terminal structure (19.25.12.11.C.8.h)		
12.k. Structural design calculations for all loading conditions (19.25.12.11.C.8.i)		
12.l. Watertight joints and fittings for the conduit (19.25.12.11.C.8.j)		
12.m. Conduit on stable foundation with settlement analysis if necessary (19.25.12.11.C.8.k)		
12.n. Seepage and compaction along the conduit addressed (19.25.12.11.C.8.l)		
12.o. Structural design calculations for intake, conduit and terminal structure provided (19.25.12.11.C.8.m)		
13. Geologic Assessment for high and significant hazard dam including the following (19.25.12.11.C.9):		
13.a. Professional engineer's certification, signature and stamp if separate from the design report. Certification for the State Engineer (19.25.12.11.C)		
13.b. Regional geologic setting, local and site geology		
13.c. Geologic suitability of the dam foundation		
13.d. Slide potential of the reservoir rim and abutment areas		
13.e. Seismic history and potential		
14. Geotechnical Investigation including the following information (19.25.12.11.C.10):		
14.a. Professional engineer's certification, signature and stamp if separate from the design report. Certification for State Engineer (19.25.12.11.C)		
14.b. Test borings in footprint of dam, spillway and other appurtenant structures (19.25.12.11.C.10.a)		
14.c. SPT or other field testing to assess soil character and consistency (19.25.12.11.C.10.b)		
14.d. Undisturbed sampling for density, shear strength and compressibility tests (19.25.12.11.C.10.c)		
14.e. Measurement of water level in drill holes and elevations provided (19.25.12.11.C.10.e)		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
14.f. Field permeability testing if necessary (19.25.12.11.C.10.f)		
14.g. Logs of test borings and test pits, location map and profile along dam axis (19.25.12.11.C.10.g)		
14.h. Testing of construction materials to determine shear strength, permeability, compressibility and filter characteristics (19.25.12.11.C.10.h)		
14.i. Evaluation of liquefaction potential (19.25.12.11.C.10.i)		
14.j. Evaluation of dynamic shear strength if deformation analysis required (19.25.12.11.C.10.i)		
14.k. Location of the borrow material and borrow stock piles identified (19.25.12.11.C.10.j)		
14.l. Other supplemental tests (19.25.12.11.C.10.d)		
14.m. Parameters to be used in the design recommended		
15. Seepage Analysis for high and significant hazard including the following information(19.25.12.11.C.11):		
15.a. Waiver request for flood control dams that drain in 96 hours (19.25.12.11.C.11)		
15.b. Discussion of methodology independent of the software program used in the analysis		
15.c. Discussion, justification and tabulation of all model input parameters independent of the software program used in the analysis		
15.d. Flow nets of appropriate size and scale (19.25.12.11.C.11.a)		
15.e. Annotated computer input and output files provided including an electronic copy of the model(19.25.12.11.C.11.a)		
15.f. Adequate design of filter, transition and drainage zones; thickness greater than or equal to 3 feet (19.25.12.11.C.11.b)		
15.g. Exit seepage gradient acceptable (19.25.12.11.C.11.b)		
15.h. Drain pipes made of non-corrodible material (19.25.12.11.C.11.c)		
15.i. Drain pipes enveloped in properly designed filter material (19.25.12.11.C.11.c)		
15.j. Perforation size is acceptable (19.25.12.11.C.11.c)		
15.k. Drain and collector pipes designed to flow depth $\leq 1/4$ diameter (19.25.12.11.C.11.d)		
15.l. Drain diameter greater than or equal to 6 inches (19.25.12.11.C.11.d)		
15.m. Drain pipes isolated to allow flow measurement of each pipe (19.25.12.11.C.11.d)		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
15.n. Measuring device appropriate for the rate of flow (19.25.12.11.C.11.d)		
15.o. Measuring device equipped with sediment trap (19.25.12.11.C.11.d)		
15.p. Rodent screens provided if discharging to daylight (19.25.12.11.C.11.d)		
16. Stability Analysis including the following information (19.25.12.11.C.12):		
16.a. Low hazard dam with U.S. slope $\leq 3H$ to 1 V; D.S. slope $\leq 2H$ to 1V and Height ≤ 25 ft., analysis not required (19.25.12.11.C.12)		
16.b. Model adequately represents the proposed dam		
16.c. Discussion of methodology independent of the software program used in the analysis		
16.d. Discussion, justification and tabulation of all model input parameters independent of the software program used in the analysis		
16.e. Scaled drawing with critical failure plane identified		
16.f. Factor of safety for steady state long-term stability ≥ 1.5 (19.25.12.11.C.12.a)		
16.g. Factor of safety for operational drawdown, ≥ 1.5 (19.25.12.11.C.12.b)		
16.h. Factor of safety for rapid drawdown ≥ 1.3 (19.25.12.11.C.12.c)		
16.i. Factor of safety for end of construction ≥ 1.3 (19.25.12.11.C.12.d)		
16.j. Stability of reservoir rim for slopes steeper than 3h to 1V		
16.k. Annotated computer input and output files provided including an electronic copy of the model		
17. Seismic Analysis for high and significant hazard dams (19.25.12.11.C.13)		
17.a. Seismological investigation including justification of the seismic parameters for the earthquake of appropriate frequency or MCE (19.25.12.11.C.13.a)		
17.b. Potential for liquefaction or sliding addressed for the foundation, abutments, embankment and reservoir area (19.25.12.11.C.13.b)		
17.c. Conditions met for pseudostatic analysis (19.25.12.11.C.13.c)		
17.d. Factor of safety for pseudostatic condition, ≥ 1.1 (19.25.12.11.C.13.c)		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
17.e. If deformation analysis performed, freeboard ≥ 3 feet after deformation (19.25.12.11.C.13.d)		
17.f. If deformation analysis performed, justification and tabulations of all input parameters, annotated computer input and output files including a digital copy		
17.g. Appurtenant structures stable under seismic analysis		
18. Dam Geometry (19.25.12.11.C.14)		
18.a. Adequate crest width, $H/5 + 8$ (19.25.12.11.C.14.a)		
18.b. Appropriate surfacing for road on dam crest (19.25.12.11.C.14.b)		
18.c. Cover above clay core ≥ 2 feet (19.25.12.11.C.14.c)		
18.d. Turnarounds on dam crest, as needed (19.25.12.11.C.14.d)		
18.e. Crest graded to prevent ponding (19.25.12.11.C.14.e)		
18.f. Slopes with adequate erosion protection from crest drainage (19.25.12.11.C.14.f)		
18.g. Concentrated crest drainage discharged to prevent embankment erosion (19.25.12.11.C.14.h)		
18.h. Adequate camber supported by embankment settlement analysis (19.25.12.11.C.14.g)		
19. Freeboard (minimum of 4 feet) (19.25.12.11.C.15)		
19.a. Wave runup from 100 mph wind w/ w.l. at spillway crest (19.25.12.11.C.15.a)		
19.b. Wave runup from 50 mph wind w/ w.l. at max. reservoir level (19.25.12.11.C.15.b)		
19.c. Minimum 3 feet remain after seismic deformation analysis, if required (19.25.12.11.C.15.d)		
20. Erosion protection (19.25.12.11.C.16)		
20.a. Wave erosion protection waived for flood control dams that drain in 96 hours (19.25.12.11.C.16.a)		
20.b. Wave erosion protection. Riprap and filter design is documented and provides adequate coverage (19.25.12.11.C.16.a)		
20.c. Area of erosion protection adequate (19.25.12.11.C.16.a)		
20.d. Surface erosion protection for crest, slopes, abutments, toe area, etc. (19.25.12.11.C.16.b)		
21. Geotextile Design (19.25.12.11.C.17)		
21.a. Location of use is appropriate		
21.b. Used in accordance with manufacturer's recommendations and specifications		

Design Report	Check if addressed and identify location with a page number if applicable	Not Required
21.c. Design computation provided		
22. Structural Design (19.25.12.11.C.18)		
22.a. Structural design calculations for all appurtenant structures including appropriate loading conditions (water, earth, ice, etc.)		
22.b. Reinforced concrete design calculations provided including appropriate loading conditions		
22.c. Computer input and output computations provided		
23. Utility placement or relocation addressed (19.25.12.11.C.18)		
23.a. Utility relocation addressed within embankment, spillway and seepage footprint		
23.b. Utilities remaining satisfy provisions for outlet conduits (compaction & seepage)		
24. Other Design considerations (19.25.12.11.C.20)		

Construction Drawings	Identify Sheet Number where item is addressed	Not Required
1. Drawings are error free and in satisfactory condition (19.25.12.11.D)		
2. Multi-page TIFF file of drawings prepared w/ aid of computer (19.25.12.11.D)		
3. Drawings and maps prepared with black ink on mylar (19.25.12.11.D.1)		
4. Accuracy of maps acceptable (19.25.12.11.D.1)		
5. Signatures in permanent ink and drawings rolled (19.25.12.11.D.1)		
6. Sheet size 22" to 24" x 34" to 36" sheets with appropriate scale & bar scale provided (19.25.12.11.D.2)		
7. Sheet numbered sequentially with only pertinent sheets incl. Number of the last sheet equals the total number of sheets submitted. (19.25.12.11.D.3)		
8. Engineer's seal and signature on each sheet (19.25.12.11.D.4)		
9. Direction of north and date on all maps including data of field survey or aerial photography (19.25.12.11.D.5)		
10. Title sheet is first sheet of plans and includes dam properties (19.25.12.11.D.6)		
10.a. Dam owner's certification on the title sheet, completed and signed (19.25.12.12.A)		
10.b. Engineer's certification on the title sheet, completed and signed (19.25.12.12.B)		
10.c. State engineer's certification on the title sheet (19.25.12.12.E)		
11. Vicinity map of sufficient size and scale on sheet 1 or 2 (19.25.12.11.D.7)		
12. Site topography sufficient and elevations based on NAVD88 (19.25.12.11.D.8)		
13. Plan view of construction features (19.25.12.11.D.9)		
14. Cross-sections at the max. section and along outlet works (19.25.12.11.D.9)		
15. Profile along dam centerline showing construction features and foundation materials (19.25.12.11.D.9)		
16. Cross-sections and profile of the emergency spillway (19.25.12.11.D.9)		
17. Cross-sections of structural features (19.25.12.11.D.9)		
18. Other details of structural features (19.25.12.11.D.9)		
19. Topography of the proposed reservoir with 1 foot contour elevations (if appropriate) based on NAVD 88 (19.25.12.11.D.10)		
20. High water line highlighted on contour map (19.25.12.11.D.10)		
21. Elevation vs. area and elevation vs. storage capacity curve & table from bottom of reservoir to the dam crest. Area in acres and storage capacity in acre-ft. (19.25.12.11.D.10)		
22. Permanent bench mark in appropriate location (19.25.12.11.D.12)		
23. Permanent bench mark tied to NAVD88 and lat and long in decimal degrees (19.25.12.11.D.11)		
24. Construction detail of the permanent bench mark (19.25.12.11.D.11)		

Specifications	Check if addressed and identify location with a page number if applicable	Not Required
1. Specific for this project in paper copy and Adobe PDF format. (19.25.12.11.E)		
2. Front cover has dam name, county and document properly identified (19.25.12.11.E.1)		
3. Engineer's certification on the first page, completed and signed (19.25.12.12.B)		
4. State Engineer's certification on the first page (19.25.12.12.E)		
5. Bound and submitted 8 1/2" by 11" paper (19.25.12.11.E.3)		
6. Include a Table of Contents (19.25.12.11.E.2)		
7. Clear, concise and error free (19.25.12.11.E)		
8. General conditions include the model statements recognizing the authority of the state engineer and the statement that the construction drawings and specifications cannot be changed without prior written approval of the state engineer (19.25.12.11.E.4)		
9. Foundation Specification includes depths, acceptable material criteria, cleaning, and grouting requirements (19.25.12.11.E)		
10. Earthwork Specification includes all material descriptions, placement criteria, compaction equipment and construction requirements. (19.25.12.11.E)		
11. Concrete, Grout and Shotcrete Specifications (19.25.12.11.E)		
12. Methods and frequency of testing		
13. Manufacturer's Specifications for Geotextile Use and Installation (19.25.12.11.E)		
14. Geotextile required to be installed by certified personnel and final installation to be certified by a qualified independent entity (19.25.12.11.C.17)		
15. Control of stream during construction (19.25.12.11.E)		
16. Blasting, Dust Control or Other Environmental Protection Requirements (19.25.12.11.E)		
17. Quality Assurance/Quality Control adequate for the project (19.25.12.11.E)		

Plat of Survey	Identify if Item has been addressed (Yes or No)	Not Required
1. Plat of Survey on 22" to 24" x 34" to 36" paper, rolled and not folded (19.25.12.11.F)		
2. Plat of Survey is a certified copy of the recorded plat bearing the recorded page and endorsement of the county clerk of the county where the dam is located (19.25.12.11.F)		
3. Plat of Survey meets requirements of 12.8.2 NMAC (19.25.12.11.F)		
4. Surveyor's Certification completed and signed (19.25.12.12.C)		
5. Survey clearly shows what rights are conveyed and to whom an easement is granted (19.25.12.11.F)		
6. Plat shows footprint of the dam and appurtenant structures (19.25.12.11.F)		
7. Plat shows the high water line in the reservoir (19.25.12.11.F)		
8. Access to the dam and outlet controls during normal storage and flood events (19.25.12.11.F.1)		
9. Prevent development from encroaching into the reservoir area defined by normal operations (19.25.12.11.F.2)		
10. Prevent development encroachment into the reservoir area defined by the SDF that adversely affects the performance of the dam (19.25.12.11.F.2)		
11. Prevent development in the approach, control and discharge section of emergency spillway that may restrict spillway flows (19.25.12.11.F.3)		
12. Return flows from outlet works and spillway to the natural drainage (19.25.12.11.F.4)		
13. Allow the outlet works to discharge freely (19.25.12.11.F.4)		
14. Ability to perform needed maintenance (19.25.12.11.F.5)		

Dam Site Security	Check if addressed and identify location with a page number if applicable	Not Required
1. Site Security Addressed (19.25.12.11.G)		
2. Site secured from unauthorized access if required (19.25.12.11.G)		
3. Operators secured from unauthorized use (19.25.12.11.G)		
4. Security and Risk Management Program waiver requested (19.25.12.11.G)		

Instrumentation Plan	Check if addressed and identify location with a page number if applicable	Not Required
1. Instrumentation adequate for monitoring performance (19.25.12.11.H)		
2. Instrumentation details included in construction drawings and specifications (19.25.12.11.H)		
3. Description of each instrument and purpose (19.25.12.11.H.1)		
4. Detailed description of installation of each instrument (19.25.12.11.H.2)		
5. Calibration and maintenance schedules and instructions (19.25.12.11.H.3)		
6. Reading schedule and instructions including accuracy (19.25.12.11.H.4)		
7. Data reduction and interpretation instructions (19.25.12.11.H.5)		
8. Identification of critical readings (19.25.12.11.H.6)		

Operation and Maintenance Manual	Check if addressed and identify location with a page number	Not Required
1. O&M Manual is bound in a 3 ring binder to facilitate changes (19.25.12.17)		
2. Electronic copy of the O&M Manual is submitted in Word Format, appendices may be submitted in Adobe PDF format (19.25.12.17)		
3. Front cover has dam name, county and document properly identified (19.25.12.17)		
4. First page includes dam name, owner and county (19.25.12.17)		
5. Dam owner's certification on the first page, completed and signed (19.25.12.12.A)		
6. Engineer's certification after owners, if required, completed and signed (19.25.12.12.B)		
7. State Engineer's certification after owners and engineers (19.25.12.12.E)		
8. O&M Manual is error free and no inconsistencies in the Manual (19.25.12.17)		
9. O&M Manual is consistent with Instrumentation Plan (19.25.12.17)		
10. General Information including:		
10.a. Location and access (19.25.12.17.A.1)		
10.b. Purpose and description of dam and appurtenant structures (19.25.12.17.A.2)		
10.c. Table of properties (19.25.12.17.A.3)		
10.d. History of construction, repairs and performance (19.25.12.17.A.4)		
11. Operation instructions including:		
11.a. Reservoir Operation Instructions including:		
11.a.i. Water right storage Allocations (19.25.12.17.B.1.a)		
11.a.ii. Elevation, area and storage curve and table to the dam crest (19.25.12.17.B.1.b)		
11.a.iii. Elevation of the high water line (19.25.12.17.B.1.c)		
11.a.iv. Discharge rating curve for the outlet conduit (19.25.12.17.B.1.d)		
11.a.v. Discharge rating curve for the spillway (19.25.12.17.B.1.e)		
11.a.vi. Emergency evacuation procedures (19.25.12.17.B.1.f)		
11.a.vii. First filling criteria and monitoring requirements (19.25.12.17.B.1.g)		
11.b. Outlet Works Operations including		
11.b.i. First operation procedures (19.25.12.17.B.2.a)		
11.b.ii. Seasonal startup procedures (19.25.12.17.B.2.b)		
11.b.iii. Seasonal shutdown procedures (19.25.12.17.B.2.c)		
11.b.iv. Installation and removal of bulkheads (19.25.12.17.B.2.d)		
11.b.v. Operation procedures for all equipment and frequency of operation (19.25.12.17.B.2.e)		
11.b.vi. Electrical systems and controls identified (19.25.12.17.B.2.f)		
11.c. Operator Safety including		
11.c.i. Confined Space Entry and Permits (19.25.12.17.B.3.a)		
11.c.ii. Fall Protection procedures (19.25.12.17.B.3.b)		
11.c.iii. Lockout / Tagout procedures (19.25.12.17.B.3.c)		
11.c.iv. Other Safety requirements (19.25.12.17.B.3.d)		
12. Instrumentation including		
12.a. Description and purpose (19.25.12.17.C.1)		

Operation and Maintenance Manual	Check if addressed and identify location with a page number	Not Required
12.b. Detailed description of the installation (19.25.12.17.C.2)		
12.c. Calibration and maintenance schedule and instructions (19.25.12.17.C.3)		
12.d. Reading schedule, accuracy and instructions (19.25.12.17.C.4)		
12.e. Data reduction and interpretation (19.25.12.17.C.5)		
12.f. Identification of critical readings and notification procedures (19.25.12.17.C.6)		
12.g. Schedule for reporting data with interpretations to the state engineer (19.25.12.17.C.7)		
13. Security if applicable shall include:		
13.a. Description of security measures (19.25.12.17.D)		
13.b. Instructions for monitoring including frequency (19.25.12.17.D)		
13.c. Instructions for inspection of security measures, frequency and inspection checklist (19.25.12.17.D)		
14. Inspection Requirements including (19.25.12.17.F):		
14.a. Inspection requirements with discussion		
14.b. Inspection frequency for dam, outlet works and other appurtenances		
14.c. Inspection checklists		
15. Maintenance Requirements (19.25.12.17.E)		
15.a. Woody vegetation clearance zones identified		
15.b. Procedures for removing emerging woody vegetation and established woody vegetation including frequency and embankment repair		
15.c. Procedures for eradicating burrowing animals and frequency		
15.d. Procedures for repairing rodent penetrations		
15.e. Procedures for repairing erosion on the embankment slopes		
15.f. Procedures for repairing concrete cracks		
16. Discussion of procedures for revising and updating the manual and documenting the change (19.25.12.17.G)		
17. Appendices with supporting documentation including:		
17.a. Captioned and dated photographs (19.25.12.17.H.1)		
17.b. Key sheets of the record construction drawings (19.25.12.17.H.2)		
17.c. Instrumentation construction drawings (19.25.12.17.H.3)		
17.d. Instrumentation rating tables and calibration details (19.25.12.17.H.4)		
17.e. Monitoring and inspection forms (19.25.12.17.H.5)		
17.f. Copy of the instrumentation plan (19.25.12.17.H.6)		
17.g. Copy of any relevant procedures (19.25.12.17.H.7)		

Emergency Action Plan (Based on Model Plan)	Yes	Not Required
1. Transmittal letter documenting changes required by Local Emergency Official (19.25.12.18)		
2. Submittal of checklists documenting coordination with Local Emergency Official		
3. EAP is bound in a 3 ring binder to facilitate changes (19.25.12.18)		
4. Yellow highlights removed from the EAP document		
5. Electronic copy of the EAP is submitted in Word Format, appendices may be submitted in Adobe PDF format (19.25.12.17)		
6. Dam owner's certification completed and signed (19.25.12.12.A)		
7. Engineer's certification after dam owner certification, completed and signed (19.25.12.12.B)		
8. Local Emergency Official's certification after engineer's certification, completed and signed (19.25.12.12.D)		
9. State Emergency Official's certification after local emergency's certification, completed and signed (19.25.12.12.D)		
10. State Engineer's certification after state emergency's certification (19.25.12.12.E)		
11. EAP is error free and consistent data provided. (19.25.12.18)		
12. Development coordinated with dam owner and local emergency official (19.25.12.18)		
13. Basic EAP Data (19.25.12.18)		
13.a Purpose of the EAP		
13.b. Description of impacted area		
13.c. Description of dam		
13.d. Driving directions		
14. Overview of EAP (19.25.12.18)		
15. Roles and Responsibilities defined for each major organization identified in the EAP (19.25.12.18.C)		
15.a. Dam Owner		
15.b. Local Emergency Official		
15.c. Incident Commander		
15.d. Owner's Engineer		
15.e. Office of the State Engineer		
16. Description of Event Detection – Step 1 (19.25.12.18.B)		
17. Emergency Level Determination – Step 2 (must be prepared by a Professional Engineer, 19.25.12.18.B)		
17.a. Definitions for Emergency Level 1, 2 and 3 customized and optional language incorporated or deleted		
17.b. Guidance for determining the Emergency Level customized for the dam and optional guidance incorporated or deleted		
17.c. Response time by Local Emergency Officials provided		
17.d. Emergency Level for each situation appropriate for the identified response time		
17.e. Guidance does not give conflicting direction to the dam owner		
17.f. Examples of Emergency Situations customized for the dam		
17.g. Examples do not give conflicting direction		
17.h. Optional examples incorporated into the documents or deleted		
18. Notification and Communication – Step 3 (19.25.12.18.A)		
18.a. Examples of communication language for each Emergency Level		
18.b. Notification Flow Chart for each Emergency Level with correct numbers		
18.c. Other Emergency Services Contact Numbers		

Emergency Action Plan (Based on Model Plan)	Yes	Not Required
19. Expected Actions – Step 4 (19.25.12.18.B and D)		
19.a. Expected Actions defined at each Emergency Level		
19.b. Examples of Emergency Remedial Actions appropriate for the dam (must be prepared by a Professional Engineer)		
20. Termination responsibilities of each organization identified – Step 5 (19.25.12.18.C)		
21. EAP Maintenance (19.25.12.18.C)		
21.a. Annual Review and Revision Form		
21.b. Plans for exercise of the EAP (Tabletop 3 year and Functional 5 year frequency)		
21.c. List of Official Record Holders of the control copies of the EAP and mailing addresses		
21.d. List of Revisions and Updates Form		
21.e. Concurrence Form if required by the Local Emergency Official. All parties having a major responsibility for implementing the EAP, not identified in the certifications, are included (19.25.12.18)		
22. Appendices (19.25.12.18)		
22.a. Contact Checklist Form		
22.b. Unusual or Emergency Event Log Form		
22.c. Dam Emergency Situation Report Form		
22.d. Any other form required by the Local Emergency Official (Optional)		
22.e. Glossary of Terms		
22.f. List of Resources available		
22.g. Location and Vicinity Map		
22.h. Evacuation Maps (19.25.12.18.E)		
22.h.i. Extend until the consequences of dam failure no longer requires evacuation or restricting access		
22.h.ii. Information at critical locations downstream as directed by the Local Emergency Official including any critical assumptions made when identifying the evacuation zone.		
22.h.iii. Disclaimer of any limitations of the evacuation map		
22.h.iv. GIS Shape files provided if created. Geo-referenced to NAD 1983 UTM Zone 13N for submittal to OSE.		
22.i. Residents/Business/Highways at risk identified		
22.j. Inundation Maps (19.25.12.18.F)		
22.j.i. At critical locations downstream, the distance, arrival time of the leading edge of the flood wave, peak flow depth, incremental rise, water surface elevation and average or peak velocity are included		
22.j.ii. Inundation map identifies key assumptions from the breach analysis and disclaimer of limitations provided.		
22.j.iii. Metadata documentation for Inundation Maps providing key assumptions		
22.k. Plan and profile view of dam		
22.l. Reservoir elevation/storage data and max. outlet and spillway capacity or rating table		

EAP Breach Analysis and Flood Routing Report	Check if addressed and identify location with a page number if applicable	Not Required
1. Breach Analysis and Flood Routing Report (19.25.12.18.F)		
2. Engineer's certification, completed and signed (19.25.12.12.B)		
3. State Engineer's certification (19.25.12.12.E)		
4. Is purpose of the Report identified? A report that identifies the purpose is intended for EAP preparation only will result in a less rigorous review. Reports without this clarification will result in a rigorous review that supports design level analysis.		
5. Hydrologic analysis to determine the maximum reservoir water level during the spillway design flood. Use Design Report Checklist 6.a through 6.k. Not required if a simplified dam breach analysis approach is approved by the state engineer.		
6. Discussion of methodology used to model the dam breach and version of computer program used.		
7. Discussion of and justification for breach scenarios analyzed		
8. Discussion and justification of all model input parameters used in the breach program		
9. Copies of all computer input and output computations and digital files for the breach model		
10. Discussion of methodology used to route the flood wave downstream and version of computer program used		
11. Discussion and justification of all model input parameters used to route the flood wave downstream.		
12. Copies of all computer input and output computations and electronic files of each failure scenario		
13. Inundation Maps		
13.a. Extended downstream to the point where consequences of failure no longer requires evacuation or restricting access		
13.b. Identify critical assumptions made during flood routing		
13.c. At critical locations downstream include distance, arrival time of the leading edge of the flood wave, peak flow depth, incremental rise, water surface elevation and peak velocity		
13.d. GIS Shape files of the plan view of the inundation map, if created. Geo-referenced to NAD 1983 UTM Zone 13N		

EAP Preparer's documentation of coordination with Local Emergency Official Emergency Elements of the EAP Checklist

Meeting Date and Location: _____

Emergency Elements of the EAP	Verified by Local Emergency Official	
	Yes/No	Document the Local Emergency Official's requested change from the Model EAP
Role and Responsibility of the Local Emergency Official		
Role and Responsibility of the Incident Commander		
Emergency Level 2 and 3 Communication customized		
Emergency Level 2 and 3 Notification Flow Charts customized		
Emergency Services Contacts		
Termination customized		
Exercise Frequencies		
Controlled copies provided to appropriate emergency responders and affected stakeholders		
Concurrence page		
Additional Emergency Forms (Appendix A-4)		
Residents/Business/Highways at Risk		

See OSE Paper "Emergency Action Plans for Dams" for additional guidance.

EAP Preparer's Signature and Date: _____

Print EAP Preparer's Name: _____

Print EAP Preparer's Title: _____

Professional Engineer's documentation of coordinating the EAP with the Local Emergency Official Engineering Elements of the EAP Checklist

Meeting Date and Location: _____

Guidelines for determining the Emergency Level	Yes	Comments
Local Emergency Official provided the estimated time needed to notify closest downstream residents		
Local Emergency Official provided the estimated time needed to evacuate the closest downstream residents		
Evacuation Map	Required by the Local Emergency Official	
	Yes	Comments
Extends to a location where consequences of dam failure no longer requires evacuation		
Cross-sections show distance from the dam		
Cross-sections show travel time of the leading edge of the flood wave		
Cross-sections show peak flow in cfs		
Cross-sections show incremental rise of water surface elevation above base flow in feet.		
Cross-sections show water surface elevation in feet		
Cross-sections show average or peak velocity of the flood wave		
Road, bridge, railroad or trail blockages identified for closure		
Critical facilities or infrastructure identified		
Evacuation routes identified		
Location of evacuation centers identified or described if outside the map extents		
Shape files of map requested and appropriately geo-referenced for local needs		

Professional Engineer's Stamp, signature and Date: