EXHIBIT I.

SEVEN OAKS DAM
INITIAL FILLING PLAN
DATED, JULY 2002

EXHIBIT I

SEVEN OAKS DAM

SAN BERNARDINO COUNTY, CALIFORNIA

INITIAL RESERVOIR FILLING PLAN

U.S. Army Corps of Engineers
Los Angeles District
Los Angeles, California

July 2002

EXHIBIT I

SEVEN OAKS DAM
SAN BERNARDINO COUNTY, CALIFORNIA

TABLE OF CONTENTS

EXHIBIT I

ATTACHMENT I – WATER CONTROL PLAN (Latest Approved Plan is Titled "Interim Water Control Plan Prior to and During Section 7 Consultation Period", dated January 2000)

ATTACHMENT II - EMERGENCY ACTION PLAN (Under Separate Cover Transmitted Previously)

ATTACHMENT III – CORPS OF ENGINEERS PUBLICATIONS (ER 1110-2-101, Reporting of Evidence of Distress of Civil Works Structures, Dated 15 March 1996; ETL 1110-2-231, Engineering and Design - Initial Reservoir Filling Plan, Dated 30 March 1979)

EXHIBIT I

SEVEN OAKS DAM
INITIAL RESERVOIR FILLING PLAN

SAN BERNARDINO COUNTY, CALIFORNIA

PURPOSE

This plan presents a guide for surveillance of the Seven Oaks Dam project during periods of reservoir filling as required by Corps of Engineers Engineer Technical Letter (ETL 1110-2-231) dated 30 March 1979, Engineering and Design Initial Reservoir Filling Plan. Also, this plan should be followed during the flood season as successively higher pools are attained for flood control that exceed the historical maximum reservoir level. The plan defines the following: inspection procedures to be used, warning signs, actions to be taken in case serious signs of distress are discovered, and data to be collected and analyzed.

PRINCIPLES UNDERLYING THE PLAN

Flood control is the primary purpose of the Seven Oaks Dam project. The project is located in a region of sporadic but sometimes intense rainfall which produces intermittent flows characterized by their extreme variability. The reservoir has filled to various levels since becoming operational; however, the maximum pool (flood control pool at spillway crest) level has not been reached to date.

This document provides a general plan to be implemented during future flood periods when the historical maximum reservoir level may be exceeded. Since it is impossible to predict the occurrence of flood flows that will result in a reservoir level that exceeds the previous historical maximum, this plan should be implemented in accordance with the visual inspections schedule (presented in Appendix II).

Although the embankments have been constructed to minimize adverse effects due to rapid pool rise, any distress during the period that the reservoir is filling at an uncontrolled rate must be detected at the earliest possible time if mitigative action is to be effective. Early detection will allow for activation of the Emergency Action Plan (EAP) if needed.

Thus, this Reservoir Filling Plan is essentially a reservoir monitoring or surveillance plan. In order to be effective, this plan must be carried out during the entire flood season each year until the maximum pool is reached. If this is not carried out on a regular basis, early warning signs of distress may go undetected. Repeated exposure to reservoir load during subsequent floods may cause the undetected problem to deteriorate with possible catastrophic consequences.

The Water Control Plan, as described in Attachment I, is different from this Reservoir Filling Plan in that the Water Control Plan details the regulation of the project for controlling the downstream discharges to non-damaging flow rates. This type of flood control operation would then induce project storage and the initiation of the Reservoir Filling Plan.

EXHIBIT I

SCOPE

The impoundment of water behind the reservoir, as discussed in the Water Control Plan in Attachment I, sets forth the general plan for the operation of the Seven Oaks Dam reservoir. Safety measures to be taken before and during filling are noted in Appendix IV and in the separate Emergency Action Plan referenced as Attachment II. The public must be informed at regular intervals as the pool is being filled under normal conditions. Various government agencies, including the public, are to be notified by the Operations Manager. This notification process will be part of normal operation of the dam project. The Operations Manager is responsible to maintain a current notification list of agencies, names, and phone numbers similar to the Notification Subplan of the separate Emergency Action Plan. As the pool is filling, project personnel must maintain surveillance in accordance with Appendix II. Should something occur which might in any way be hazardous to the structure or the safety of the public, the Emergency Action Plan must be put into effect. Additional appendices covering such information as cultural site surveillance and environmental considerations are included for referral by the Seven Oaks Dam Operations Manager.

a. Appendix I - Pertinent Project Data. This appendix contains all pertinent data concerning the project.

b. Appendix II - Project Surveillance. This appendix discusses instrumentation, visual inspection, and instrument monitoring. Various criteria are listed that would call for an unscheduled inspection.

c. Appendix III - Environmental and Cultural Site Surveillance. This is a discussion of the observation of historical properties and the procedures to be taken if a site is found or if damage is discovered on an existing site.

d. Appendix IV - Safety Plan. This appendix discusses safety procedures to be followed when implementing this plan.

e. Appendix V – Checklist of Conditions Affecting Dam Safety. This appendix contains a checklist to be used in discovering and correcting problems.

f. Attachment I - Water Control Plan. This attachment provides a detailed plan for the safe and effective operation of Seven Oaks Dam. Due to the listing of the San Bernardino Kangaroo Rat (SBKR) to the endangered species list in January 1998, the Corps is in Section 7 consultation with the U.S. Fish and Wildlife Service to assess operation impacts and mitigation plans. The water control plan that is approved and currently implemented is titled “Interim Water Control Plan Prior to and During Section 7 Consultation Period”, dated January 2000. The plan remains in force until the consultation process is complete and a water control plan for normal flood control operation is approved. The final water control plan may

differ from the original plan contained in the project documents depending upon the results of the Section 7 consultation.

g. Attachment II - Emergency Action Plan (under separate cover). In case of emergency, this attachment sets forth a specific plan of action and designates key personnel to be notified. It also designates the responsibilities of various personnel during an emergency. The latest plan is dated June 2001 and distributed to the local sponsors in a separate report. The Emergency Action Plan will be referenced throughout this Initial Reservoir Filling Plan.

h. Attachment III - Corps of Engineers Publications. Included is a copy of the publications (ER 1110-2-101, dated 15 March 1996, subject: "Reporting of Evidence of Distress of Civil Works Structures" and ETL 1110-2-231, dated 30 March 1979, subject: "Engineering and Design - Initial Reservoir Filling Plan").
.

PREFERRED FILLING RATE

Once a reservoir has been safely filled to a certain level and subsequently evacuated, it can be refilled safely to that level at a rapid rate if no signs of distress were noted since the previous filling. The term "safely" is defined as behaving as designed, not simply the fact that failure did not occur. Signs or evidence of distress which could result in problems during subsequent filling if undetected are discussed in Attachment III, ER 1110-2-101, dated 15 March 1996, subject: "Reporting of Evidence of Distress of Civil Works Structures".
(http://www.usace.army.mil/inet/usace-docs/eng-regs/er1110-2-101/entire.pdf)

IMPLEMENTATION

The responsibility to see that the procedures outlined herein are carried out shall rest with the Operations Manager for the Seven Oaks Dam project, who is responsible for the daily operation and maintenance of the project. Based on the local sponsors' mutual agreement, San Bernardino County Flood Control District sponsor is designated as the lead operational agency for physical operations and maintenance. Orange County Flood Control District sponsor is responsible for the water control management (Reservoir Regulation) functions. Therefore, San Bernardino County Flood Control District, in coordination with Orange County Flood Control District, is responsible for the duties of the Operations Manager. The Operations Manager will keep the Corps of Engineers Los Angeles District Office, Reservoir Regulation Section informed of sponsors' implementation of the program. He will also keep the Los Angeles Corps of Engineers District Office, Emergency Management advised as to progress, problems and actions being undertaken by the sponsors. The Seven Oaks Dam Operations Manager and his staff will hereinafter be referred to as the project personnel.

The Operations Manager for the Seven Oaks Dam project will be responsible for determining the dates or events by which the reservoir filling monitoring and surveillance plan should be commenced and terminated each year. The time to implement the plan would most likely overlap the flood season. He will also ensure adequate technical and material resources are available to implement the plan.

EXHIBIT I

REFERENCES

The following Corps of Engineers publications were used in the preparation of this Reservoir Filling Plan. They may be accessed via the Internet: (http://www.usace.army.mil/inet/usace-docs/eng-regs/er1110-2-101/entire.pdf)

a. ETL 1110-2-231, 30 Mar 79, Engineering and Design - Initial Reservoir Filling Plan.

b. ER 1130-2-530, 30 Oct 96, Flood Control Operations and Maintenance Policies.

c. ER 1110-2-1150, 31 Aug 99, Engineering and Design for Civil Works Projects.

d. ER 1110-2-101, 15 Mar 96, Reporting of Evidence of Distress of Civil Works Structures.

EXHIBIT I

APPENDIX I

PERTINENT PROJECT DATA

Appendix I

Seven Oaks Dam
Pertinent Data Sheet

Stream System		Santa Ana River
Drainage Area	sq. miles	177
Dam		
Crest Width	feet	40
Design Freeboard	feet	5.3
Reservoir		
Elevation		
Original Streambed	feet, NGVD	2,060
Debris Pool (Year 1)	feet, NGVD	2,200
Top of Flood Control	feet, NGVD	2,580
Top of Spillway	feet, NGVD	2,580
Top of Dam	feet, NGVD	2,610
Area		
Debris Pool (Year 1)	acres	79
Top of Flood Control	acres	802
Top of Spillway	acres	802
Top of Surcharge	acres	969
Top of Dam	acres	1,067
Capacity		
Debris Pool (Year 1)	acre-feet	3,128
Top of Flood Control	acre-feet	147,970
Top of Spillway	acre-feet	147,970
Top of Dam	acre-feet	174,609
Allowance for Sedimentation	acre-feet	32,000
Spillway		
Type		Unlined Trapezoid w/ Concrete Sill
Crest Invert Length	feet	1,400
Crest Width	feet	500
Crest Elevation	feet, NGVD	2,580
Outlet Works		
Upstream Tunnel Diameter	feet	18
Downstream Tunnel Width	feet	18
Length of Tunnel		
(Sta.11+44.25 to Sta.28+00, including gate chamber)	feet	1,655.75

Intake Structure Deck Elevation	feet, NGVD	2,302
High Level Intake Elevation	feet, NGVD	2,265
Diversion Intake Elevation	feet, NGVD	2,100
Gate Type	Vertical Hydraulic	
Main Gate Dimensions (Width x Height, dual tandem)	feet	5 x 8.5
Low-Flow Gate Dimensions (Width x Height, single tandem)	feet	2 x 3.5

Reservoir Design Flood (General Storm)		
Total Volume (4-day)	acre-feet	115,000
Peak Inflow	ft^3/s	85,000
Peak Outflow	ft^3/s	7,000
Peak Water Surface Elevation	feet, NGVD	2,580

Probable Maximum Flood (General Storm)		
Total Volume	acre-feet	326,000
Peak Inflow	ft^3/s	185,000
Peak Outflow	ft^3/s	180,000
Peak Water Surface Elevation	feet, NGVD	2,604.7

EXHIBIT I

APPENDIX II

PROJECT SURVEILLANCE

APPENDIX II

PROJECT SURVEILLANCE

1. General

General surveillance of Seven Oaks Dam will be carried out by project personnel under the direction of the Seven Oaks Dam Operations Manager. Technical Specialists, under the direction of the Seven Oaks Dam Operations Manager will make regular inspections. The Operations Manager will report observed conditions to the Water Control Manager. Report of observed conditions should also be made to the Los Angeles Corps of Engineers District, Engineering Division, Reservoir Regulation Section by voice and in written document.

2. Visual Inspection

During the flood season, when this Reservoir Filling Plan is in effect, visual inspections of the project shall be performed in accordance with the following schedule.

a. A thorough visual inspection should be performed on or before September 15 of each year prior to the beginning of the flood season. This should be accomplished sufficiently early to allow remedial actions to be taken prior to the onset of the flood season, if such actions are required.

b. When the reservoir level is below the historical maximum level, inspections should be made once per week.

c. When the reservoir is being filled at or below the preferred filling rate, inspections should be made once per week.

d. When the reservoir is above the historical maximum pool level, inspections should be made daily. The inspectors shall contact the Operations Manager and Water Control Manager if unusual conditions exist at the project so the dam can be operated accordingly.

This schedule of inspections assumes that no unusual conditions exist. If signs of distress are discovered, the schedule should be revised to monitor the potential problem area more often.

In general, the visual inspections include critical areas discussed in ER 1110-2-101, dated 15 March 1996, subject: "Reporting of Evidence of Distress of Civil Works Structures." The inspections will identify the critical areas, as noted in the following paragraph 3.

In addition, the following elevation-based events will initiate a geotechnical specialist response. The purpose of the elevation-based geotechnical response will be to confirm the integrity of the embankment, and the function of the system of seepage monitors and controls.

1. Elevation 2300 feet, NGVD. The stability of the slopes below the Intake access Road will be assessed by geotechnical specialists.

2. Elevation 2375 feet, NGVD. The downstream toe of the embankment, adjacent to the right abutment, will be assessed by personnel from the geotechnical specialists for any local seepage effects related to the grouting of the exposed rock nose at the right abutment.

3. Elevation 2418 feet, NGVD. The downstream instrumentation will be monitored by geotechnical specialists as water is impounded above the abutment drain material.

4. Elevation 2580 feet, NGVD. The spillway condition will be assessed by geotechnical specialists.

3. Warning Signs

The following tabulation presents conditions, which provide an indication that undesirable behavior is taking place.

a. Embankment Structures

Crest:

Distortion of alignment
Depressions or sink holes
Cracks

Slopes (upstream and downstream):

Depressions or sink holes
Cracks
Sloughs
Animal burrows
Seepage exiting on the downstream slope or at the toe
Bulges on the slope or at the toe

b. Concrete Structures

Inlet Structure:

Tilting
Cracking or crushing
Monolith displacement
Offsets at joints
Clogging with debris

Outlet Structure:

Distortion of alignment
Seepage

Cracking or crushing
Opening of joints or cracks
Monolith displacement
Unusual flow from drains
Misalignment of handrails
Misalignment of guardrails

c. Spillway Crest:

Distortion of sill contacts
Surface cracks of sill
Slope failures in spillway walls

d. Downstream Area:

Sand boils
Depressions or sinkholes
Seepage
Bulges

e. Abutments Adjacent to Structure:

Animal burrows
Seeps
Sloughs
Cracks

4. Instrumentation

Project instrumentation can be valuable in identifying signs of distress, which cannot be visually observed. It is important, therefore, to obtain accurate instrument readings on a regular basis throughout the flood season. Monitoring of instrumentation is not intended to eliminate the need for visual surveillance of the project but is intended to provide supplemental information which is necessary to evaluate the overall performance of the project.

The embankment surface settlement and horizontal movement points should be measured periodically during flood control detention and drawdown. If measurements should produce readings, which differ from historical trends or if the rate of reservoir rise significantly exceeds the preferred filling rate, then the frequency of observation should be increased to suit the circumstances. The embankment geotechnical instrumentation reading schedule is presented in Table II-2-4. The outlet works geotechnical and hydraulic instrumentation reading schedule is presented in Table II-2-10. These tables are excerpted from the project Operation, Maintenance, Repair, Replacement & Rehabilitation (OMRR&R, or O&M) Manual. These schedules should be used in conjunction with the requests of the Los Angeles Corps of Engineers District, Engineering Division, Reservoir Regulation Section regarding frequency of readings under unusual conditions.

Note that the piezometers in the embankment downstream shell are not expected to detect water. If

they do, this is a signal for concerns, and the Seven Oaks Dam Operations Manager should immediately notify their Water Control Manager and the Los Angeles Corps of Engineers District, Engineering Division, Reservoir Regulation Section.

Project personnel should be especially diligent in discovering and reporting any seepage. If such discharges increase suddenly or show signs of turbidity, the Seven Oaks Dam Operations Manager should immediately institute continuous monitoring and simultaneously notify their Water Control Manager and the Los Angeles Corps of Engineers District, Engineering Division, Reservoir Regulation Section.

5. Emergency Decision Conditions

a. Documentation. Visual inspection will be made of the dams and principal appurtenances for any evidence of distress that could lead to unsatisfactory performance or potential failure. Any abnormal occurrence should be closely monitored and thoroughly documented. A detailed record of pertinent information is to be maintained, including, but not limited to, description of occurrence, cause if known, whether or not the problem is worsening with time, severity of problem, location, date, time, weather conditions, pool elevation, and remedial actions, if any. The collection of all factual and technical information is important. Photographs are particularly valuable for documenting an abnormal occurrence and should be used extensively to record such conditions visually.

b. Abnormal Occurrences The following summarizes items that may require emergency action and should be considered serious enough to warrant immediate notification of the Water Control Manger and engineering office for assistance and direction:

Reservoir:

* Development of whirlpools

* Development of a constant stream of air bubbles for no apparent cause

* Indication of impending landslides in the reservoir rim

Dam Section and Foundation (Embankment Section):

* Development of cracks or enlargement of existing cracks in the dam crests or along the dam slopes

* Slides or sloughs in the dam sections on either face of the dams

* Development of bulges or depressions on the dam crest or slopes or at the toes of the embankments

* Development of depression on the dam crests or slopes

* Misalignment of roadways, guard rail or other appurtenant structures that could be evidence of movement within the dam sections

* Development of seeps on the downstream slope of the dams

* Undesirable changes in existing seeps such as significant increases in quantity or turbidity of the seepage water

* Abnormal readings from project instrumentation

Abutments and Contacts:

* Development of cracks or enlargement of existing cracks on the abutment slopes

* Development of bulges at the toe of a slope

* Development of large slides on the abutments

* Distortion of abutment slopes that indicate the potential for large slides

* Evidence of serious seepage along or through the abutment

* Undesirable changes in seepage conditions such as significant increases in seepage quantity or increase in turbidity of seepage water

Concrete Structures:

* Signs of significant cracking or movement of joints and/or cracks

* Seepage through joints or cracks

* Abnormal increases in flow quantity and/or turbidity of discharges from foundation drains

* Abnormal changes in magnitude of readings from foundation drains

6. Reporting

Any abnormal or critical occurrences will be reported immediately by the Seven Oaks Dam Operations Manager to their Water Control Manager for further instructions or advice, and so that any additional specialists can be mobilized. Operations Manager should also report the occurrences to the Los Angeles Corps of Engineers District Office, Engineering Division, Reservoir Regulation Section.

EXHIBIT I

TABLE II-2-4 (From O&M Manual): EMBANKMENT GEOTECHNICAL INSTRUMENTATION READING SCHEDULE

EMBANKMENT GEOTECHNICAL INSTRUMENTATION	LOCATION	NUMBER OF INSTRUMENTS	MINIMUM READING SCHEDULE			
			TRIGGERING EVENT	NORMAL OPERATION		
				FIRST 2 YEARS	2 TO 5 YEARS	MORE THAN 5 YEARS
STRONG MOTION ACCELEROGRAPHS	Embankment crest, right abutment, free-field (A-1 to A-4, A-7 and A-8)	6	Post-earthquake condition – read as soon as possible if any of the following conditions applies: - Richter 4.0 or greater within 3 miles radius, or - Richter 5.0 or greater within 30 miles radius, or - Richter 6.0 or greater within 50 miles radius, or - Damage reported at project, or - Acceleration of 0.1g.	Semi-annually	Semi-annually	Semi-annually
EMBANKMENT PIEZOMETERS (VWP & PNP)[(2)]	Embankment drain zones interface	24	Pool level between El. 2150 & 2200; weekly. Pool level between El. 2200 & 2300; daily. Pool level between El. 2300 & 2400; one reading at every 10 foot increase in pool level. Pool level above 2400; one reading at every 5-10 foot increase in pool level.	Quarterly	Semi-annually	Annually
OBERVATION WELLS	Downstream toe of dam (OW-1 and OW-2)	2	Same as specified for embankment piezometers.	Quarterly	Semi-annually	Annually

EXHIBIT I

EMBANKMENT GEOTECHNICAL INSTRUMENTATION	LOCATION	NUMBER OF INSTRUMENTS	MINIMUM READING SCHEDULE			
			TRIGGERING EVENT	NORMAL OPERATION		
				FIRST 2 YEARS	2 TO 5 YEARS	MORE THAN 5 YEARS
INCLINOMETERS SETTLEMENT & HORIZONTAL MOVEMENT	Embankment (SI-1 to SI-6)	6	Pool level between El. 2150 & 2200; one reading when pore pressure is detected. Pool level between El. 2200 & 2300; one reading every 2 weeks on SI-3, SI-4, & SI-5. Pool level between El. 2300 & 2400; one reading at every 50 foot increase in pool level on SI-1 thru SI-6. Pool level above 2400; one reading at every 20 foot increase in pool on all inclinometers. Post-earthquake condition (see strong motion accelerographs); read as soon as possible.	Quarterly	Semi-annually	Annually
SETTLEMENT MONUMENTS	Embankment (SM-100 to SM-177)	78	Pool level between El. 2150 & 2200; one reading when pore pressure is detected. Pool level between El. 2200 & 2300; one reading every 2 weeks on all monuments except for monuments inundated. Pool level between El. 2300 & 2400; one reading at every 50 foot increase in pool on all monuments except for monuments inundated. Pool level above 2400; one reading at every 20 foot increase in pool on all monuments except for monuments inundated. Post-earthquake condition (see strong motion accelerographs); read as soon as possible.	Semi-annually(3)	Semi-annually(3)	Annually

EXHIBIT I

EMBANKMENT GEOTECHNICAL INSTRUMENTATION	LOCATION	NUMBER OF INSTRUMENTS	MINIMUM READING SCHEDULE			
			TRIGGERING EVENT	NORMAL OPERATION		
				FIRST 2 YEARS	2 TO 5 YEARS	MORE THAN 5 YEARS
RESERVOIR INDEX RANGE LINES MONUMENTS	Reservoir (7000 to 7054, 8000 to 8024, and 9000 to 9023)	104	After major flooding or sediment inflow.	Initial	5 years	5 years
STAFF GAGES	Along upstream left abutment groin	102	As required during reservoir operations			

(1) See Table II-2-10 for Outlet Works Geotechnical and Hydraulic Instrumentation Reading Schedule.
(2) VWP is vibrating Wire Piezometers. PNP is Pneumatic Piezometers.
(3) 100% of the embankment settlement monuments and inclinometers should be read for vertical and horizontal displacement at each monitoring session, except as indicated as follows:
A reduced number of settlement monuments may be read for horizontal displacement during the first 5 years at 6th month, 18th month, 30th month, 42nd month, and 54th month periods. See O&M Manual, Part II, Chapter 2, paragraph 2.2.2.8.

EXHIBIT I

TABLE II-2-10 (From O&M Manual): OUTLET WORKS GEOTECHNICAL AND HYDRAULIC INSTRUMENTATION READING SCHEDULE

OUTLET WORKS GEOTECHNICAL & HYDRAULIC INSTRUMENTATION	LOCATION	NUMBER OF INSTRUMENTS	MINIMUM READING SCHEDULE			
			TRIGGERING EVENT	NORMAL OPERATION		
				FIRST 2 YEARS	2 TO 5 YEARS	MORE THAN 5 YEARS
OUTLET WORKS STRONG MOTION ACCELEROGRAPHS	Intake structure and gate chamber (A-5 and A-6)	2	Post-earthquake condition – read as soon as possible if any of the following conditions applies: - Richter 4.0 or greater within 3 miles radius, or - Richter 5.0 or greater within 30 miles radius, or - Richter 6.0 or greater within 50 miles radius, or - Damage reported at project, or - Acceleration of 0.1g.	Semi-annually	Semi-annually	Semi-annually
JOINT METERS	Rock/concrete interface of intake structure backslope (JM-1, JM-2, JM-2A, JM-4, JM-4A, JM-5, JM-6, JM-7, and JM-8)	9	Initial filling – daily for a week; weekly for a month; monthly. Subsequent Fill/Empty Cycles – based on results of initial fill monitoring; same reading as initial filling for subsequent filling exceeding previous maximum reservoir level. Post-earthquake condition (see strong motion accelerographs)– read as soon as possible. If readings represent a change from previous readings, continue daily for 1 week, or until readings return to pre-earthquake readings, whichever is less. Return to normal reading schedule.	Monthly to establish baseline values.	Quarterly	Quarterly

EXHIBIT I

OUTLET WORKS GEOTECHNICAL & HYDRAULIC INSTRUMENTATION	LOCATION	NUMBER OF INSTRUMENTS	MINIMUM READING SCHEDULE			
			TRIGGERING EVENT	NORMAL OPERATION		
				FIRST 2 YEARS	2 TO 5 YEARS	MORE THAN 5 YEARS
STRAIN METERS	Upstream tunnel and upstream gate chamber transition (SM-1 to SM-3, SM-6, and SM-7)	8	Initial pressure flow in tunnel – daily. Partial flow in tunnel during reservoir fill/empty – weekly for a month, then monthly. Post-earthquake condition (see strong motion accelerographs)– read as soon as possible. If readings represent a change from previous readings, continue daily for 1 week, or until readings return to pre-earthquake readings, whichever is less. Return to normal reading schedule.	Monthly readings to establish baseline.	Quarterly	Quarterly
LOAD CELLS	Intake structure rockslope (LC-1 to LC-12)	12	Initial filling – daily for a week; weekly for a month; monthly. Subsequent Fill/Empty Cycles – based on results of initial fill monitoring; same reading as initial filling for subsequent filling exceeding previous maximum reservoir level. Post-earthquake condition (see strong motion accelerographs)– read as soon as possible. If readings represent a change from previous readings, continue daily for 1 week, or until reaings return to pre-earthquake readings, whichever is less. Return to normal reading schedule.	Monthly readings to establish baseline.	Quarterly	Quarterly
VOLUME-TIME FLOW DEVICE	One gate chamber gutter, and two accerss tunnel gutters	3	Pool at 5-year or greater event elevation.	Monthly and for any high pool above normal debris pool elevation.	Twice a year at minimum and maximum pool.	Twice a year at minimum and maximum pool.

EXHIBIT I

OUTLET WORKS GEOTECHNICAL & HYDRAULIC INSTRUMENTATION	LOCATION	NUMBER OF INSTRUMENTS	MINIMUM READING SCHEDULE			
			TRIGGERING EVENT	NORMAL OPERATION		
				FIRST 2 YEARS	2 TO 5 YEARS	MORE THAN 5 YEARS
SURVEY MONUMENTS	Intake structure (SO2001-3 and SO2001-4) and access tunnel (SM200 to SM222)	25	Post-earthquake condition (see strong motion accelerographs); read as soon as possible.	Semi-annually(2)	Semi-annually(2)	Annually(2)
HYDRAULIC OPERATIONAL PIEZOMETERS	Intake structure, outlet tunnel, minimum discharge line (O-1 to O-10)	10	As required during reservoir operations			

(1) See Table II-2-4 for Embankment Geotechnical Instrumentation Reading Schedule.
(2) When embankment dam settlement monuments are read, also read 100% of outlet works survey instruments for horizontal and vertical displacement.

EXHIBIT I

APPENDIX III

ENVIRONMENTAL AND CULTURAL SITE SURVEILLANCE

APPENDIX III

ENVIRONMENTAL AND CULTURAL SITE SURVEILLANCE

1. Environmental Considerations

All environmental commitments made in the 1988 Supplemental Environmental Impact Statement (SEIS) prior to project construction have been complied with during design and construction. Post-construction mitigation monitoring will be performed on remaining required environmental commitments. Project personnel are required to continue to adhere to the environmental commitments and mitigation measures that were developed during preparation of the SEIS, Section 7 (Endangered Species Act) consultations, and subsequent coordination and NEPA/CEQA (National Environmental Policy Act/California Environmental Quality Act) documentation. NEPA compliance will be required if environmental conditions or future operation and maintenance activities change. Monitoring of reservoir water quality is required in accordance with environmental commitments in the SEIS. Refer to project OMRR&R Manual for water quality testing parameters and frequency.

Environmental problems associated with filling Seven Oaks Dam Reservoir to levels in excess of historical maximum floods are minor. The highly variable flow rates characteristic of the Santa Ana River have allowed the development of local plant and animal communities which are adapted to alternating conditions of drought and flood. Area trees and shrubs are tolerant or intermediately tolerant to flooding and should not be adversely affected by short-term flood storage. Following floodwater recession, increased soil moisture should allow rapid germination and re-vegetation of the area by grasses and other herbaceous plants. Colonists from the surrounding area will replace animal resources lost due to flooding. Tumbleweeds have typically been the first and most abundant species to re-establish after any retention of flood waters, often so dense as to be an operational problem in that they plug channel areas and preclude growth of other species.

2. Cultural Resources Surveillance

Cultural resources investigations for the project area were conducted for the SEIS in 1988. It involved an overview study (Altschul, Rose and Lerch 1984), extensive historic archival research, oral historical interviews, and a sample field survey (Brock, et al. 1986). The surveys located 39 cultural resources in the area of potential effect, including the damsite, reservoir area, borrow areas, and haul roads and staging areas. Historic properties subject to impacts of reservoir inundation included the Southern California Edison Santa Ana River Hydroelectric System, the Santa Ana Canyon Road, and multiple historic refuse scatters. The Edison Hydroelectric System was determined eligible for inclusion in the National Register of Historic Places and concurred by the State Historic Preservation Officer. The effected facilities have been relocated or modified for inundation as mitigation measure.

Any change noticed in prehistoric or historic archeological sites during routine inspection of the reservoir, especially those attributed to water erosion, shall be reported by Operations Manager to the sponsors' District archeologists within two (2) working days of their discovery. The District archeologists will be responsible for determining the nature and severity of the damage and coordinate with the State Historic Preservation Officer and Advisory Council on Historic Preservation.

EXHIBIT I

APPENDIX IV

SAFETY PLAN

APPENDIX IV

SAFETY PLAN

1. All personnel in the field will wear hard hats for identification and will be fully authorized to act on any matter dealing with safety.

2. All instances of safety violations, hazardous conditions, or incidents will be documented and logged.

3. Personnel should be firm, but tactful, in dealing with the public to protect them from hazards. If cooperation cannot be obtained, the situation should be reported immediately to the operations manager.

4. If assistance is required to remove the public from the pool rise area, assistance will be available from the operations manager's office and the local authorities will be dispatched.

5. All personnel are cautioned to be alert during surveillance activities due to the increased dangers of falls due to steep terrain, mud, and banks caving in from wave action. These dangers should be pointed out to any of the public observed near the reservoir.

6. The Seven Oaks Dam Operations Manager will take action to inform the public during pool rise of hazards expected.

7. All access roads into the expected pool area will be closed to the public. Standard reflectorized signs and barricades will be used. Cable gates will not be used to close roads.

EXHIBIT I

APPENDIX V

CHECKLIST OF CONDITIONS AFFECTING DAM SAFETY

APPENDIX V

CHECKLIST OF CONDITIONS AFFECTING DAM SAFETY

The Seven Oaks Dam Operations Manager and technical staff will make routine inspections of the dam at intervals that will assure safety and operating reliability. This Appendix contains a checklist which is to be used to aid in discovering and correcting problems which could lead to dam failure or uncontrolled release of water.

TABLE V-1

ENGINEERING PROBLEMS

OBSERVANCE - SINKHOLES IN CREST OF DAM, SLOPES OF DAM, OR DOWNSTREAM OF DAM

Probable Cause	Contributing Factors	Surveillance Frequency	Action
Piping (internal erosion), either in the embankment or foundation, has eroded a cavity causing the earthen material above to collapse.	Fault in embankment foundation -- fine material migrating due to excessive seepage pressure.	Constant, until condition stabilized and/or cause is established and corrected, if possible.	Outlet works should be opened to full capacity immediately. Walkover inspection of entire dam searching for additional sinkholes, muddy discharges downstream, whirlpools upstream. Read all piezometers. Advise lead Sponsor's Operations Center and Corps of Engineers Reservoir Operations Center (ROC) immediately, regardless of time of day. In extreme cases where the sinkhole is very large and/or rapidly enlarging, especially if accompanied by large muddy discharge and/or upstream sinkhole or whirlpool, the dam should be considered in imminent danger and immediate action must be taken. Warn downstream areas and notify lead Sponsor's Operations Center and Corps of Engineers ROC as soon as possible. Implement Emergency Action Plan notifications.

OBSERVANCE - CRACKS OR SLIDES IN EMBANKMENT, FOUNDATION, OR NATURAL MATERIAL OR RESERVOIR RIM

Probable Cause	Contributing Factors	Surveillance Frequency	Action
Shrinkage due to drying. Movement resulting from shear failure could be due to seepage, surface runoff entering cracks, wet season, or rapid reservoir drawdown.	Dry weather, high pool, low pool, pool quickly drawn down, earthquake.	Continuous until cause is established.	Check for enlargement of cracks due to erosion. Determine if movement is still occurring. Check for seepage, boils, etc. Walkover inspection of entire dam. Observe alignment of dam crest, bulging of toe of dam, displacement of riprap, or slope protection. If crack is small and not enlarging and not carrying material (clear water), notify lead Sponsor's Operations Center and Corps of Engineers Reservoir Operations Center (ROC) during normal business hours. In all <u>new</u> instances, notify lead Sponsor's Operations Center and Corps of Engineers ROC immediately. Determine if slide is moving and the extent of slide, if possible. If crack is enlarging due to seepage or effluent from the crack is carrying a large amount of material, warn downstream areas and notify lead Sponsor's Operations Center and Corps of Engineers ROC as soon as possible. When the dam is being over-topped or is in danger of being overtopped, the dam is in imminent danger. Warn downstream residents and lead Sponsor's Operations Center and Corps of Engineers ROC as soon as possible. Implement

Emergency Action Plan. Sandbags or other means should be used to increase freeboard where feasible, and the outlet fully opened.

OBSERVANCE - LEAKAGE: WATER SEEPAGE

Probable Cause	Contributing Factors	Surveillance Frequency	Action
Faulty seepage barrier in foundation, abutments, or embankment	Higher pool levels than previously impounded, rapid filling of the reservoir	Constant until cause is established.	Walkover inspection of entire area downstream of dam. Report all seeps to lead Sponsor's Operations Center and Corps of Engineers ROC. Try to determine source of seepage. Unless the muddy water is due to surface erosion, muddy seepage should be considered serious and lead Sponsor's Operations Center and Corps of Engineers Reservoir Operations Center (ROC) notified immediately. If the discharge is large or increasing rapidly, the dam should be considered in imminent danger of failure. Place gravel or rock materials in the seepage area to stop migrating soil (but not the water). Use filter cloth if available. Warn downstream areas and lead Sponsor's Operations Center and Corps of Engineers ROC as soon as possible. Implement Emergency Action Plan. If upstream entrance point is known, try to plug area in a manner discussed below for "upstream, whirlpool." Outlet should be fully open.

OBSERVANCE - UPSTREAM WHIRLPOOL

Probable Cause	Contributing Factors	Surveillance Frequency	Action
Piping (internal erosion) uncontrolled seepage had eroded a substantial cavity through which a large volume of water is escaping either through the embankment or foundation.	Sinkholes, cracks, boils, or seepage through the embankment, foundation, or abutments.	Continuous, or as frequent as practicable.	The dam is in imminent danger of failure. Warn downstream areas and notify lead Sponsor's Operations Center and Corps of Engineers Reservoir Operations Center (ROC) as soon as possible. Implement Emergency Action Plan. Search abutments, dam and downstream area for seepage, sinkholes, boils, and/or if there is discharge of water somewhere downstream. Attempt should be made to plug the entrance with large rock or anything that is available. Use riprap off the face of the dam if practicable. Vehicles may also be useful. If the large material appears to reduce the flow, follow with progressively smaller material.

OBSERVANCE - OVERFLOWING PIEZOMETERS

Probable Cause	Contributing Factors	Surveillance Frequency	Action
Increase in water pressure in foundation or embankment.	High pool. Increase in ground water elevation due to wet weather. Crack or piping through impervious zone.	Frequently until cause is determined.	Look for boils and wet areas. Note change in seepage or relief well flow. Unless severe or accompanied by other problems, notify lead Sponsor's Operations Center and Corps of Engineers Reservoir Operations Center (ROC) during normal business hours. Add pressure gage or increase piezometer elevations, if possible.

OBSERVANCE - CONDUIT FLOWS GREATER THAN NORMAL FOR A SET GATE OPENING

Probable Cause	Contributing Factors	Surveillance Frequency	Action
Structural or stability failure in the outlet works.	Lake water has percolated through the embankment and is entering the outlet works passageway.	Constant until cause is determined.	Close the conduit gates and observe discharge in stilling basin. If original observance is confirmed, keep gates in closed position and notify lead Sponsor's Operations Center and Corps of Engineers Reservoir Operations Center (ROC).

TABLE V-2
EXTREME CONDITION CHANGES

RADICAL CHANGE IN CONDITIONS - EARTHQUAKE

Observe	Check	Frequency	Action
Dams and abutments	All engineering problems.	Constantly.	See appropriate engineering Problem.
Outlet works	Determine if gates are operational		Put gates into operation as soon as possible.
Conduit	Opening of joints.		Determine location and extent of opening if possible.
	If electric power is disrupted.		Provide emergency power by means of portable generator.

RADICAL CHANGE IN CONDITIONS - HIGH WIND

Observe	Check	Frequency	Action
Waves overtopping dam.	Downstream slope for erosion.	Continuous, or as frequent as practicable.	Any time dam is likely to be overtopped, notify lead Sponsor's Operations Center and Corps of Engineers ROC.
Condition of riprap.	Upstream slope for erosion of waterline.		If practicable, try to control erosion with sandbags or other means.

RADICAL CHANGE IN CONDITIONS - FLOOD POOLS

	Observe	Check	Frequency	Action
	Abutments and downstream area.	Seepage areas, boils, cracks, slides, bulging at toe.	Frequent.	See appropriate action under Engineering Problems.
	Crest.	Cracks, slides, over-topping, alignment of guardrail posts, settlement.		
	Upstream slope.	Condition of riprap, alignment of waterline, upstream whirlpool.		
Spillway discharge	Spillway.	Erosion, slides, stability of spillway structure.	Frequent.	Improve stability. Place rock or other material to control erosion and direction of flow where practicable.
	Downstream toe.	Erosion, eddy currents, direction of flow.		Warn downstream areas of flows that will exceed channel capacity.

EXHIBIT I

ATTACHMENT I

WATER CONTROL PLAN

Refer to the latest
WATER CONTROL PLAN

EXHIBIT I

ATTACHMENT II

EMERGENCY ACTION PLAN

Refer to the latest EMERGENCY ACTION PLAN under separate cover

EXHIBIT I

ATTACHMENT III

CORPS OF ENGINEERS PUBLICATIONS

ER 1110-2-101, Reporting of Evidence of Distress of Civil Works Structures, Dated 15 March 1996

ETL 1110-2-231, Engineering and Design - Initial Reservoir Filling Plan, Dated 30 March 1979