APPENDIX G

TITLE 22 SUMMARY

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In January 1977 the California State Water Resources Control Board (CSWRCB) approved resolution number 77-1 which states, "the California legislature has declared that the state shall undertake all possible steps to encourage the development of water reclamation facilities so that reclaimed water may be made available to help meet the growing water requirements of the state". The resolution also recognizes the need to protect public health from the environmental problems associated with reclamation projects. To this end the, CSWRCB included in its July 1997 strategic plan a goal to meet this objective. Goal #3 states "our goal is to encourage balanced and efficient use of water through water transfers, recycling and conservation". The CSWRCB recognizes that California's growing population and business requirements for water are increasing demands on a limited water supply, as such several objectives have been laid out. One objective is to increase the reliability of water supplies to agricultural and urban uses thereby maximizing the effective use of California's limited water supply.

Recycled water has been used in California since the late 1800s. Public health restrictions have been in effect since the early part of this century. The regulations covering recycled water in California are found in California Health and Safety Code (CH&SC) division 104, part 12, California Water Code (CWC), division 7, California Code of Regulations (CCR), Title 22, division 4, and CCR, Title 17 division 1, chapter 5, group 4. Each regulation will be explored in the following chapters.

California Health and Safety Code (CH&SC) Division 104, Environmental Health Services, Part 12, Drinking Water, Chapter 4, California Safe Drinking Water act, deals with recycled water only slightly. Article 2, Section 116815 states, "all pipes installed above or below ground, on or after June 1, 1993, that are designed to carry recycled water, shall be colored purple or distinctively wrapped with purple tape. Subdivision (b) goes on to state, that this does not apply to water delivered for agricultural use.

The California Water Code states that recycled water, which as a result of treatment of waste is suitable for a direct beneficial use, or a controlled use that would not otherwise occur, is considered a valuable resource. Section 13510 states that the people of the state have a primary interest in the development of facilities to recycle water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state. Section 13520 states that recycling criteria are the levels of constituents of recycled water, and means for assurance of reliability under design concept, which will result in recycled water safe from the standpoint of public health.

Section 13521 states that the State Department of Health Services shall establish uniform statewide recycling criteria for each varying type of use of recycled water where the use involves the protection of the public health. Section 13551 states that no one shall use sources of potable water for non-potable uses, including cemeteries, golf courses, parks, highway landscapes and irrigation when suitable recycled water is available.

Section 13625 through 13632 give requirements for competency of wastewater treatment employees. Section 13627 states, supervisors and operators of wastewater treatment plants shall possess a certificate of appropriate grade in accordance with, and to the extent recommended by the advisory committee required by, regulations adopted by the state board.

Title 22 California Code of Regulations, Division 4, Chapter 3 defines water-recycling criteria. Article 3, Section 60304 states, Recycled water used for surface irrigation of the following shall be disinfected tertiary recycled water, unless it has been filtered in accordance with Section 60301.320(a)

1. Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop.

2. Parks and playgrounds.

3. School yards.

4. Residential landscaping.

5. Unrestricted access golf courses

6. Any other irrigation use not specified in this section and not prohibited by other sections of the California Code of Regulations.

Recycled water used for the surface irrigation of food crops where the edible portion is produced above ground and not contacted by the recycled water shall be at least disinfected secondary-2.2 recycled water.

Disinfected tertiary recycled water is defined as a filtered and subsequently disinfected wastewater that meets the following requirements.

a) The filtered wastewater has been disinfected by either:

1) A chlorine disinfection process following filtration that provides a chlorine residual/contact time value of not less the 450 milligram-minutes per litter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow.

2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and or remove 99.999 percent of plaque forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of demonstration.

b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed a most probable number (MPN) of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

Section 60301.320(a) states that filtered wastewater must be oxidized and passed through natural undisturbed soils or a bed filter media pursuant to the following.

a) At a rate that does not exceed 5 gallons per minute per square foot of surface area in mono, dual or mixed gravity, upflow or pressure filtration systems, or does not exceed 2 gallons per minute per square foot of surface area in traveling bridge automatic back wash filters; and

b) So that the turbidity of the filtered wastewater does not exceed any of the following:

1) An average of 2 nephlometric turbidity units (NTU) within a 24-hour period.

2) 5NTU more than 5 percent of the time within a 24-hour period; and

3) 10 NTU at any time.

Disinfected secondary-2.2 recycled water is defined as recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period.

Recycled water used for the surface irrigation of the following shall be at least disinfected secondary-23 recycled water:

1) Cemeteries

2) Freeway Landscaping

3) Restricted access golf courses

4) Ornamental nursery stock and sod farms where access by the general public is not restricted

5) Pasture for animals producing milk for human consumption

6) Any non-edible vegetation where access is controlled so that the irrigated area can not be used as if it were part of a park, playground or schoolyard.

Secondary-23 recycled water is recycled water that has been oxidized and disinfected so that the median concentration of total coliform bacteria in the disinfected effluent does not exceed a MPN of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed, and the number of total coliform bacteria does not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30 day period.

Recycled wastewater used for surface irrigation of the following shall be at least undisinfected secondary recycled water:

1) Orchards where recycled water does not come in contact with the edible portion of the crop.

2) Vineyards where the recycled water does not come in contact with the edible portion of the crop.

3) Non food-bearing trees (Christmas tree farms are included in this category provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting or allowing access by the general public).

4) Fodder and fiber crops and pasture for animals not producing milk for human consumption.

5) Seed crops not eaten by humans.

6) Food crops that must undergo commercial pathogen destroying processing before being consumed by humans.

7) Ornamental nursery stock and sod farms provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public.

Undisinfected secondary recycled water is oxidized wastewater. Oxidized wastewater is wastewater in which the organic matter has been stabilized, is nonputrescible and contains disolved oxygen.

Section 60305 explains the use of recycled water for impoundment's. Section 60305 states that recycled water used as a source of water supply for nonrestricted recreational impoundment's shall be disinfected tertiary recycled water that has been subject to conventional treatment. Except under the following conditions.

1) Disinfected teriary recycled water that has not received conventional treatment may be used for nonrestricted recreational impoundments provided the recycled water is monitored for the presence of pathogenic organisms in accordance with the following:

    a) During the first 12 months of operation and use the recycled water shall be sampled and analyzed monthly for *Giardia,* enteric viruses and *Cryptosporidium.* Following the first 12 months of use, the recycled water shall be sampled and analyzed quarterly for *Giardia,* enteric viruses and *Cryptosporidium.* The ongoing monitoring may be discontinued after the first two years of operation with the approval of the State Department of Health Services (SDHS). This monitoring shall be in addition to the monitoring set forth in section 60321.

    b) The samples shall be taken at a point following disinfection and prior to the point where the recycled water enters the use impoundment. The samples shall be analyzed by an approved laboratory and the results submitted quarterly to the regulatory agency.

2) The total coliform bacteria concentrations in recycled water used for nonrestricted recreational impoundments, measured at a point between the disinfection process and the point of entry to the use impoundment, shall have a median concentration of total coliform bacteria measured in the disinfected effluent that does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteria does not exceed an MPN of 23 per 100 milliliters in more than one sample

in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

3) Recycled water used as a source of supply for restricted recreational impoundments and for any publicly accessible impoundments at fish hatcheries shall be at least disinfected secondary-2.2 recycled water.

4) Recycled water used as a source of supply for landscape impoundments that do not utilize decorative fountains shall be at least disinfected secondary-23 recycled water.

Restricted recreational impoundment refers to an impoundment of recycled water in which recreation is limited to fishing, boating and non-body contact water recreational activities. Non restricted recreational impoundment refers to an impoundment of recycled water in which no limitations are imposed on body-contact water recreational activities.

Title 22, Article 4 designates area use requirements.

1) No irrigation with disinfected tertiary recycled water shall take place within 50 feet of any domestic water supply well unless all of the following conditions have been met:

   a) A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from the ground surface.

   b) The well contains an annular seal that extends from the surface into the aquitard.

   c) The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities.

   d) The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well.

   e) The owner of the well approves of the elimination of the buffer zone requirment.

2) No impoundment of disinfected tertiary recycled water shall occur within 100 feet of any domestic water supply well.

3) No irrigation with, or impoundment of, disinfected secondary-2.2 or disenfected secondary-23 recycled water shall take place within 100 feet of any domestic water supply well.

4) No irrigation with, or impoundment of, undisinfected secondary recycled water shall take palace within 150 feet of any domestic water supply well.

5) Any use of recycled water shall comply with the following:

   a) Any irrigation runoff shall be confined to the recycled water use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency.

   b) Spray, mist or runoff shall not enter dwellings, designated outdoor eating areas or food handling facilities.

   c) Drinking water fountains shall be protected against contact with recycled water spray, mist or runoff.

6) No spray irrigation of any recycled water, or other than disinfected tertiary recycled water shall take place within 100 feet of a residence or a place where public exposure could be similar to that of a park, playground or schoolyard.

7) All use areas where recycled water is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches high by 8 inches wide, that include the following words: "RECYCLED WATER – DO NOT DRINK". Each sign shall display an international symbol similar to that shown below. The State Department of Health Services may accept alternative signage and wording, or an educational program, provided the applicant demonstrates to the department that the alternative approach will assure an equivalent degree of public notification.

8) Except as allowed under section 7604 of title 17, California Code of Regulations, no physical connection shall be made or allowed to exist between any recycled water system and any separate system conveying potable water.

9) The portions of the recycled water piping systems that are in areas subject to access by the general public shall not include any hose bibbs. Only quick couplers that differ from those used on potable

water system shall be used on the portions of the recycled water piping system in areas subject to public access.

Tittle 22 CCR, Article 6, gives methods for testing and analysis.

1) Disinfected secondary-23, disinfected secondary-2.2 and disinfected tertiary recycled water shall be sampled at least once daily for total coliform bacteria. The samples shall be taken from disinfected effluent and shall be analyzed by an approved laboratory.

2) Disinfected tertiary recycled water shall be continuously sampled for turbidity using a continuous turbidity meter and recorder following filtration. Compliance with the daily average operating filter turbidity shall be determined by averaging the levels of recorded turbidity taken at four-hour intervals over a 24-hour period. Compliance with turbidity pursuant to section 60301.320 shall be determined using the levels of recorded turbidity taken at intervals of no more than 1.2 hours over a 24-hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2 hours may be substituted for a period of up to 24 hours. The results of the daily average turbidity determinations shall be reported quarterly to the regulatory agency.

Article 7 specifies engineering reports and operational requirements.

1) No person shall produce or supply reclaimed water for direct reuse from a proposed water reclamation plant unless he files an engineering report.

2) The report shall be prepared by a properly qualified engineer registered in California and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed reclamation system. The report shall clearly indicate the means for compliance with these regulations and any other features specified by the regulatory agency.

3) The report shall contain a contingency plan, which will assure that no untreated or inadequately treated wastewater will be delivered to the use area.

Section 60325 establishes requirements for plant personnel.

1) Each reclamation plant shall be provided with a sufficient number of qualified personnel to operate the facility effectively so as to achieve the required level of treatment at all times.

2) Qualified personnel shall be those meeting requirements established pursuant to section 13625 of the Water Code.

Section 60327 requires that a preventive maintenance program shall be provided at each reclamation plant to ensure that all equipment is kept in a reliable operating condition.

Section 60329 sets forth operating records and reports requirements.

1) Operating records shall be maintained at the reclamation plant or a central depository within the operating agency. These shall include: all analyses specified in the reclamation criteria; records of operational problems, plant and equipment breakdown and diversions to emergency storage or disposal; all corrective or preventive action taken.

2) Process or equipment failures triggering alarm shall be recorded and maintained as a separate file. The recorded information shall include the time and cause of failure and corrective action taken.

3) A monthly summary of operating records as specified under (1) of this section shall be filed monthly with the regulatory agency.

4) Any discharge of untreated or partially treated wastewater to the use area, and the cessation of same shall be reported immediately by telephone to the regulatory agency, the State Department of Health and the local health officer.

Section 60331 states there shall be no bypassing of untreated or partially treated wastewater from the reclamation plant or any intermediate unit processes to the point of use.

Article 8 sections 60333 through 60337describes general design requirements. Section 60333 mandates the design of process piping, equipment arrangement and unit structures in the reclamation plant must allow for efficiency and convenience in operation and maintenance and provide flexibility of operation to permit the highest possible degree of treatment be obtained under varying circumstances.

Section 60335 sets requirements for alarm devices required for various unit processes as specified in other sections of the regulations. It states that alarms must be installed to provide warning of:

1) Loss of power from normal power supply.

2) Failure of a biological treatment process.

3) Failure of a disinfection process.

4) Failure of a coagulation process.

5) Failure of a filtration process.

6) Any other specific process failure for which warning is required by the regulatory agency.

Section 60335 goes on to say that all required alarm devices shall be independent of the normal power supply of the reclamation plant. The person to be warned shall be the plant operator, superintendent or any other responsible person designated by the management of the reclamation plant and capable of taking prompt corrective action. Individual alarm devices may be connected to a master alarm to sound at a location where an attendant can conveniently observe it. In case the reclamation plant is not attended full time, the alarm shall be connected to sound at a police station, fire station or other full time service unit with which arrangements have been made to alert the person in charge at times that the reclamation plant is unattended.

Section 60337 states that the power supply shall be provided with one of the following reliability features:

1) Alarm and standby power source.

2) Alarm and automatically actuated short-term retention or disposal provisions as specified in section 60341.

3) Automatically actuated long-term storage or disposal provisions as specified in section 60341.

Article 9 addresses the reliability requirements for primary effluent. It states that reclamation plants producing reclaimed water exclusively for uses for which primary effluent is permitted shall be provided with one of the following reliability features:

1) Multiple primary treatment units capable of producing primary effluent with one unit not in operation.

2) Long-term storage or disposal provisions as specified in section 60341.

Article 10 addresses reliability requirements for full treatment. Section 60341 addresses emergency storage or disposal as follows:

1) Where short-term retention or disposal provisions are used as a reliability feature, these shall consist of facilities reserved for the purpose of storing or disposing of untreated or partially treated wastewater for at least a 24-hour period. The facilities shall include all the necessary diversion devices, provisions for odor control, conduits and pumping and back pump equipment. All of the equipment other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

2) Where long-term storage or disposal provisions are used as a reliability feature, these shall consist of ponds, reservoirs, percolation areas, downstream sewers leading to other treatment or disposal facilities or any other facilities reserved for the purpose of emergency storage or disposal of untreated or partially treated wastewater. These facilities shall be of sufficient capacity to provide disposal or storage of wastewater for at least 20 days, and shall include all the necessary diversion works, provisions for odor and nuisance control, conduits and pumping and pump back equipment. All of the equipment other than pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

3) Diversion to a less demanding reuse is an acceptable alternative to emergency disposal of partially treated wastewater provided that the quality of the partially treated wastewater is suitable for the less demanding reuse.

4) Subject to prior approval by the regulatory agency, diversion to a discharge point that requires lesser quality of wastewater is an acceptable alternative to emergency disposal of partially treated wastewater.

5) Automatically actuate short-term retention or disposal provisions and automatically actuated long-term storage or disposal provisions shall include, in addition to provisions (1), (2), (3) or (4) of this section, all the necessary sensors, instruments, valves and other devices to fully enable automatic diversion of untreated or partially treated wastewater to approved emergency storage or disposal in the event of failure of a treatment process, and a manual reset to prevent automatic restart until the failure is corrected.

Section 60343 through 60351 deal with reliability features of various treatment steps. Each step with its corresponding reliability feature will be given below.

1) 60343-Primary treatment. All primary treatment unit processes shall be provided with one of the following reliability features:

   (a) Multiple primary treatment units capable of producing primary effluent with one unit not in operation.

   (b) Standby primary treatment unit process.

   (c) Long-term storage or disposal provisions.

2) 60345-Biological treatment. All biological treatment unit processes shall be provided with on eof the following reliability features:

   (a) Alarm and multiple biological treatment unit capable of producing oxidized wastewater with one unit not in operation.

   (b) Alarm, short-term retention or disposal provisions and standby replacement equipment.

(c) Alarm and long-term storage or disposal provisions.

(d) Automatically actuated long-term storage or disposal provisions.

3) 60347-Secondary sedimentation. All secondary sedimentation unit processes shall be provided with one of the following reliability features:

(a) Multiple sedimentation units capable of treating the entire flow with one unit not in operation.

(b) Standby sedimentation unit process.

(c) Long-term storage or disposal provisions.

4) 60349-Coagulation.

(a) All coagulation unit processes shall be provided with the following mandatory features for uninterrupted coagulant feed:

1. Standby feeders.

2. Adequate chemical stowage and conveyance facilities.

3. Adequate reserve chemical supply.

4. Automatic dosage control.

(b) All coagulation unit processes shall be provided with one of the following reliability features:

1. Alarm and multiple coagulation units capable of treating the entire flow with one unit not in operation.

2. Alarm, short-term retention or disposal provisions, and standby replacement equipment.

3. Alarm and long-term storage or disposal provisions.

4. Automatically actuated long-term storage or disposal provisions.

5. Alarm and standby coagulation process.

5) 60351-Filtration. All filtration unit process shall be provided with one of the folowing reliability features:

(a) Alarm and multiple biological treatment unit capable of producing oxidized wastewater with one unit not in operation.

(b) Alarm, short-term retention or disposal provisions and standby replacement equipment.

(c) Alarm and long-term storage or disposal provisions.

(d) Automatically actuated long-term storage or disposal provisions.

(e) Alarm and standby filtration unit process.

6) 60353-Disinfection

(a) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with the following features for uninterrupted chlorine feed:

1. Standby chlorine supply.

2. Manifold systems to connect chlorine cylinders.

3. Chlorine scales.

4. Automatic devices for switching to full chlorine cylinders.

Automatic residual control of chlorine dosage, automatic measuring and recording of chlorine residual and hydraulic performance studies may also be required.

(b) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with one of the following reliability features:

1. Alarm and standby chlorinator.

2. Alarm, short-term retention or disposal provisions and standby replacement equipment.

3. Alarm and long-term storage or disposal provisions.

4. Automatically actuated long-term storage or disposal provisions.

5. Alarm and multiple point chlorination, each with independent power source, separate chlorinator and separate chlorine supply.

Title 17, California Code of Regulations, Division 1, Chapter 5, Group 4, codifies protection of drinking water supplies from recycled water through the use of backflow preventers.

Table 1
Allowable Uses of Recycled Water

Disinfected Tertiary Recycled Water	1. Food crops, including all edible root crops where the edible portion comes into contact with the edible portion of the crop 2. Parks and Playgrounds 3. School yards 4. Residential landscaping 5. Unrestricted access golf courses 6. Any other irrigation use not specified in this section and not prohibited by other sections of the California Code 7. Nonrestricted recreational impoundment's
Disinfected Secondary Recycled Water (Max 2.2 MPN Coliform Bacteria per 100 Milliliters of Sample)	1. Food crops where the edible portion is produced above ground and not contacted by the recycled water 2. Restricted recreational impoundment's
Disinfected Secondary Recycled Water (Max 23 MPN Coliform Bacteria per 100 Milliliters of Sample)	1. Cemeteries 2. Freeway landscaping 3. Restricted access golf courses 4. Ornamental nursery stock and sod farm where access by the general public is not restricted 5. Pasture for animals producing milk for human consumption 6. Any non-edible vegetation where access is controlled so that irrigated areas can not be used as if it were part of a park, playground or schoolyard
Undisinfected	1. Orchards where recycled water does not come into contact with the edible portion of the crop 2. Vineyards where the recycled water does not come in contact with the edible portion of the crop 3. Non food bearing trees (Christmas tree farms are included in this category provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting or allowing access by the general public 4. Fodder and fiber crop and pasture for animals not producing milk for human consumption* 5. Seed crop not eaten by humans 6. Food crops that must undergo commercial pathogen destroying processing before being consumed by humans 7. Ornamental nursery stock and sod farms provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting, retail sale, or allowing access by the general public

Source: The Purple Book, California Health Laws Related to Recycled Water

* Applicable to Lancaster Wastewater Treatment Plant Alternative 3 and Storage Reservoirs