

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION**

**BOARD ORDER NO. R6V-2015-0004
WDID NO. 6B361409017**

**WASTE DISCHARGE REQUIREMENTS
FOR**

**FORT IRWIN U.S. ARMY NATIONAL TRAINING CENTER
IRWIN WATER WORKS**

San Bernardino County

The California Regional Water Quality Control Board, Lahontan Region (Water Board) finds:

1. Discharger

The Fort Irwin U.S. Army, National Training Center submitted a Report of Waste Discharge (RoWD) for the Irwin Water Treatment and Distribution System (Irwin Water Works) located at the western end of Irwin Basin on Fort Irwin, San Bernardino County, California. For the purposes of this Water Board Order (Order), the U.S. Army Fort Irwin National Training Center, which is part of the United States Department of Defense, is referred to as the "Discharger". Information submitted as part of the RoWD is listed in Attachment A.

2. Facilities

The Discharger constructed and will operate a 6 million gallon per day water treatment plant. The Irwin Water Works (IWW) treats groundwater for potable water supply by reducing dissolved inorganic ions to below drinking water standards. A general site map is provided in Attachment B. The IWW has a water production design capacity of 6.0 million gallons per day (mgd). The potable water flows anticipated for the IWW include 2.0 mgd to 2.5 mgd annual average daily flow (ADF), 0.8 mgd minimum daily flow, and 5.4 mgd maximum daily flow (MDF). The Discharger's IWW includes an electro dialysis reversal (EDR) process that will remove/reduce primary target compounds such as arsenic, fluoride, nitrates, and total dissolved solids. Following the EDR process, the concentrated brine receives additional treatment before the concentrated brine is then discharged to the on-site lined evaporation ponds (surface impoundments). The concentrated brine will be allowed to dry on the on-site surface impoundments before being removed and disposed of at an off-site landfill. See Attachment C for a simplified diagram of water treatment processes. For the purposes of this Order, the water processing units, the associated piping, the surface impoundments, and associated infrastructure are the Facility. The 9 evaporation ponds (surface impoundment) are each approximately 0.78 acres in size and are located on the west side of the IWW.

3. Order History

This is the first order issued for this Facility.

4. Reason for Action

The Discharger proposes to discharge concentrated brine from the water treatment process to nine lined surface impoundments. Waste contains high concentrations of total dissolved solids (TDS) and other constituents. The discharge to the surface impoundments is subject to regulation under California Code of Regulations (CCR), title 27. This order implements those regulations.

5. Location of Facilities

The Facility is located on land owned by the Discharger. The Facility is situated on a 43 acre site approximately ½ mile west of the main cantonment area, near the intersection of Goldstone Road and North Loop Road, Fort Irwin, California. The site is located on the western margin of the Irwin Basin which is part of the Langford Valley Groundwater Basin within Section 31, T14N, R3E and Section 36, T14N, R2E, San Bernardino, Base and Meridian. Attachment B shows the location of the Facility.

6. Site Geology

The IWW is situated adjacent to Southwest Ridge within an alluvial fan/alluvial wash transitional area and lies adjacent to bedrock areas to south that consist of basalt, tuff, and quartz monzodiorite. The area is characterized by moderate to shallow dipping volcanic rocks that dip to the north-northwest, under the IWW.

Based on borehole logs and field observations, the stratigraphy is comprised of unconsolidated alluvial and gully wash materials at the surface with older basalt, volcanic tuff, presumably all overlying the Jurassic age quartz monzodiorite basement rock. The unconsolidated alluvial material is comprised of well-rounded sand to angular boulder size materials composed of nearby bedrock material. The boulder material consists of volcanic basalt and andesite detritus that is dense to very vesicular in texture (remnants of gas bubbles in the lava). The overlying basalt has similar characteristics such that the basalt can be dense to very friable depending on whether the basalt is solid or vesicular in texture. The basalt overlays an older volcanic tuff comprised of low density, friable, silicic tuff and tuffaceous sediment. Borehole logs suggest that a sand layer lies below the older basalt unit. Based on exposures along Southwest Ridge, the older Jurassic age quartz monzodiorite should be present at depth. The quartz monzodiorite was not encountered during drilling activities. Maximum depth of drilling to date is 500 feet below ground surface.

7. Site Hydrogeology

Based on recently installed monitoring wells, a deep aquifer has been identified at about 400 feet below ground surface (2300 feet above mean sea level (MSL)). Shallower groundwater was also encountered at about 200 feet below ground surface (2500 feet MSL), however this may be a thin perched zone or flow in fractures within the porous basalt or fractured/vesicular basalt. The shallow wells appear to make little water with some wells requiring several days after pumping to show the presence of water in the wells. Groundwater present near the site is believed to flow slightly north and east toward the Irwin groundwater basin where several of the base production wells are located approximately 1.5 miles from the Facility. Depth to groundwater in the Irwin Basin is found approximately 400 feet below ground surface (or approximately 2200 feet MSL).

8. Site Surface Hydrology and Stormwater Runoff

There are no permanent surface water bodies or natural springs on or near the Facility. Surface waters in the area include ephemeral surface water that would be present only during and following significant storm events. Surface runoff in the area is primarily by sheet flow within localized drainages.

The IWW is located near an ephemeral wash that may fill with water for short periods of time following significant storm events. There are several natural drainage courses that may contain significant surface flow during heavy precipitation within close proximity to the Facility. The Discharger has constructed flood protection structures including stormwater diversion channels to redirect upslope runoff around the Facility to nearby natural drainage courses. Such protection is provided for the water treatment facilities and the lined evaporation ponds. The storm water conveyance system is designed to contain the 100-year, 24-hour storm event. Best management practices will be employed to prevent erosion and damage to facilities.

9. Site Water Quality

The site is located on the western edge of the Irwin groundwater basin. To investigate water quality beneath the site, the Discharger installed groundwater monitoring wells at the Facility. Three rounds of groundwater sampling have been conducted to date. Analytical data show that water quality is good below the site having the following range of concentrations based on initial sampling: sodium (96 to 150 mg/L), chloride (47 to 130 mg/L), sulfate (83 to 160 mg/L), fluoride (2.7 to 7.2 mg/L), arsenic (0.008 to 0.17 mg/L), and TDS (450 to 1,000 mg/L). The highest concentrations are from the first samples collected from the deepest well on the upslope side of the site. This well was poorly developed prior to sampling and these values may be high compared to other data collected. This Order requires the Discharger to continue to collect and analyze groundwater samples from below the Facility and conduct a statistical analysis of

the data to determine water quality parameters from which to develop a Water Quality Protection Standard. Initial results indicate that water from the shallow zone is similar to groundwater in the deeper zone beneath the site.

10. Water Quality from Irwin, Bicycle Lake and Langford Lake Groundwater Basins

The Langford Valley Hydrologic Unit contains the Irwin, Bicycle Lake, and Langford groundwater basins. The Bicycle Valley Hydrologic Unit contains the Bicycle Lake groundwater basin. Groundwater at the Irwin, Bicycle Lake and Langford basins tends to contain high total dissolved solids and various dissolved metals depending on the underlying bedrock composition. High levels of fluoride and arsenic are present in groundwater produced from the 3 groundwater basins that provide water to the Base.

Groundwater quality in the area groundwater basins is characterized as being highly saline with TDS values ranging from 690 to 890 milligrams per liter (mg/L). Other inorganic constituents of concern (COC) include arsenic [(25 to 40 microgram per liter ($\mu\text{g/l}$))] and fluoride (5.1 to 8.75 mg/L).

The Discharger currently supplies domestic water to the Fort Irwin community from wells located in Irwin Basin, Langford Lake Basin, and Bicycle Lake Basin. Water from water supply wells in the 3 basins is blended and processed by a reverse osmosis (RO) facility on the Base. The previously used RO water treatment plant will be closed and the new IWW will replace this system. The RO facility discharged to the domestic wastewater sewer system.

11. Faulting and Seismicity

Active faults close to the IWW include the Calico-Hidalgo, the Garlock Fault, and Blackwater Fault. The Garlock Fault located approximately 23 miles north of the site, is capable of generating a maximum credible earthquake of magnitude 7.5. The IWW is not crossed by a mapped surface trace, nor is the site located in an Alquist-Priolo Earthquake Fault Zone associated with these faults.

The closest mapped fault to the site is identified as the Rifle Range fault located approximately 5,500 feet west of the site. The Rifle Range fault is well exposed in the Southwest Ridge area. The Rifle Range fault is probably related to the Goldstone Lake fault system exposed northwest of the site. A strand of the fault that crosses Southwest Ridge cuts older basalt (Tob), older alluvium, and intermediate age alluvial fan deposits. Along most of the fault trace, alluvium is faulted down to the west against older basalt. The age of latest movement along this fault is not known.

The Facility, including the Class II Surface Impoundments, has been designed using Class C design criteria, based on the 2010 California Building Code.

12. Site Topography

The site lies within a transitional area between an active channel and alluvial fan material which slopes towards the east-northeast. Elevations of the ground surface range from approximately 2,710-feet above MSL on the west side of the site to 2,685-feet above MSL at the eastern end of the site.

13. Climatology

The project site is located approximately 35 miles northeast of Barstow, California, in the north-central portion of the Mojave Desert. Characteristic of a desert climate, Fort Irwin experiences hot summers, mild winters, infrequent rainfall, and moderate afternoon winds. On average, the warmest month is July (average high is 104 °F and lows of 73 °F), while the coolest month is December (average highs of 60 °F and lows of 48 °F).

The bulk of the precipitation occurs in December, January, and February, with February averaging as the wettest month. Annual rainfall ranges from 0.75 inches in 2006 to a maximum of 7.68 inches in 2002. Summer thunderstorms are also common in late summer and early fall. Average annual rainfall is approximately 4.08 inches.

Pan evaporation rates are the greatest in June, July, and August. Pan evaporation rates are typically greater than the monthly precipitation rates for all months except January. The calculated net annual evaporation rates for the Fort Irwin area is approximately 67.85 inches per year with a cumulative average monthly pan evaporation rate of 111.59 inches.

The predominant wind direction in the Fort Irwin area is from the west.

14. Land Uses

Land in the vicinity of the Facility is owned by the Federal government (Department of Defense) and is part of the Fort Irwin Army National Training Center. Within half a mile east of the IWW is base housing and the main cantonment area. The main cantonment is a small town of its own, providing all the basic services to military personnel and their families that one would expect in a small community of similar population. The main cantonment provides housing, a preschool and elementary school for children of military personnel, as well as a hospital, restaurants, and other amenities that would be found in typical small communities.

Fort Irwin is a remote military post that contains a variety of land uses both close to the main cantonment area and within a short distance of the base community. Immediately north and south of the IWW, the land use is open land with typical desert vegetation. Immediately west of the site is industrial type land use that

includes buildings and warehouses that are associated with storage areas. The site itself is located on the edge of a drainage that flows to the east toward Irwin Basin.

15. Description of the Waste Stream and Waste Classification

The main chemicals of concern in the concentrated waste brine being discharged to the evaporation ponds include the anions and cations of chloride, nitrate, sulfate, potassium, and sodium that when discharged to the ponds have a TDS concentration of approximately 144,000 milligrams per liter (mg/L). The brine waste stream is classified as a designated waste under title 27 of the CCR. This liquid designated waste must be contained in a Class II surface impoundment constructed with a double liner and a leachate collection and removal system (LCRS) per CCR, title 27. As part of the CCR, title 27 requirements, the Discharger is also required to monitor the surface impoundments, including the vadose zone and groundwater beneath the site. A monitoring and reporting program is specified to confirm compliance. Based on mass balance equations and predictive modeling, the concentrated waste brine is expected to have characteristics listed in Table 1. These concentrations assume influent water quality with 99% recovery and with 99.6% recovery. The 99.6% recovery is the upper goal for the new treatment process and will result in lower volume (flow) but higher concentrate waste stream being discharged to the surface impoundments.

Table 1

Description of Waste – all values are in mg/L unless otherwise noted.	Combined Evaporation Pond Influent Water Quality at 99.0%	Combined Evaporation Pond Influent Water Quality at 99.6%
Flow, gpm Instantaneous * Maximum Average	125 gpm, 44 gpm (63,360 gpd) 22 (31,680 gpd)	7.04 gpm (10,138 gpd)
Specific Gravity, g/cm ³	1.04	1.11
Temperature, °C	47.38	72.13
pH	9.1	9.7
Total Alkalinity	189	926
Nitrogen, as Ammonia	1.07	1.75
Nitrogen, as Nitrate	412	1,061
Silica	89.7	255
ANIONS		
Bicarbonate	93	98
Carbonate	37	235
Chloride	15,358	48,997
Fluoride	62	202
Nitrate	1,823	4,697
H ₃ SiO ₄	66	318
H ₂ SiO ₄ ²⁻	0.41	35.85
Sulfate	11,812	36,886

Description of Waste – all values are in mg/L unless otherwise noted.	Combined Evaporation Pond Influent Water Quality at 99.0%	Combined Evaporation Pond Influent Water Quality at 99.6%
CATIONS		
Calcium	108	358
Magnesium	7.7	25.6
Potassium	760	2407
Sodium	15,846	49,910
Ammonium	0.25	0.03
Aluminum	0.00	0.00
Arsenic (+5)	0.36	1.02
Barium	0.03	0.10
Cadmium	0.00	0.00
Chromium	0.00	0.00
Copper	0.00	0.00
Iron (+3)	0.12	0.28
Lead	0.00	0.00
Manganese	0.00	0.00
Nickel	0.00	0.00
Silver (+1)	0.00	0.00
Strontium	1.03	3.40
Zinc	0.00	0.00
OTHER		
TSS	8.4	8.2
TDS (sum of ions)	46,056	144,307
TDS (180 °C)	46,009	144,258
Conductivity, microS/cm	88,787	279,559
Total Hardness, mg/L as CaCO ₃	303	1,003
Langlier Saturation Index (LSI)	1.8	3.7
Note: Average waste stream is based on a blend of 60% ambient water, 20% moderately high TDS, and 20% high TDS. *At 97% recovery and 6 MGD plant production. Does not include pond-to-pond transfer.		

16. Description of Surface Impoundments

The design of the Class II Surface Impoundments (evaporation ponds) includes several layers of protection and monitoring capabilities. The uppermost layer consists of a soil cement liner placed as an armament on the bottom of the ponds and up the side slopes to prevent puncture of the liners by equipment during solids removal. A 20-ounce primary non-woven geotextile fabric is installed just below the soil cement layer followed by a 60-mil textured HDPE primary liner, which is designed to prevent leachate from migrating below the ponds. A second 60-mil HDPE drain liner makes up the bottom of the leachate collection and removal system (LCRS). A sump is constructed in each pond that directs moisture within the LCRS to the sump. A 20 ounce geosynthetic clay liner (GCL) is installed below the LCRS system to protect the liner from the compacted subgrade/native soil. Below the LCRS sump and along the centerline of each

pond is another liner designed to monitor any potential leaks through the surface impoundments (soil-cement armament and LCRS) to the environment. This bottom liner is defined as the free-draining vadose zone monitoring system (VZMS). Liquid collected by the VZMS will be directed to a sump that is part of the VZMS. Each VZMS sump will also contain an access pipe that will allow monitoring of moisture in the engineered vadose zone monitoring system.

17. Authorized Disposal Site

The nine (9) lined surface impoundments are the only authorized disposal locations.

18. Waste Management Unit Classification

Wastewater brine and residual solid materials contained in the surface impoundments will consist of pollutants that, under ambient environmental conditions, if released, could result in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state as contained in the *Water Quality Control Plan for the Lahontan Region* (Basin Plan). This wastewater brine and residual solids are considered designated wastes pursuant to Water Code section 13173. Because the wastewater brine and residual materials are classified as designated wastes, the surface impoundments must meet the containment requirements for a Class II surface impoundment as defined in title 27.

19. Water Quality Protection Standard

Water Quality Monitoring and Reporting (WQMR) Plans propose a Water Quality Protection Standard (WQPS) that consists of COCs, Monitoring Parameters, Concentration Limits, Monitoring Points, and the Point of Compliance. The WQPS applies over the active life of the surface impoundments, closure, and post-closure maintenance period, and the compliance period as defined in CCR title 27, Section 20410 (Section 20410 Compliance Period). The WQMR Plan will be provided by the Discharger as outlined in the Monitoring and Reporting Program, below.

20. Detection Monitoring System

The Discharger shall maintain a detection monitoring program as required in Section 20385(a)(2) or (3) of title 27. Components of the detection monitoring program include a leachate collection and removal system (LCRS), a vadose zone monitoring system (VZMS), and a groundwater detection monitoring program. The Discharger proposes to use elevated concentrations of sodium and chloride, and elevated electrical conductivity measurements as a field method to determine if concentrated brine is present in the LCRS and or the VZMS. Each pond will have its own LCRS and VZMS.

a. Leachate Collection and Removal System (LCRS):

The LCRS consists of an upper 60 mil textured HDPE primary liner overlying a 60-mil HDPE drain liner. The system is designed to detect any leaks and collect any moisture that may develop in the LCRS. The bottom liner is designed to capture any liquid that leaks through the upper primary liner with the liquid being collected in the sump area for collection and removal. The sump will be continuously monitored using a solar-powered level switch that is installed in the monitoring tube of each LCRS sump. The solar system will provide power to operate the switch and the light beacon that will alarm the IWW operator of liquid in the LCRS.

b. Vadose Zone Monitoring System (VZMS):

The VZMS consists of a free draining lysimeter or more simply, a partial fourth liner that shall be installed directly below the LCRS sump and along the centerline of each pond where leaks are most likely to occur. The VZMS will consist of a gravel layer and a lined sump (40-mil geotextile) designed to allow for moisture detection monitoring, collection and removal. Should a leak develop in the LCRS system, the VZMS is designed to detect the leak and to enable sampling of the moisture present in the sump to determine the source of the moisture (from the ponds or from some other source). The VZMS extends the entire length of the centerline of each pond and is a minimum of 3 feet wide. This VZMS liner shall be centered along the V-shaped bottom of each surface impoundment.

c. Groundwater Detection Monitoring System:

A groundwater investigation was conducted to determine the presence of groundwater directly below the site and to determine groundwater quality. During the initial investigation, groundwater was identified both shallow and deep. Shallow groundwater is located approximately 200 feet below ground surface. The deeper more continuous groundwater zone is located about 400 feet below ground surface. Shallow groundwater appears to be located in fractured / vestibular basalt. Deep wells have consistently had groundwater and groundwater elevations from these deeper wells indicate a general gradient toward the Irwin Groundwater Basin to the north and east. Water detected in the shallow wells was originally thought to be perched water on top of a basaltic layer; however, measurable groundwater in these shallow wells is not consistent. To date, there has been insufficient water in shallow wells to sample. Deep groundwater is present in stratified volcanic tuff or sandstone. Three rounds of groundwater samples have been collected for general chemistry analyses from three of the four wells and water quality in the shallow and deep wells are very similar suggesting that there is connection between the two water-bearing zones. While initial sampling suggests groundwater quality is similar in both shallow and deep zones,

additional monitoring well(s) and sampling is required to determine background water quality. Since the presence of groundwater in the shallow well is inconsistent, additional monitoring well development will focus on the deeper zone.

21. Evaluation Monitoring Program

The Discharger shall establish an evaluation monitoring program whenever there is statistically significant evidence of a release from the Facility as required in Section 20385.1(a)(2) or (3) of CCR title 27.

22. Corrective Action Monitoring Program

The Discharger shall institute a corrective action plan (CAP) when required pursuant to Section 20385(a)(4) of CCR title 27.

23. Action Leakage Rates (ALRs)

An action leakage rate of (ALR) of 20 gallons per acre per day will be applied for the upper liner of the double lined surface impoundments. An action leakage rate of 20 gallons per acre per day shall be the point at which the Discharger will notify the Water Board of a potential leak requiring the Discharger to collect a sample and determine the source of the liquid. Should the liquid be identified as originating from the ponds (high TDS), the Discharger shall prepare a plan describing how the Discharger plans to deal with the exceedance. The liquid collected in the LCRS sumps will be removed and pumped to a surface impoundment that is not leaking above the ALR, or an approved alternative.

24. Rapid and Large Leakage Rate (RLLR)

The Rapid and Large Leakage Rate (RLLR) is defined as the maximum design flow rate that the leak detection system (LDS) can remove without the fluid head on the bottom liner exceeding 1 foot of head. The Discharger has proposed Rapid and Large Leakage Rate (RLLR) of 1,282 gallons per acre per day. Since each pond covers an area of approximately 0.78 acres, the pond leakage rate is 1,000 gallons per pond per day. If the Rapid and Large Action Leakage Rate is met or exceeded, the Discharger shall remove the pond from service and repair the leak. The Discharger shall notify the Water Board immediately of such exceedances.

25. Closure Post-Closure Maintenance

The Discharger has identified clean closure per CCR, title 27, Division 2, Subdivision 1, Chapter 3 Subchapter 5, Article 3, Section 21400 as the likely closure process to be implemented when the Facility is decommissioned. The expected life of the Facility is 50 years. The preliminary closure and post-closure

maintenance plan shall be updated if there is a substantial change in operations or cost for closure, and a report shall be submitted annually indicating conformance with existing operations. A final plan shall be submitted at least 180 days prior to beginning any partial or final closure activities or at least 120 days prior to discontinuing the use of the site for waste management, storage or disposal, whichever is greater. The final plan shall be prepared by or under the supervision of either a California Registered Civil Engineer or a California Certified Engineering Geologist.

26. Reasonable and Foreseeable Releases

The Discharger has proposed costs needed for financial assurance to cover the estimated cost of the worst case known (if appropriate) or reasonably foreseeable release. The Discharger shall submit a report on financial assurance for corrective action for the Water Board's Executive Officer's review and approval. Every 5 years after submittal of the initial financial assurance report, or earlier, if requested by the Executive Officer, the Discharger shall submit a report that either validates the financial assurance instrument's ongoing viability or proposes and substantiates any needed changes. The Discharger may combine the three components (Closure, Post Closure, Corrective Action) of the instruments into one report to comply with the requirement.

27. Financial Assurances

The Discharger shall obtain and maintain Financial Assurance Instruments that comply with CCR Title 27 (Section 22207 [Closure Fund], 22212 [Post Closure Fund], and 22220 et seq. [Correction Action Fund]) and 40 CFR parts 257 and 258. The Discharger has provided a letter stating that the Facility is on land owned by the Federal Government (Department of Defense) and that the federal government is a self-insured entity. The statement is submitted in compliance with CCR Title 27 §22250.

28. Lahontan Basin Plan

The Water Board adopted a Basin Plan which became effective in March 31, 1995, and this Order implements the Basin Plan as amended.

29. Receiving Waters

The receiving waters are groundwater of the Irwin Sub-Basin (6-36.02) of the Langford Valley Groundwater Basin (6-36).

30. Beneficial Groundwater Uses

The beneficial uses of groundwater of the Irwin Sub-Basin of the Langford Valley Groundwater Basin as set forth and defined in the Basin Plan are:

- a. MUN – municipal and domestic supply
- b. AGR – agricultural supply
- c. IND – industrial service
- d. FRSH – fresh water replenishment

31. Evaluation of Water Code Section 13241

Pursuant to Water Code section 13241 the requirements of this Order take into consideration:

a. Past, present, and probable future beneficial uses of water.

The findings of this Order identify past, present and probable future beneficial uses of water, as described in the Basin Plan, that are potentially affected by the discharge. Present or probable future beneficial uses of the water, including municipal water supply, agricultural supply, industrial, and freshwater replenishment will not be affected by the discharge, and will be maintained.

b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

The findings of this Order concerning geology, hydrogeology, and hydrology and provide general information on the hydrographic unit potentially affected by the discharge. Water quality is generally suitable for beneficial uses, although the Discharger has to remove naturally-occurring arsenic, fluoride, and high TDS from the ground water to meet drinking water standards to supply the community. This Order requires controls to protect and maintain the existing groundwater quality of the aquifer. The Water Board has considered the environmental characteristics of the hydrographic unit, including the quality of water available.

c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

The discharge will be contained by double-lined ponds designed to meet Title 27 performance criteria. The containment facilities are designed to control the discharge so that it does not reach groundwater. Groundwater and vadose zone monitoring will be implemented to verify compliance. Factors that could affect water quality in the area are being controlled in accordance with the Basin Plan policies. The nearest drinking water well has naturally-occurring arsenic, fluoride, and high TDS above levels suitable for municipal supply, and is controlled by treatment. Ground water quality will be maintained for its beneficial uses, consistent with coordinated controls for the area.

d. Economic considerations.

The proposed Facility is necessary to allow for the continued occupancy of the community with adequate water supply. The Discharger has not indicated any economic hardship associated with the proposed Facility.

e. The need for developing housing within the region.

This project is in support of existing housing facilities and future expansion for military personnel and their families. The Discharger has determined the planned Facility will support existing and currently-planned service levels. This Order will support the existing and planned military housing and support facilities.

f. The need to develop and use recycled water. This Facility will not have a recycled water component. It is a new water treatment unit that will maximize the beneficial use of pumped groundwater by treating source water with a minimum of 99 percent recovery.

32. California Environmental Quality Act Compliance Finding

On December 8, 2014, the Water Board provided notice of intent to certify a negative declaration (SCH No. 2014121024) for the Fort Irwin U.S. Army National Training Center Irwin Water Works project (Cal. Code Regs., tit. 14, §15072.) The negative declaration for the Fort Irwin U.S. Army National Training Center Irwin Water Works, San Bernardino County – Waste Discharge Requirements Board Order No. R6V-2014 (PROPOSED) WDID No. 6B361409017 reflects the Water Board's independent judgment and analysis. After considering the document and comments received during the public review process, the Water Board hereby determines that the proposed project will not have a significant effect on the environment. The negative declaration is hereby certified. The documents or other material, which constitute the record, are located at the Water Board's office at 14440 Civic Drive, Suite 200, Victorville, California 92392. The Water Board will file a Notice of Determination with the Office of Planning and Research within five working days from the issuance of this order.

33. Notification and Consideration of Comments

The Water Board has notified the Discharger and interested parties of its intent to issue WDRs for the discharge and Facility. A notice of the availability of a draft order, and that a public meeting would be held to consider adoption of the order, was published/advertised in the Victorville Daily Press and the Barstow Desert Dispatch on December 23, 2014. The Water Board, in a public meeting on February 12, 2015 heard and considered all comments pertaining to the discharge. The Water Board has considered comments provided in accordance with applicable time limits.

34. Notification of Interested Parties

The Water Board has notified the Discharger and all known interested parties of its intent to issue WDRs for the Facility.

35. Consideration of Interested Parties

The Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the Discharger shall comply with the following requirements:

I. DISCHARGE SPECIFICATIONS

A. Discharge Limits

1. All wastewaters (concentrated brine) discharged to the Class II Surface Impoundments shall not contain concentrations of parameters that either equal or exceed the Soluble Threshold Limit Concentration (STLC) limits identified in the STLC Limits Table 2, below, which are included in Title 22, Section 66261.24. All extractants obtained from settled solids or salt samples collected from within the lined evaporation ponds shall not contain concentrations of parameters that either equal or exceed the limits identified in tables 2 and 3 below. The laboratory extractant is generated by conducting the Waste Extraction Test (WET) or Toxicity Characteristic Leaching Procedure (TCLP) on a sample of Salt precipitate, which has been dried in accordance with USEPA Method 160.1. The WET and TCLP shall be conducted in accordance with Section 66261.24, Title 22, California Code of Regulations (22CCR §66261.24).
2. All solids or salts within the Class II Surface Impoundments shall not contain concentrations of parameters that either equal or exceed the Total Threshold Limit Concentration (TTLC) limits identified in Table 3, below.
3. All wastewater discharged to the Class II Surface Impoundments, and the wastewater and solids or salt within each Class II Surface Impoundments shall not exhibit characteristics of: (a) ignitability, (b) corrosivity, (c) reactivity or (d) toxicity as defined in Title 22, California Code of Regulations §66261.21, §66261.22, §66261.23 and §66261.24, respectively.

4. The flow of concentrated brine to the Class II Surface Impoundments shall not exceed the total design flows as noted previously in Table 1.

Table 2
Discharge Limits for Wastewater/Limits for Wastewaters within Class II Surface Impoundments (STLC Limits)

Parameter	Units	Less Than
Antimony (Sb)	mg/L	15
Arsenic (As)	mg/L	5
Barium (Ba)	mg/L	100
Beryllium (Be)	mg/L	0.75
Cadmium (Cd)	mg/L	1
Chromium (Cr)	mg/L	5
Cobalt (Co)	mg/L	80
Copper (Cu)	mg/L	25
Lead (Pb)	mg/L	5.0
Mercury (Hg)	mg/L	0.2
Molybdenum (Mo)	mg/L	350
Nickel (Ni)	mg/L	20
Selenium (Se)	mg/L	1
Silver (Ag)	mg/L	5
Thallium (Tl)	mg/L	7
Vanadium (V)	mg/L	24
Zinc (Zn)	mg/L	250
Fluoride (F)	mg/L	180

Table 3
Discharge Limits for Settled Solids/Limits for Solids within Class II Surface Impoundments (TTLC Limits)

Parameter	Units	Less Than
Antimony (Sb)	mg/kg	500
Arsenic (As)	mg/kg	500
Barium (Ba)	mg/kg	10,000
Beryllium (Be)	mg/kg	75
Cadmium (Cd)	mg/kg	100
Chromium (Cr)	mg/kg	500
Cobalt (Co)	mg/kg	8000
Copper (Cu)	mg/kg	2,500
Lead (Pb)	mg/kg	1,000
Mercury (Hg)	mg/kg	20
Molybdenum (Mo)	mg/kg	3,500
Nickel (Ni)	mg/kg	2,000

Parameter	Units	Less Than
Selenium (Se)	mg/kg	100
Silver (Ag)	mg/kg	500
Thallium (Tl)	mg/kg	700
Vanadium (V)	mg/kg	2,400
Zinc (Zn)	mg/kg	5,000
Fluoride (F)	mg/kg	18,000

B. Receiving Water Limits

1. The discharge of waste shall not cause the presence of the following substances or conditions in groundwater:
 - a) the presence of constituents in concentrations that exceed WQPS levels; and
 - b) the presence of toxic substances in concentrations that individually, collectively, or cumulatively cause detrimental physiological response in humans, plants, animals, or aquatic life.
2. This discharge shall not cause a violation of any applicable water quality standards adopted by the Water Board or the State Water Resources Control Board.

II. REQUIREMENTS AND PROHIBITIONS

A. General

1. There shall be no discharge, bypass, or diversion of concentrated brine from the collection, conveyance, or disposal facilities to adjacent land areas or surface waters.
2. All facilities used for the collection, conveyance, or disposal of brine shall be adequately protected against overflow, washout, inundation, structural damage, or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.
3. Direct pipeline discharge to the Class II Surface Impoundments shall be either equipped with devices or shall have fail-safe operating procedures to prevent overfilling. Discharges shall be stopped immediately in the event of any containment system failure, and the system repaired.

4. There shall be no discharge, bypass, or diversion of concentrated brine from the collection, conveyance, or disposal facilities to adjacent land areas or surface waters.
5. The Class II Surface Impoundments shall be designed and constructed to prevent scouring of the containment structures at points of discharge into the impoundments and by wave action at the waterline.
6. The discharge of waste exhibiting hazardous waste characteristics as defined in Title 22, California Code of Regulations, to the Class II Surface Impoundments or generation of waste exhibiting hazardous waste characteristics in the Class II Surface Impoundments is prohibited.
7. The Discharger shall not cause pollution, or threatened pollution, as defined in Section 13050 of the California Water Code.
8. Neither the treatment nor the discharge shall cause a nuisance as defined in Section 13050 of the California Water Code.
9. Any discharge of waste to surface water or the environment outside the waste discharge ponds except as authorized in the permit is prohibited.

B. Class II Surface Impoundments

1. Surface Impoundments shall be built as described in the RoWD, including their size, number and location.
2. The discharge of concentrated brine except to the authorized Class II Surface Impoundments is prohibited.
3. All lined facilities shall be effectively sealed to prevent the exfiltration of liquids. For this project, "effectively sealed" facilities are the Impoundments that are designed and constructed in accordance with the requirements of Title 27 for Class II Surface Impoundments or an approved engineered alternative.
4. The Class II Surface Impoundments shall have sufficient free board to accommodate seasonal precipitation and the design storm specified in Table 4.1 of Title 27, California Code of Regulations. But in no case will the vertical distance between the liquid surface elevation and the lowest part of a pond dike or the invert of an overflow structure be less than two feet.

C. Leachate Collection and Removal System (LCRS)

1. If liquids are detected in the LCRS sumps at a rate equal to or greater than the “Action Leakage Rate” of 20 gallons per acre per day (Table 4 below), then the Discharger shall comply with the notice of adverse condition requirements presented in Standard Provisions for Waste Discharge Requirements, Section 2.a., (Attachment D). The Discharger shall prepare a plan for investigating the potential release. The plan must be submitted with the next self-monitoring report.

**Table 4
 Action Leakage Rates**

Impoundment	Surface Area (Acres)	Action Leakage Rate (gallons per day per pond)
Pond Size	0.78	15.6

Note: The Action Leakage Rate is the equivalent of 20 gallons per acre per day

2. If liquids are detected in the LCRS sumps at rates greater than the “Rapid and Large Leakage Rate” as described in Table 5, below, the Discharger shall immediately notify the Water Board and cease discharge of waste to the affected impoundment. Discharges of waste to the affected impoundment are prohibited until the appropriate repairs are made and approval for discharge is granted.

**Table 5
 Rapid and Large Leakage Rates**

Impoundment	Surface Area (Acres)	Rapid and Large Leakage Rate (gallons per day)
Pond Size	0.78	1,000

Note: The Rapid and Large Leakage Rate is the equivalent of 1,282 gallons per acre per day

3. If leachate is present in the leachate collection sump, the level of leachate in the leachate collection sump shall be no higher than needed to ensure efficient sump dewatering pump operation.
4. The LCRSs shall be operated to function without clogging throughout the life of the project including closure and post closure maintenance periods.
5. The LCRSs shall be tested in the event no leachate is being generated by the system and the vadose zone monitoring system (VZMS) indicates no seepage for a period of 12 months. If leachate is collected in either the LCRS or VZMS, it is inferred that

the system is operating as designed. If testing is warranted, any tests performed shall be by an approved method.

6. The LCRS shall be capable of removing twice the maximum anticipated daily volume of leachate from the waste management unit.
7. Any leachate collected in an LCRS shall be pumped into an adjacent Class II Surface Impoundment that is not leaking above the ALR or to another approved holding alternative.

D. Detection Monitoring Trigger Points

Field measurements shall be used to monitor the quality of liquid present in the various monitoring locations. If liquid is present in the LCRS at flows less than the Rapid Action Leakage Rate, the Discharger shall maintain the liquid at no more than 1-foot of head in the LCRS sump. If the Discharger is unable to maintain 1-foot of head or less, the Discharger shall remove the pond from service and repair the leak. Should liquid be discovered in the VZMS indicative of concentrated brine (see Table 6 below), the data will indicate that a release to the environment has occurred and corrective actions shall be taken.

Table 6

Monitoring Program	Sodium (mg/L)	Chloride (mg/L)	Specific Conductance
LCRS	>10,000	>10,000	>12,500
VZMS	5,000	5,000	12,500
Groundwater	WQPS	WQPS	WQPS

E. Detection Monitoring Program

The Discharger shall maintain a Detection Monitoring Program as required in Section 20385(a)(1) of CCR, Title 27.

F. Evaluation Monitoring Program

The Discharger shall establish an Evaluation Monitoring Program whenever there is statistically significant evidence of a release from the Facility as required in Section 20385(a)(2) or (3) of CCR, Title 27.

G. Corrective Action Program

The Discharger shall institute a Corrective Action Program when required pursuant to Section 20385(a)(4) of CCR, Title 27.

III. WATER QUALITY MONITORING AND RESPONSE PROGRAMS

A. Water Quality Protection Standard

1. Following groundwater characterization (as required in section IV.B.1, below), the Discharger shall propose to the Water Board constituents of concern for the surface impoundments, based on the expected discharge chemistry to the surface impoundments. The Discharger shall notify the Water Board at least 180 days before the discharge of any new COCs not included in the list to the Class II Surface Impoundments. Before a new discharge commences, the Discharger shall estimate the concentration for such constituents within the wastewater stream and submit written statistical method(s) in order to detect a release of such constituents.
2. At any given time, the concentration limit for each groundwater monitoring parameter constituent of concern shall be equal to the background value of that constituent.
3. If the Discharger or Executive Officer determines that concentration limits were or are exceeded, the Discharger shall immediately institute verification procedures upon such determination as specified below or submit an amended RoWD within 90 days of such determination in order to establish an Evaluation Monitoring Program.

B. Statistical Methods

1. The Discharger shall use Water Board approved statistical data analysis methods to evaluate Point of Compliance data in order to determine "measurably significant" (as defined in Section 20164 of Title 27) evidence of a release from the Class II Surface Impoundments.
2. Allowable statistical methods include: Parametric Analysis of Variance (ANOVA) and Nonparametric (ANOVA), Tolerance Interval, Control Chart, or other statistical methods approved by the Water Board.
3. Point of compliance monitoring wells will be established based on the groundwater investigation currently underway. The Discharger has installed three groundwater monitoring wells to date and will be installing additional wells in the future to define groundwater flow direction below the Class II Surface Impoundments. Once groundwater flow directions and ambient groundwater quality is

established, point of compliance wells, consisting of at least 1 upgradient and 2 downgradient wells shall be established to monitor groundwater directly below the site. The upgradient well(s) will establish groundwater quality below the site, and the downgradient point of compliance wells will be used to monitor for any release from the Class II Surface Impoundments. The downgradient point of compliance wells will be installed immediately downgradient of the Class II Surface Impoundments.

The Discharger shall determine, within 60 days after completion of sampling, whether there is statistically significant evidence of a release from the Class II Surface Impoundments at each monitoring point. The analysis shall consider all monitoring parameters and COCs. The Executive Officer may make an independent finding that there is statistically significant evidence of a release or physical evidence of a release.

4. If there is statistically significant evidence of a release, the Discharger shall immediately notify the Water Board by calling the Victorville office immediately and by certified mail (see reporting procedures contained in the Attachment D). Subsequently, the Discharger may immediately initiate verification procedures as specified below whenever there is a determination by the Discharger or Executive Officer that there is statistically significant evidence of a release.
5. If the Discharger does not use verification procedures to evaluate evidence of a release, then there is confirmation that there is statistically significant evidence of a release. The Discharger is required to submit, within 90 days of such confirmation, an amended Report of Waste Discharge in order to establish evaluation monitoring or make a demonstration to the Water Board that there is a source other than the Class II Surface Impoundments that caused evidence of a release (see reporting procedures contained in Attachment D).

C. Nonstatistical Methods

The Discharger shall determine whether there is significant physical evidence of a release from the Facility. Significant physical evidence may include, but is not limited to, unexplained volumetric changes in the surface impoundments, unexplained stress in biological communities, unexplained changes in soil characteristics, visible signs of leachate migration, and/or unexplained water table mounding beneath or adjacent to the Facility, or any other change in the environment that could reasonably be expected to be the result of a release from the Facility (see

notification procedures contained in the Monitoring and Reporting Program).

D. Verification Procedures

1. The Discharger shall immediately initiate verification procedures as specified below whenever there is a determination by the Discharger or Executive Officer that there is evidence of a release. If the Discharger declines the opportunity to conduct verification procedures, the Discharger shall submit a technical report as described below under the heading Technical Report without Verification Procedures.
2. The verification procedure shall only be performed for the constituent(s) that have shown a statistically significant evidence of a release, and shall be performed for those monitoring points at which a release is indicated.
3. If a determination is made that there is evidence of a release using an approved statistical method, the Discharger may, within 30 days of such determination, update the Upper Tolerance Limit and reevaluate Point of Compliance data in order to verify evidence of a release from the Class II Surface Impoundments. The Discharger must also collect three additional samples from the affected Monitoring Points and compare the results to the updated Upper Tolerance Limit.
4. The Discharger shall either conduct a composite retest using data from the initial sampling event with all data obtained from the resampling event or shall conduct a discrete retest in which only data obtained from the resampling event shall be analyzed to verify evidence of a release.
5. The Discharger shall report to the Water Board by certified mail the results of the verification procedure, as well as all concentration data collected for use in the retest within seven days of the last laboratory analysis.
6. If the Discharger or Executive Officer verify evidence of a release, the Discharger is required to submit, within 90 days of such a determination that there is, or was, a release, a technical report pursuant to Section 13267(b) of the California Water Code. The report shall propose an Evaluation Monitoring Program (see subsection, II.F.), **OR**, make a demonstration to the Water Board that there is a source other than the Class II Surface

Impoundments that caused evidence of a release (see procedures contained in Attachment D).

E. Technical Report without Verification Procedures

If the Discharger chooses not to initiate verification procedures after there has been a determination made for evidence of a release, a technical report shall be submitted pursuant to Section 13267(b) of the California Water Code. The report shall propose an evaluation-monitoring program, **OR**, attempt to demonstrate that the release did not originate from the Facility.

IV. PROVISIONS

A. Standard Provisions

The Discharger shall comply with the "Standard Provisions for Waste Discharge Requirements," dated September 1, 1994, which is attached and is made part of this Order (Attachment D).

B. Monitoring and Reporting

1. The Discharger shall prepare a Groundwater Data Report, determining background groundwater quality parameters and other criteria necessary to develop a WQPS. The Groundwater Data Report shall include geologic borehole logs, well development logs, purge logs, well completion reports, and analytical data. A Draft Groundwater Data Report shall be submitted to the Water Board **no later than July 1, 2015.**
2. The Discharger shall prepare a Water Quality Monitoring and Response Program Plan (WQMRPP) **no later than July 1, 2015.**
3. The Discharger shall submit a Draft Water Quality Protection Standard (WQPS) Report **no later than October 1, 2015.**
4. The Discharger shall respond to Water Board comments and submit a revised Final WQPS Report **no later than February 1, 2016.**
5. The Discharger provided a Construction Quality Assurance Plan, Design Drawings, and Preliminary Closure Plan in the RoWD. The Discharger shall submit within 30 days of completion of construction to Water Board staff construction as-built diagrams/drawings and a completion quality assurance report signed by the Engineer of Record.

6. As required in Section 20324, CCR, title 27, Final Documentation - at the completion of the lined evaporation ponds construction project, the Discharger shall prepare Final Documentation, which contains all reports submitted concerning the placement of the containment system. This document shall provide evidence that the Construction Quality Assurance plan was implemented as proposed and that the construction proceeded in accordance with design criteria, plans, and specifications. The Discharger shall submit copies of the Final Documentation report as prepared by the Construction Quality Assurance officer and signed by the Engineer of Record to the Water Board within 6 months of project completion.
7. Once construction is complete, as-built diagrams shall be stored by the Discharger in a manner that shall allow for easy access while still protecting them from any damage. All documentation shall be maintained from operation through the post closure maintenance period at the Discharger's office of operation. A complete set of as-built construction drawings documenting the construction of the Facility shall be signed by the Engineer of Record, and submitted to the Water Board within 6 months of final construction and be stored at the Facility in the event they are needed for reference in the future.
8. The Discharger shall keep on-site a Permanent Site Log Book that shall be used to record site operations, maintenance, and inspection activities. The log book shall be a bound log book with pre-printed, consecutively numbered pages.
9. All reports and data shall be uploaded to Geotracker per title 23, sections 3890-3895.

C. Closure and Post Closure Maintenance Plan

The preliminary Closure and Post-Closure Maintenance Plan provided in the RoWD shall be updated if there is a substantial change in operations or costs for closure, and a report shall be submitted annually indicating conformance with existing operations. A final plan shall be submitted at least 180 days prior to beginning any partial or final closure activities or at least 120 days prior to discontinuing the use of the site for waste treatment, storage or disposal, whichever is greater. The final plan shall be prepared by or under the supervision of either a California Registered Civil Engineer or a California Certified Engineering Geologist.

D. Claim of Copyright or other Protection

Any and all reports and other documents submitted to the Water Board pursuant to this Order will need to be copied for some or all of the

following reasons: 1) normal internal use of the document, including staff copies, record copies, copies for Board members and agenda packets; 2) any further proceedings of the Water Board and the State Water Resources Control Board; 3) any court proceedings that may involve the document; and 4) any copies requested by members of the public pursuant to the Public Records Act or other legal proceedings.

If the Discharger or its contractor claims any copyright or other protection, the submittal must include a notice, and the notice will accompany all documents copied for the reasons stated above. If copyright protection for a submitted document is claimed, failure to expressly grant permission for the copying stated above will render the document unusable for the Water Board's purposes, and will result in the document being returned to the Discharger as if the task had not been completed.

I, Patty Kouyoumdjian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by California Regional Water Quality Control Board, Lahontan Region, on February 11, 2015.



PATTY Z. KOUYOUMDJIAN
EXECUTIVE OFFICER

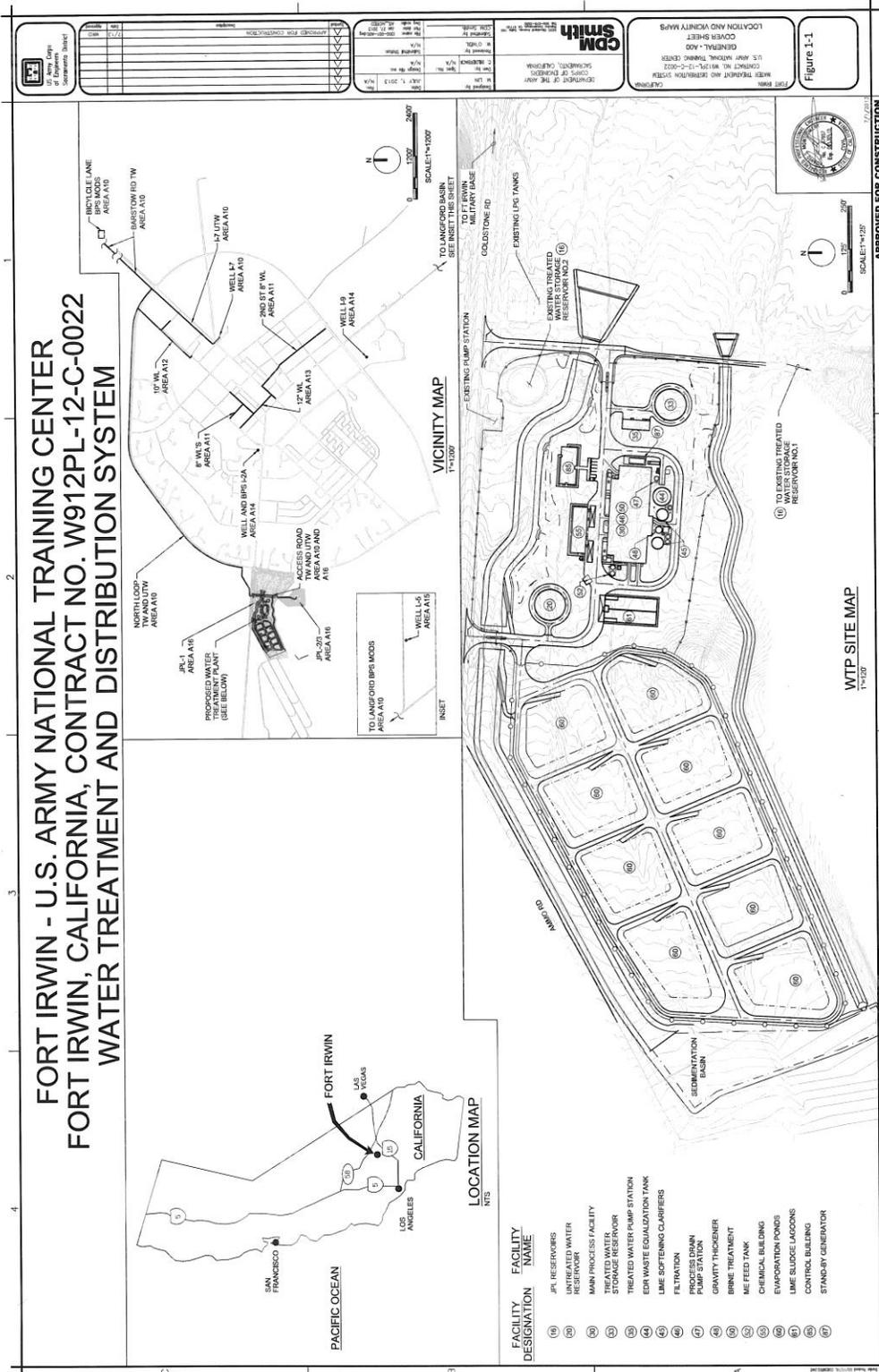
Attachments: A. References
B. Site Map
C. Water Treatment Plant Process Flow Diagram
D. Standard Provisions

Attachment A

REFERENCES

1. U.S. Army, 2014. Form 200 Application/Report of Waste Discharge General Information Form for Waste Discharge Requirements or NPDES Permit, September 4, 2014
2. U.S. Army, 2014. Federal Certification for Fort Irwin Water Works Evaporation Ponds, Financial Assurances Letter, dated August 25, 2014.
3. U.S. Army, 2014. Preliminary Cost Estimate to Complete Closure Post Closure compliance, dated TBD

Attachment B – Site Map

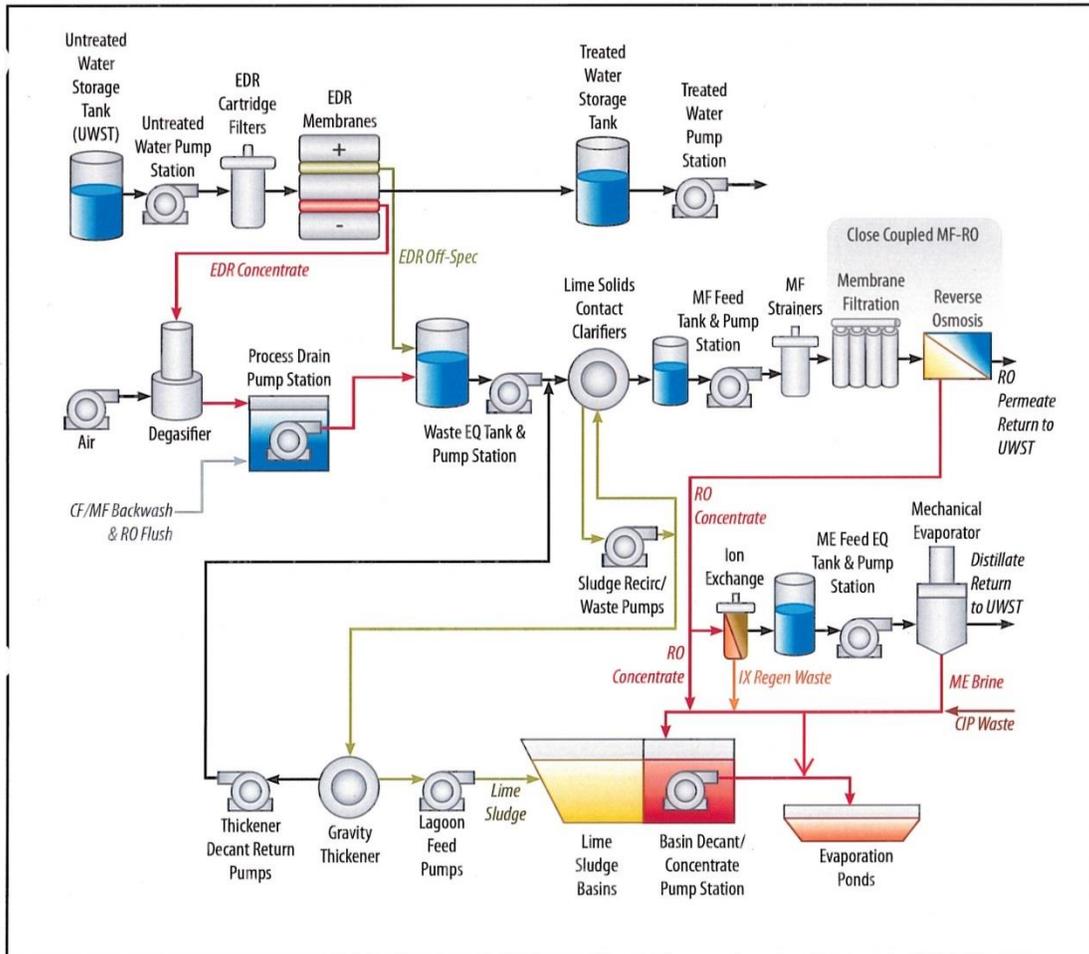


APPROVED FOR CONSTRUCTION



Attachment C – Water Treatment Plant Process Flow Diagram

Figure 1-4 Process Flow Diagram



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

STANDARD PROVISIONS
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

The Discharger shall permit Regional Board staff:

- a. to enter upon premises in which an effluent source is located or in which any required records are kept;
- b. to copy any records relating to the discharge or relating to compliance with the Waste Discharge Requirements (WDRs);
- c. to inspect monitoring equipment or records; and
- d. to sample any discharge.

2. Reporting Requirements

- a. Pursuant to California Water Code 13267(b), the Discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.
- b. Pursuant to California Water Code Section 13260 (c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant soil disturbances.
- c. The Owners/Discharger of property subject to WDRs shall be considered to have a continuing responsibility for ensuring compliance with applicable WDRs in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the WDRs shall be reported to the Regional Board. Notification of applicable WDRs shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.
- d. If a Discharger becomes aware that any information submitted to the Regional Board is incorrect, the Discharger shall immediately notify the Regional Board, in writing, and correct that information.

- e. Reports required by the WDRs, and other information requested by the Regional Board, must be signed by a duly authorized representative of the Discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation.
- f. If the Discharger becomes aware that their WDRs (or permit) are no longer needed (because the project will not be built or the discharge will cease) the Discharger shall notify the Regional Board in writing and request that their WDRs (or permit) be rescinded.

3. Right to Revise WDRs

The Regional Board reserves the privilege of changing all or any portion of the WDRs upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. Duty to Comply

Failure to comply with the WDRs may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and re-issuance, or modification.

5. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the WDRs which has a reasonable likelihood of adversely affecting human health or the environment.

6. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the WDRs. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the Discharger, when necessary to achieve compliance with the conditions of the WDRs.

7. Waste Discharge Requirement Actions

The WDRs may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for waste discharge requirement modification, revocation and re-issuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the WDRs conditions.

8. Property Rights

The WDRs do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the WDRs including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the WDRs shall be kept and maintained by the Discharger and be available at all times to operating personnel.

11. Severability

Provisions of the WDRs are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from treatment and disposal facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operation. The owner/operator must request the transfer in writing and receive written approval from the Regional Board's Executive Officer.

14. Definitions

a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.

b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

All facilities used for collection, transport, treatment, storage, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

**CALIFORNIA WATER QUALITY CONTROL BOARD
LAHONTAN REGION**

**MONITORING AND REPORTING PROGRAM
NO. R6V-2015-0004
WDID NO. 6B361409017**

FOR

**FORT IRWIN U.S. ARMY NATIONAL TRAINING CENTER
IRWIN WATER WORKS**

_____ San Bernardino County _____

I. MONITORING

The Discharger's Detection Monitoring Program shall comply with the monitoring provisions contained in Section 20385 through 20430 of title 27, California Code of Regulations.

A. The Discharger shall monitor the following:

1. The total volume, in million gallons, of wastewater flow to each Surface Impoundment for each day.
2. The average daily flow, in million gallons, of wastewater flow to the Surface Impoundments calculated for each month.
3. The total volume, of wastewater to the Class II Surface Impoundments calculated for the last 12 months.
4. Yearly, calibrate the wastewater flow meters.

B. Plant Operational Monitoring

1. Operational Monitoring

The Discharger is proposing operational monitoring. Operational monitoring samples will be analyzed using field instruments (electrical conductivity and pH) and State-Certified laboratory.

Operational monitoring samples will be collected at the following stations:

- a. Concentrated brine from IWW effluent to the Surface Impoundments,
- b. concentrated brine precipitate (Surface Impoundment solids),
and

- c. Other Waste Streams as deemed appropriate by the Plant Operators.

IWW effluent will be monitored monthly for pH and conductivity and monitored semi-annually for TDS, sodium, chloride, fluoride, and arsenic. Other elements shall be monitored as necessary to ensure proper Plant operation.

2. Reporting Operational Monitoring Results

- a. The Discharger must provide a narrative summary of the Operational Monitoring results with each monitoring report. A bound Permanent Site Log Book (Site Log Book) shall be kept on-site to record all observations.

- C. Surface Impoundment Monitoring

1. Dikes and Liners

- a. Monthly, the freeboard (vertical distance from the top of the lowest part of the dike to the wastewater surface) shall be measured, in each surface impoundment. If the pond is dry, indicate that it is dry.
- b. Monthly, the integrity of the dikes and liners shall be checked. Should the inspection indicate any unauthorized discharge has occurred or may occur, the Water Board shall be notified immediately, followed by confirmation in writing.
- c. Monthly, inspect the discharge pipe at each pond to ensure that salt precipitate has not clogged the discharge pipe preventing flow to ponds and potentially causing overflow conditions. Clean as appropriate to prevent clogging. Note scale accumulation in the Site Log Book.
- d. If, during the active life of the ponds the wastes are removed and impoundments are cleaned down to the soil-cement liner, an inspection shall be made of the bottom of each empty surface impoundment prior to refilling the impoundment. Any defects (cracks, abraded concrete, etc.) shall be noted and repaired as necessary.

2. Leachate Collection and Removal Systems (LCRS)

- a. Continuous monitoring of the LCRS system will be conducted using a solar powered electrode installed into the LCRS sump. Should liquid collect in the sump, the circuit would be completed and a light at the surface over the evaporation pond would light up. If liquid is present in the sump, a sample shall be collected and analyzed for electrical conductivity using the field electrical

conductivity meter and a sample shall be sent to the laboratory for analysis of sodium and chloride to determine the origin of the liquid. The results of those inspections and samples shall be recorded in a Site Log Book, photocopied and sent to the Water Board.

- b. Any volume of liquid pumped out of the LCRS detection sumps shall be recorded along with date, time and discharge location in the Site Log Book kept on-site. The leakage rate must be determined and compared to the Action Leakage Rate identified in waste discharge requirements, and any necessary corrective action must be identified and implemented.
- c. If liquid is not identified in the LCRS monitoring system for one year, the LCRS sample and collection system shall be tested at least once annually to demonstrate proper operation. The results of the testing shall be submitted in the annual monitoring reports. The first annual report shall include a description of the method used to test the LCRS.
- d. As a part of each regularly scheduled monitoring report identified below in section IV, the total volume of leachate collected in the LCRS sump each month since the previous monitoring report shall be reported.

D. Surface Impoundment Sampling (Liquid)

Two (2) sample locations shall be established for each surface impoundment. A liquid grab sample shall be collected at each sample location and composited for each surface impoundment. The composite sample collected at each surface impoundment shall be analyzed to determine the concentration of the following parameters:

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Total Dissolved Solids	mg/l	Semi Annual
Chloride	mg/l	Semi Annual
Sodium	mg/l	Semi Annual
Sulfate	mg/l	Semi Annual
Fluoride	mg/l	Semi Annual
Total Metals ¹	mg/l	Annually
Electrical Conductivity (E _e) ²	micromhos/cm	Monthly

E. Surface Impoundment Sampling (Solids)

Two (2) sample locations shall be established for each surface impoundment. A grab sample of solids shall be collected at each sample

¹ Analyze for all metals listed in Section 66261.24, Title 26, Cal. Code of Regs. For all metals, the sampling frequency is annually.

² Electrical conductivity shall be measured monthly using a calibrated field electrical conductivity meter.

location and composited for each pond. If no solids are present in the surface impoundments, a statement to that effect must be made in the monitoring report. The composite sample collected at each pond shall be analyzed to determine the total concentration of the following parameters:

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Anions	mg/kg	Semi Annually
Fluoride	mg/kg	Semi Annually
Chloride	mg/kg	Semi Annually
Sodium	mg/kg	Semi Annually
Sulfate	mg/kg	Semi Annually
Nitrate	mg/kg	Semi Annually
Potassium	mg/kg	Semi Annually
Total Metals	mg/kg	Annually

F. Detection Monitoring

The Discharge shall implement a detection monitoring program consisting of unsaturated zone monitoring and groundwater monitoring. Using approved statistical or non-statistical data analysis methods, the Discharger shall, for each monitoring event, compare the concentration of each monitoring parameter with its respective concentration limit to determine if there has been a release from the Facility. The detection monitoring program shall include the following:

1. Unsaturated Zone Monitoring (Vadose Zone Monitoring System)

- a. Quarterly, the Discharger shall inspect the vadose zone monitoring system (VZMS) sump beneath each surface impoundment utilizing an electronic sounder lowered into the VZMS sump via each access tube. If liquid is identified in a VZMS sump, the Discharger shall immediately notify the Water Board by telephone or via email followed by a letter to be sent to the Water Board in Victorville within two weeks. If the liquid is determined to have originated from the surface impoundments (as evidenced by electrical conductivity measurements greater than 12,500 microohms seconds per centimeter ($\mu\text{S}/\text{cm}$), the Discharger shall cease discharge to the affected surface impoundment and repairs shall be made.
- b. If no liquid is detected in the VZMS annually, the VZMS shall be tested to demonstrate proper operation. The test results shall be logged in the Site Log Book and reported in the annual report.

2. Groundwater Monitoring

The groundwater data report shall establish background groundwater quality conditions at the site and these background water quality

values will be used to establish Water Quality Protection Standards which will be used to determine whether a release has occurred.

- a. Groundwater samples shall be collected and analyzed for the parameters listed below.

The sample results shall be used to determine evidence of a release using the Upper Prediction Limit (UPL) and shall be used to construct an Upper Tolerance Limit annually (described below). If results show concentrations of monitoring parameters greater than the UPL (concentration limit) listed in the Order, the Discharger shall notify, using the notification procedures below, the Water Board and report that there is statistically significant evidence of a release. Due to limited data related to background concentrations of monitoring parameters, the UPL may be reconstructed and adjusted on an annual basis for the first two years to better establish background parameters. In addition, the UPL may be adjusted when there is an accepted demonstration that there is no evidence of a release.

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
chloride	mg/l	<i>Semi Annually</i>
sulfate	mg/l	<i>Semi Annually</i>
Total Metals	mg/l	<i>Semi Annually</i>
total dissolved solids	mg/l	<i>Semi Annually</i>
static water depth	feet below ground surface grade	<i>Semi Annually</i>
electrical conductivity(E_c)	micro Siemens/cm	<i>Semi Annually</i>
pH reading	pH units	<i>Semi Annually</i>
temperature	deg F or C	<i>Semi Annually</i>

- b. Quarterly for the first two years, then semi-annually thereafter, the direction and velocity of the groundwater flow under each surface impoundment shall be calculated.
- c. Quarterly for the first two years, then semi-annually thereafter, the static water level, in feet below ground surface, shall be recorded on an 8.5" x 11" copy of a site plan showing the monitoring well locations.
- d. Each monitoring well shall be sufficiently purged in accordance with generally accepted sampling procedures in order to obtain a representative groundwater sample. If any deep monitoring well is dry for more than four quarters, a new or modified well shall be provided.

Table 1 below outlines the detection monitoring program requirements for start-up and.

Table 1

Location	Operation Phase	Monitoring Frequency	Action Taken if leachate is present in the LCRS	Action Taken if Leachate is present in the VZMS (Corrective Action)
Groundwater	After operation of the plant begins	Quarterly for the first two years, then semi-annually thereafter.	Continue monitoring semi annually; increase to quarterly if action leakage rate is exceeded.	Implement M&RP requirement III.B.
LCRS	Start-up: First week of operation	Continuous monitoring electronically with daily O&M validation	Measure leachate accumulation rate daily, institute appropriate leachate removal actions. Notify the Water Board of leak and prepare a response action to be taken. Remove pond from service if leakage rate exceeds the Rapid and Large Leakage Rate (RLLR) and repair.	Remove Pond From Service. Implement M&RP requirement III.B.
	First 3 months of operation	Continuous monitoring electronically with weekly O&M validation		
	After 3 months of operation	Continuous monitoring electronically with monthly O&M validation		
VZMS	Start-up: First week of operation	Daily	Monitor Daily	
	First 3 months of operation	Weekly	Monitor daily for one week, return to weekly if leachate accumulation rates are stable in LCRS and below the Action Leakage Rate (ALR). If leakage rate exceeds the ALR, Discharger shall prepare and implement a plan to monitor and manage the pond as necessary and investigate and remediate any unauthorized waste discharge from the leak	

Location	Operation Phase	Monitoring Frequency	Action Taken if leachate is present in the LCRS	Action Taken if Leachate is present in the VZMS (Corrective Action)
	After 3 months of operation	Quarterly	to the Water Board for review and approval. Monitor daily for one week, return to quarterly monitoring if leachate accumulation rates are stable and below the ALR. If the leakage rate is above the ALR but below the RLLR, the Discharger shall prepare and implement a plan to monitor and manage the pond as necessary and to investigate and remediate any unauthorized waste discharge from the leak to the Water Board for review and approval.	

II. REPORTING REQUIREMENTS

A. Water Quality Monitoring and Response Program Plan (WQMRPP)

1. By July 1, 2015, the Discharger shall submit to the Water Board a Draft WQMRPP for detection monitoring. The Draft WQMRPP shall include the following:
2. A report describing the Discharger's proposed detection monitoring program [27 CCR § 20395] and proposed water quality protection standard, which consists of the proposed:
 - a. Constituents of concern [27CCR § 20395];
 - b. Concentration limits [27CCR § 20400];
 - c. Monitoring points and point of compliance [27CCR § 20405];
 - d. Monitoring parameters [27CCR § 20420(e)];
 - e. Statistical method for detecting a release [27CCR § 20415(e)]; and
 - f. Method for determining background [23CCR § 20415(e)(6), (7); and (10)].

3. Sampling and analytical methods for brine, sludge, groundwater, and the unsaturated zone (vadose zone), including a detailed description of procedures and techniques for:
 - a. Sample collection, including purging techniques, sampling equipment, and decontamination procedures to be followed for the sampling equipment;
 - b. Sample preservation and shipment;
 - c. Analytical procedures;
 - d. Chain of custody control;
 - e. Quality assurance/quality control (QS/QC) [27CCR § 20415 (e)]; and
 - f. Boring logs [27 CCR §2045(e)].
4. A revised financial assurance document which is signed and meets the requirements of 27 CCR §22250.

B. Finalized Version of Revised WQMRPP

5. By January 15, 2016, the Discharger shall submit to the Water Board a finalized version of the WQMRPP for detection monitoring that fully complies with the requirements of Title 27, CCR.

III. RECORD KEEPING AND REPORTING REQUIREMENTS

A. Scheduled Reports To Be Filed With The Water Board

A self-monitoring report shall be submitted to the Water Board semiannually. The content of the monitoring report shall be as follows:

1. Results of sampling analysis, including statistical limits for each monitoring point,
2. For groundwater, a description and graphical presentation of the velocity and direction of groundwater flow under and around the Facility, based upon water level elevations taken during the collection of the water quality data submitted in the report,
3. A map or aerial photograph showing the locations of all monitoring points and background monitoring points,
4. An evaluation of the effectiveness of the leachate monitoring and control facilities,
5. A letter transmitting the essential points in each report, including a discussion of any requirement violations found since the last report was submitted, and describing actions taken or planned for correcting those violations. If the Discharger has previously submitted a detailed

time schedule for correcting requirement violations, a reference to the correspondence transmitting this schedule will be satisfactory. If no violations have occurred since the last submittal, this shall be stated in the letter of transmittal, and

6. A list of the time periods when the effluent waste streams (concentrated brine entering the evaporation ponds) flows were shut down to prevent violation of Discharge Specifications for effluent quality. Include a description of the reason for the shutdown and corrective action that was taken, and
7. All reports and laboratory data are required to be uploaded to Geotracker.

B. **Unscheduled Reports To Be Filed With The Water Board.**
The Discharger shall perform the procedures contained in this subsection whenever there is evidence of a release from the Facility.

1. **Notification Procedures - Physical or Statistically Significant Evidence of a Release**

The Discharger shall immediately notify the Water Board verbally whenever a determination is made that there is physical or statistically significant evidence of a release from the Facility. This verbal notification shall be followed by written notification via certified mail within seven days of such determination. Upon such notification, the Discharger may initiate verification procedures or demonstrate that another source other than the Facility caused evidence of a release (see below). The notification shall include the following information:

- a. Surface impoundment that may have released or be releasing;
 - b. general information including the date, time, location, and cause of the release;
 - c. an estimate of the flowrate and volume of waste involved;
 - d. a procedure for collecting samples and description of laboratory tests to be conducted;
 - e. identification of any water bearing media affected or threatened;
 - f. a summary of proposed corrective actions;
 - g. statistically significant evidence of a release; monitoring parameters and/or constituents of concern that have indicated statistically significant evidence of a release from the Facility; or for physical evidence of a release; and
 - h. physical factors that indicate physical evidence of a release.
2. **Notification Procedures - Other Source that may Cause Evidence of a Release**

The Discharger may make a demonstration that a source other than the Facility caused evidence of a release. For this case, the Discharger shall notify the Water Board of the intention to make this demonstration. The notification shall be sent to the Water Board by certified mail within seven days of determining physical or statistically significant evidence of a release [section 20420(i)(1) of title 27].

3. Evaluation Monitoring

The Discharger shall, within 90 days of determining a release, submit an amended RoWD proposing an evaluation monitoring program [sections 20420 (l)(5) of title 27].

4. Preliminary Engineering Feasibility Study Report

The Discharger shall within 180 days of discovering the release, submit a Preliminary Engineering Feasibility Study [Section 20420 (l)(6) for Corrective Action].

IV. REPORTING

A. General Provisions

The Discharger shall comply with the "General Provisions for Monitoring and Reporting," dated September 1, 1994, which is attached to and made a part of this Monitoring and Reporting Program.

B. Submittal Periods

Beginning on July 15, 2015, a quarterly monitoring report including the preceding information shall be submitted to the Water Board to determine the background water quality. Once background conditions are determined, a semi annual report shall be submitted. Subsequent monitoring reports shall be submitted to the Water Board by the 15th day of the month following each semi annual sampling event (January 15, and July 15).

C. Annual Report

By **January 15th** of each year, the Discharger shall submit an Annual Report to the Water Board with the following information:

1. A review of the closure plan and a statement that the closure activities described are still accurate or an updated closure plan;

2. Results of all inspections to determine the condition of all surface impoundments; and
3. A summary of continuous electronic monitoring for leakage in LCRS and vadose zone monitoring systems. Include a description of the current monitoring system integrity, any failures that occurred and corrective actions taken.



Ordered by:

Dated: February 11, 2015

PATTY Z. KOUYOUMDJIAN
EXECUTIVE OFFICER

Attachment: A. General Provisions for Monitoring and Reporting Program

R6V-2015/BoardOrders2015/FtIrwin/IrwinWaterWorks

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

GENERAL PROVISIONS
FOR MONITORING AND REPORTING

1. **SAMPLING AND ANALYSIS**

- a. All analyses shall be performed in accordance with the current edition(s) of the following documents:
 - i. Standard Methods for the Examination of Water and Wastewater
 - ii. Methods for Chemical Analysis of Water and Wastes, EPA
- b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board Executive Officer. Specific methods of analysis must be identified on each laboratory report.
- c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board prior to use.
- d. The Discharger shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.
- e. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.
- f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.
- g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. OPERATIONAL REQUIREMENTS

a. Sample Results

Pursuant to California Water Code Section 13267(b), the Discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

3. REPORTING

- a. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and shall submit a timetable for correction.
- b. Pursuant to California Water Code Section 13267(b), all sampling and analytical results shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.
- c. The Discharger shall provide a brief summary of any operational problems and maintenance activities to the Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.
- d. Monitoring reports shall be signed by:
 - i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;
 - ii. In the case of a partnership, by a general partner;
 - iii. In the case of a sole proprietorship, by the proprietor; or

- iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.
- e. Monitoring reports are to include the following:
 - i. Name and telephone number of individual who can answer questions about the report.
 - ii. The Monitoring and Reporting Program Number.
 - iii. WDID Number.
- f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation under Section 13268 of the Water Code.