

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
FACT SHEET
(Pursuant to NAC 445A.236)

Permittee Name: Nevada Department of Corrections
3955 W. Russell Rd.
Las Vegas, NV 89118-2316

Permit Number: NEV87034

Location: Ely Maximum State Prison
4569 N. State Rt. 490, Ely, NV 89301 (White Pine County)
Prison located approx. 10 mi. NNW of the City of Ely
Wastewater Treatment Facility (WWTF):
Latitude: 39° 22' 39"N, Longitude: 114° 56' 11"W
Township 18N, Range 62E, Section 36; and
Township 18N, Range 63E, Section 31; and
Township 17N, Range 62E, Section 1

Bureau of Corrective Actions Sites: There is no remediation site managed by the NDEP Bureau of Corrective Actions, which is located within a one-mile radius of the Ely Prison WWTF.

Wellhead Protection Area: The effluent discharge point of the Ely Prison WWTF is located within the 3,000 feet, Drinking Water Protection Area 3, of two wells supplying potable water to the prison. These wells are owned and operated by the Nevada Department of Corrections. The wellhead-capture zones for these two supply wells have not been delineated (modeled) and input into the NDEP i-Map application.

General: NDEP renewed and modified this permit on December 8, 2008 to incorporate a denitrification upgrade from a pond (Phase I) to a fixed-film bioreactor (Phase II). The Permittee has requested by a modification request that the 30-day average basis flow limit be increased from 0.3 to 0.45 MGD (no change needed to the daily maximum). This flow limit increase is to accommodate the additional wastewater contribution from operation of commercial cooling units such as air conditioners and evaporative coolers, where the drain water (blow down) is routed to the sanitary collection system. Such non-domestic wastewater sources may contain an increase in TDS or salt over background supply levels but no appreciable organic matter. The volume of this cooling water wastewater stream was not included in the 2008 permit application wherein a flow rate limit of 0.3 MGD was indicated for domestic wastewater capacity. At a design inmate housing capacity of 1,000, 0.3 MGD of domestic wastewater flow allows up to 300 GPD/inmate-contribution, which is still much higher than typical residential domestic wastewater flows of 110 GPD/capita. In a follow up submittal dated October 21, 2009, the design engineer indicates that the new treatment system will provide sufficient treatment and disposal capacity for up to 0.45 MGD of total wastewater flow from domestic and cooling sources.

Phase I: The prison's wastewater treatment system was constructed in 1989 and originally consisted of a head works (filter screen) and two 3-acre facultative ponds, which were lined with 60-mil HDPE. This system was rated at 0.09 / 0.11 MGD capacity. This system was eventually found inadequate to meet the facility's organic loading. The City of Ely provided the prison with four

surplus 5-HP pontoon-float aerators (two per pond) to increase available water oxygen levels during ice-free operating periods (non-winter months). However, partial-mix ponds do not denitrify, which prompted the bioreactor design in lieu of a conventional activated sludge plant to address elevated groundwater nitrate (now total nitrogen) levels. In 2005, the groundwater nitrate level increased to a peak of 17 mg/l as observed in MW-1. In Phase II, the existing ponds remain as clarifiers (settling ponds) to capture the surplus growth of attached-growth microorganisms routinely sloughed off the fixed-film media surface. The four existing rapid infiltration basins (RIB) also remain in-place for effluent disposal and total effluent disposal area is eight acres.

Phase II: A head works upgrade to replace the filter screen with a grinder and auger screen is complete and operational. The fixed-film bioreactor is constructed and has separate anoxic and aerobic compartments. The plastic media blocks are arranged into sections measuring 16 feet (total tower height or submerged depth) and the media was manufactured by Brentwood Industries. The treatment compartments are designed for nitrifying (aerobic) and denitrifying (anoxic) biological reactions. Air is supplied by mechanical blowers. After the bacterial growth is settled in the ponds, the design effluent total nitrogen level (TN) will be discharged into the RIBs ≤ 13 mg/l according to the design engineer's specifications. Final denitrification to the NDEP groundwater TN standard of 10 mg/l will be accomplished in each RIB with alternate dosing (anoxic) and resting-drying (aerobic) cycles. RIB effluent quality will be demonstrated by collection of a lysimeter sample. The lysimeter collection tubes are designed to collect percolating effluent at 3 feet level below the bottom of the disposal basins and prior to groundwater recharge. The bioreactor first commenced operation in January 2009 but operations were soon halted within only two weeks. The diagnosis was that high head loss (media plugging) occurred in the anoxic zone media blocks from clogging due to the high rate of fixed film growth with no mechanism for cleaning except complete bypass, shutdown, draining and hose down of the bioreactor media blocks. To resolve this issue, the design engineer submitted a corrective actions plan to replace the existing anoxic compartment media with a media block having larger plate openings to reduce the operating head loss and allow easier flow through of the circulating wastewater flow. In addition, a series of coarse bubble diffusers will be installed and operated intermittently under the anoxic media blocks during timed cleaning steps to scour off the anoxic media surface and remove any surplus bio-film growth by gravity sloughing. In operation, the air diffusers in the aerobic section run continuously for air supply and scour cleaning. NDEP approved this repair plan in November 2009. According to the plant operator, this repair upgrade is expected to be complete and operational sometime within the first quarter of 2010. During the offline period, both polishing ponds were also cleaned one at a time to remove the 20 years of accumulated sludge buildup in each cell. The HDPE liner was determined to be salvageable and the ponds were refilled. When dried, the biosolids (sludge) were hauled to the City of Ely Landfill for disposal. For now, the two partial-mix ponds remain in-service as the primary treatment process until the bioreactor is upgraded and Phase II operations resumed. When the surface ice thaws in this spring, the aerators will be replaced and then removed each fall prior to annual ice-over.

Flow: The total flow of domestic and cooling blow down wastewater discharged into the prison collection system averaged 0.38 MGD in 2009. This prison is currently housed at its maximum inmate capacity of 1,091. According to NDOC, Ely Prison is at maximum capacity with future expansion of maximum security housing units slated for the High Desert State Prison in Indian Springs (Clark County). Thus, Phase II is designated as the final WWTF build out phase at Ely.

Receiving Water Characteristics: The depth to groundwater is currently at 112.5 feet bgs (MW-1). The groundwater TN level is reported as being at 10 (MW-1) and 4.7 (MW-2) mg/l, respectively, with a groundwater direction (flow gradient) in the southwest direction. The lower nitrogen level in MW-2 is explained by this well being located further down-gradient from the four RIBs than MW-1. Groundwater dischargers of treated sanitary effluent first trigger a requirement for a nitrogen reduction plan upon reaching a groundwater TN level of 7.0 mg/l.

DMR Analysis: In 2009, the treated pond effluent was discharged at average CBOD and TSS levels of 28.5 and 61.5 mg/l, respectively (effluent nitrogen monitoring is not required in Phase I). The effluent pH level averaged 8.4 Standard Units.

Proposed Effluent Limitations and Special Conditions:

Table 1: Phase I (Ponds)

PARAMETER	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	30-Day Average	Daily Maximum	Measurement Frequency	Sample Type
Flow, MGD (Influent)	0.09	0.11	Continuous	Flow Meter
CBOD, mg/L (Influent)	-	M&R	Quarterly	Discrete
CBOD, mg/L (Effluent)	-	45	Quarterly	Discrete
TSS, mg/L (Influent)	-	M&R	Quarterly	Discrete
TSS, mg/L (Effluent)	-	90	Quarterly	Discrete
pH, Std. Units (Effluent)	-	6.0 – 9.0	Quarterly	Discrete
Inmate Population, # of persons	-	M&R	Quarterly	Population Count

Table 2: Phase II (Bioreactor)

PARAMETER	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	30-Day Average	Daily Maximum	Measurement Frequency	Sample Type
Flow, MGD (Influent)	0.45	0.9	Continuous	Flow Meter
BOD ₅ , mg/L (Influent)	-	M&R	Quarterly	Discrete
BOD ₅ , mg/L (Effluent)	-	45 – Pond Outlet	Quarterly	Discrete
		10 – Lysimeter		
TSS, mg/L (Influent)	-	M&R	Quarterly	Discrete
TSS, mg/L (Effluent)	-	90 – Pond Outlet	Quarterly	Discrete
		10 – Lysimeter		
Total Nitrogen as N, mg/l (Effluent)	-	13 – Pond Outlet	Quarterly	Discrete
		10 – Lysimeter		
pH, Std. Units (Effluent)	-	6.0 – 9.0 (Pond Outlet & Lysimeter)	Quarterly	Discrete
Inmate Population, # of persons	-	M&R	Quarterly	Population Count

Table 3: Groundwater Monitoring (MW-1 & MW-2)¹

PARAMETER	GROUNDWATER LIMITATIONS	MONITORING REQUIREMENTS	
		Measurement Frequency	Sample Type
TDS, mg/L	Monitor & Report	Quarterly	Discrete
Chlorides, mg/L	Monitor & Report	Quarterly	Discrete
Nitrate as N, mg/L	Monitor & Report	Quarterly	Discrete
Total Nitrogen as N, mg/L	10.0	Quarterly	Discrete
Depth to Groundwater, ft	Monitor & Report	Quarterly	Field Measurement
Groundwater Elevation, ft	Monitor & Report	Quarterly	Field Measurement

1. Groundwater samples shall be taken after purging at least three (3) well volumes of groundwater from the monitoring wells.

Schedule of Compliance: (all compliance deliverables shall be addressed to the attention of the Compliance Coordinator, Bureau of Water Pollution Control):

- The Permittee shall notify the Division in writing not more than fourteen (14) calendar days

upon completion and startup of the bioreactor modification.

- Within thirty (30) days of completion and startup of the bioreactor modification, the Permittee shall submit a copy of the engineer's Construction Quality Assurance (CQA) letter indicating that the modifications were installed in accordance with the approved design plans. The CQA letter shall be wet stamped and signed by a Nevada Professional Engineer (P.E.).
- Within ninety (90) days of completion and startup of the bioreactor modification, the Permittee shall submit a revised (amended) copy to the O&M Manual that was submitted to NDEP in March 2009.

Procedures for Public Comment: The Notice of the Division's intent to modify discharge permit # NEV87034, subject to the conditions contained within the permit is being sent to the **Ely Times** and **Reno Gazette-Journal** newspapers for publication. The notice is also being electronically mailed to all interested persons requesting listing on our public notification mailing list. Anyone wishing to comment on the proposed permit can do so in writing within a period of thirty (30) calendar days of the date of publication of the public notice in the newspaper. The comment period can be extended at the discretion of the Administrator. The deadline date and time by which all comments are to be submitted (via postmarked mail or time-stamped faxes, e-mails, or hand-delivered items) to the Division is **Friday, March 12, 2010, by 5:00 P.M. PST.**

A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected interstate agency, the Regional Administrator or any interested agency, person or group of persons.

The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.238.

The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

Proposed Determination: The Division has made the tentative determination to issue (modify) the proposed water pollution control discharge permit. If issued, these modifications to the permit conditions will remain in effect until the permit expiration at midnight, December 7, 2013.

Prepared by: Mark A. Kaminski, P.E., Staff Engineer III
Bureau of Water Pollution Control

Date: February 4, 2010