

ENVIRONMENTAL

No. 72900 E

AMENDED

APPLICATION FOR PERMIT TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF NEVADA

Date of filing in State Engineer's Office JUN 01 2005

Returned to applicant for correction JUN 22 2005

Corrected application filed JUL 05 2005

Map filed JUL 14 2005 under 72900

The applicant **American Pacific Corporation**, hereby make application for permission to appropriate the public waters of the State of Nevada, as hereinafter stated. (If applicant is a corporation, give date and place of incorporation; if a copartnership or association give names of members.) **May 12, 1998, Las Vegas, Nevada 89109, a Nevada corporation**

1. The source of the proposed appropriation is **Underground source, in the Las Vegas Valley Basin---**, Clark County, Nevada, at a depth of 5 to 40 feet below the ground surface

2. The amount of water applied for is **1.0 second-feet**

(a) If stored in reservoir give number of acre-feet **0 (non consumptive use)**

3. The water to be used for **Environmental-Groundwater Remediation**

4. If use is for:

(a) Irrigation, state number of acres to be irrigated **0**

(b) Stockwater, state number and kinds of animals to be watered **0**

(c) Other use (describe fully under No. 12. "Remarks") **Bioremediation of ground water**

(d) Power:

(1) Horsepower developed **0**

(2) Point of return of water to stream

5. The water is to be diverted from its source at the following point **Within the SE $\frac{1}{4}$ of SE $\frac{1}{4}$ of Section 35, T21S, R62E, M.D.M., Clark County, Nevada (see attached water survey map, page 1 of 3), six wells:**

AREW-1: A distance of 2,799.26 ft S 25° 13' 24" W from the E $\frac{1}{4}$ corner of said Section 35

AREW-2: A distance of 2,717.23 ft S 21° 18' 49" W from the E $\frac{1}{4}$ corner of said Section 35

AREW-3: A distance of 2,650.18 ft S 17° 17' 23" W from the E $\frac{1}{4}$ corner of said Section 35

AREW-4: A distance of 2,594.94 ft S 12° 56' 28" W from the E $\frac{1}{4}$ corner of said Section 35

AREW-5: A distance of 2,556.58 ft S 08° 35' 47" W from the E $\frac{1}{4}$ corner of said Section 35

AREW-6: A distance of 2532.90 ft S 03° 48' 42" W from the E $\frac{1}{4}$ corner of said Section 35

6. Place of Use **Within the SE $\frac{1}{4}$ of SE $\frac{1}{4}$ of Section 36 (the "ISB Plant" where the water will be processed, but not treated, prior to re-injection and treatment in situ) and the S $\frac{1}{2}$ of the SW $\frac{1}{4}$ of Section 25 (for re-injection and treatment in situ subsequently), T21S, R62E, M.D.M., Clark County, Nevada**

7. Use will begin about **January 1** and end about **December 31** of each year.

8. Description of proposed works Water will be diverted by use of a pump and motor within a well. The maximum pumping rate at any one well will be 0.3 ft³/sec (150 gpm). The maximum aggregate pumping rate for all 6 wells will be 1.0 ft³/sec. (450 gpm). See attached Exhibit A (Work Plan submitted to NDEP), and B (April 14, 2005 NDEP Concurrence with Conditions)

9. Estimated cost of works More than \$4,000,000

10. Estimated time required to construct works See Attachment A

11. Estimated time required to complete the application of water to beneficial use. The estimated time is more than 5 years. The exact time can only be estimated since the total volume of the target contaminant in the aquifers of interest is not yet precisely quantified and the final target maximum contaminant level not yet established

12. Remarks: The diverted water will be processed and re-injected for the sole purpose of remediating in situ the compound perchlorate as well as, coincidentally, several other oxygen based compounds, including nitrate and chlorate. The system will be zero consumptive use. The water will be returned to the groundwater aquifer at the re-injection area as noted on page 3 of 3 of the attached water survey map and as described in the Work Plan

By s/ Jeff Gibson Jeff Gibson
3770 Howard Hughes Parkway #300
Las Vegas, NV 89109

Compared ll/gkl ll/gkl

Protected _____

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This environmental permit is issued subject to existing rights on the source. It is understood that the amount of water herein granted is only a temporary allowance for pollution control as mandated by orders issued by the Nevada Division of Environmental Protection and subsequent correspondence with said agency. The right will cease to exist upon termination of clean up activity as determined by the Nevada Division of Environmental Protection. A totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and records of this measurement shall be submitted on an annual basis. It is also understood that this right must allow for a reasonable lowering of the static water level of permittee's well due to other ground water development in the area. The well shall be equipped with a 2-inch opening for measuring depth to water. If the well is flowing, a valve must be installed and maintained to prevent waste. The State retains the right to regulate the use of water granted herein at any and all times.

This environmental permit is issued pursuant to the provisions of NRS 533.4375. Well drillers' reports for any well(s) drilled under this permit shall be filed within 30 days from the completion of the well.

Within 30 days after the completion of the project, the permittee shall notify the State Engineer of such completion and all wells shall be plugged and abandoned in accordance with Chapter 534 of the Nevada Administrative Code.

This environmental permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

(Continued on Page 3)

The issuance of this environmental permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, and not to exceed **1.0** cubic feet per second, **and not to exceed 723.97 acre-feet annually**

Work must be prosecuted with reasonable diligence and be completed on or before:

Proof of completion of work shall be filed on or before:

Water must be placed to beneficial use on or before:

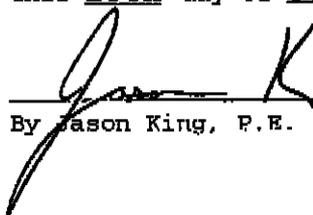
Proof of the application of water to beneficial use shall be filed on or before:

Map in support of proof of beneficial use shall be filed on or before:

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* The right will cease to exist upon termination of clean up activity as determined by the Nevada Division of Environmental Protection.

IN TESTIMONY WHEREOF, I, HUGH RICCI, P.E.,
State Engineer of Nevada, have hereunto set
my hand and the seal of my office,
this 25th day of July, A.D. 2005

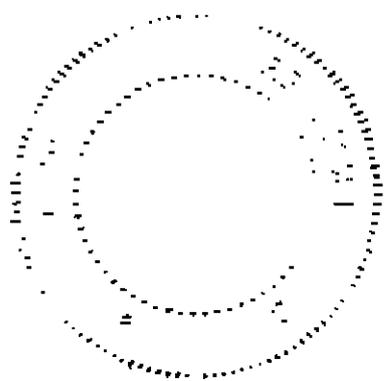

By Jason King, P.E. Deputy State Engineer

Completion of work filed N/A

Proof of beneficial use filed N/A

Cultural map filed N/A

Certificate No. _____ Issued _____



Attachment A Item 10 Response

Construction Time. The estimated time to construct the works is 3 months.

Description of Works. The works is a scale up of the technology pilot tested under permit 68622E. The works will be a component in a groundwater remediation system located at Henderson and unincorporated Clark County, Nevada. The target material for remediation is perchlorate (ClO_4^-). This material is relatively stable in groundwater. The technology to be used to remediate or reduce the target material is in situ bioremediation whereby an electron donor (an organic chemical with the appropriate effects on microorganisms in the aquifer) is injected periodically into the extracted groundwater prior to its re-injection.

The system is composed of the following primary components:

1. **Extraction System (the Works):** There will be a total of nine (9) extraction wells each with a diameter of 8 inches or less, a total depth of 60 feet or less, with the following identifications and with locations as noted on the attached.

1. AREW-1 - Max. pumping rate will be 0.16 ft³/sec.
2. AREW-2 - Max. pumping rate will be 0.16 ft³/sec.
3. AREW-3 - Max. pumping rate will be 0.16 ft³/sec.
4. AREW-4 - Max. pumping rate will be 0.16 ft³/sec.
5. AREW-5 - Max. pumping rate will be 0.16 ft³/sec.
6. AREW-6 - Max. pumping rate will be 0.16 ft³/sec.
7. AREW-1 - Max. pumping rate will be 0.30 ft³/sec.
8. APEW-2 - Max. pumping rate will be 0.30 ft³/sec.
9. APEW-3 - Max. pumping rate will be 0.12 ft³/sec.

The first six extraction wells are to be located on Athens Road just east of Boulder Highway and south of the South Valley Ranch development. Each of these wells will pump between 35 and 70 gpm. Extraction wells APEW-1 and APEW-2 are to be located north of Athens Road and east of Wiesner Way. These two wells will pump a total of between 50 and 150 gpm. Extraction well APEW-3 will be located to the east of APEW-1 and APEW-2 and will pump between 2 and 50 gpm.

The wells are designed to extract groundwater from the saturated alluvium and (to a lesser extent) the upper layers of more permeable Muddy Creek Formation. The groundwater extraction will be accomplished by use of an electric downhole submersible stainless steel pump.

2. **In Situ Bioremediation (ISB) Plant:** The extracted groundwater will be conveyed via underground pipeline to an ISB plant. Within this plant, the groundwater will be stored above ground momentarily, filtered (using bag filters) to remove most suspended particulates, pH adjusted (downward slightly to minimize the chance for precipitation), periodically amended with electron donor (citric acid, sodium benzoate, sodium acetate, or sodium formate); periodically amended with an injection well biofoul control chemical such as chlorine dioxide, hypochlorite, Tólcide, or sodium azide, and then re-injected. The electron donor induces the microorganisms to reduce the perchlorate as well as several other oxygen containing compounds, but not including sulfate. The biofoul control chemical is designed to minimize the accumulation of populations in the immediate vicinity of the injection well. The plant is to be located closer to extraction wells APEW-1, 2, and 3.

3. **Re-Injection and reduction of perchlorate.** The groundwater after going through the ISB plant process, will hit the re-injection wells located approximately 4,000 ft to the north. After re-injection into the shallow saturated alluvium at this area, the naturally occurring microorganisms will induce a reduction of perchlorate and several other oxygen based compounds to relatively benign products such as CO₂, biomass, and water.

