



UNEV Permit Application Form U203

APPLICATION ATTACHMENTS – Class 5 Remediation or Tracer Testing Wells

Attachments are required to be submitted with all UNEV permit applications. Be sure you choose the appropriate “Attachments” Form from the list below that applies to the type of well you will be using. Go to <http://ndep.nv.gov/bwpc/forms/html#uic> if you need to obtain one of these other forms.

- I. Form U201 – CLASS 5 – (types not listed below)
 - II. Form U202 – CLASS 2, CLASS 3, or CLASS 5 GEOTHERMAL
 - III. Form U203 – CLASS 5 REMEDIATION or TRACER TESTING
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IF APPLICATION IS FOR AN UIC GENERAL PERMIT, STOP HERE – do not provide the attachments below. Instead, attach the specific Notice of Intent (NOI) for that general permit.

Application Attachments for GROUNDWATER REMEDIATION or TRACER TESTING – CLASS 5 INJECTION WELLS

If an applicant does not meet the requirements for inclusion under any of the General Permits, they must apply for an UIC UNEV Permit. The following types of injection require an UIC UNEV Permit: Pump & Treat systems that inject treated effluent below ground surface, greater than 4% hydrogen peroxide (including Fenton’s Reagent), potassium permanganate, persulfate, pure oxygen gas by iSOC®, experimental technologies, and tracers.

Read the instructions for preparing the attachments carefully and refer to the regulations (NAC 445A.867). The ability to process your application for a permit depends heavily on the completeness and accuracy of the attachments. Attachments shall be submitted with the *UIC Permit Application – Form U200*.

Please Note: the attachments list was updated in 2006, and are in a different order than in previous editions. Additionally, some attachments have been expanded for clarification, and permit renewal requirements have been added.

Attachments

- A. **MAPS AND CROSS SECTIONS OF USDW's AND GEOLOGIC STRUCTURE OF AREA** - Submit a narrative report on the hydrology/hydrogeology of the site. Include the geologic name and depth to bottom of all underground sources of drinking water (USDW) which may be affected by the injection. Note that NAC 445A.837 defines USDW's as all aquifers of the state regardless of the quality of the water, except those that are exempt.

Submit maps and geologic cross sections indicating the vertical limits of all underground sources of drinking water within the area of review, their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection. Include a scaled groundwater elevation (amsl) contour map for the entire site and the range of hydraulic conductivities.

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Note that when oxygen is injected into formations that contain pyrite, there may be an increased potential of leaching of natural metals in the groundwater.

A map of all underground utilities and underground storage tanks (USTs) will be required for all injections that are exothermic and increase the temperature in an injection well over 20°F.

A baseline water analysis of the receiving groundwater (zone of injection) of the injection wells (not impacted by contamination) must be submitted with the application. The applicant may wish to provide more than one sample to adequately characterize the receiving groundwater for baseline purposes. It is the responsibility of the applicant to determine background water quality conditions (physical and chemical) in the region immediately surrounding the injection wells, and determine current baseline water quality in the ground/surface water above the injection zone(s) and of the receiving groundwater. Determination of baseline and background conditions may require multiple sampling points and/or dates. Keep in mind baseline values in the application may be reflected in permit limitations in the UIC permit, so the more background data an applicant uses, the better actual conditions will be represented.

The sample(s) must be analyzed for volatiles (EPA method 8260B), inorganics (UIC Sample List 1), and other relevant compounds as needed.

Submit concentration maps for all contaminants above Federal and State Drinking Water Standards and Action Levels. The maps must be scaled and show the most recent data for the plumes. Additional historic plume maps may also be submitted if they provide further information. All current occurrences of plume migration off the property must be thoroughly documented.

FOR RENEWAL

Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize and provide new maps and cross sections in the renewal application.

- B. **MAPS OF WELLS/AREA AND AREA OF REVIEW (AOR)** – The area of review shall be a fixed radius of 1 mile from the proposed injection wells. Attach a **scaled map** of the location of the facility on which the injection is proposed **and** the surrounding properties. The map should include all injection wells, all major structures and property lines, all water wells and surface bodies of water, location of sensitive receptors within 1,000 feet of the site, dewatering wells, groundwater contours (amsl), groundwater flow direction, the **owner** of all surrounding properties, and the location of remediation wells on adjacent properties. Supply contact information for the owner(s) of all surrounding properties. Identify the location of remediation wells on adjacent properties.

Submit a topographic map (a USGS 7.5' quad or comparable map), extending at least one mile beyond the proposed injection wells, showing the injection well(s) or project area for which a permit is sought and the applicable area of review. The map must show all intake and discharge structures and all hazardous waste, treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable, i.e. distributing injection fluid to all wells in the area, including all system monitoring points). Within the area of review, the map must show the following:

The number of wells and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, public water supply systems, remediation wells, and other pertinent surface features, including residences, roads, faults (if known or suspected), etc. Don't spend an inordinate amount of time researching abandoned and/or dry wells.

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For a facility, or neighboring facility with a dewatering permit, include a description of dewatering activities, a map showing the location of dewatering wells, and an explanation of the effect on the injection wells, groundwater flow and direction.

FOR RENEWAL

Please review the original and subsequent renewal applications, and update the maps of wells and AOR. Identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in this renewal application.

- C. **WORKPLAN AND WELL DATA** – Submit the NDEP Bureau of Corrective Actions' concurrence letter with the proposed groundwater remediation Workplan. Applications for Remediation cannot be processed without the Letter of Concurrence with the Workplan by the Bureau of Corrective Actions (BCA) or the Washoe County District Health Department (WCDHD) Case Officer. NDEP typically requires that injection occur only in *injection wells* and not in *monitoring wells* due to the potential for dilution of samples. If injection must occur in *monitoring wells*, the Workplan shall require specifications that sampling of the monitoring wells will occur no sooner than 30 days after injection. Submit the final Workplan. Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those in the map required in part B, which penetrates the proposed injection zone. Such data shall include the following:

A description of each well's type, construction, date drilled, location, depth, screened interval, record of plugging and/or completion, and any additional information the Director may require.

FOR RENEWAL

Submit the most current Workplan if it has been revised from the original. Provide information on any wells modified or constructed within the AOR since the last renewal or original application. Submit any details needed for corrective action on these or other wells.

- D. **CONSTRUCTION PROCEDURES and DETAILS** – Discuss the injection well construction procedures. This should include details of the type of rig used to drill the well; the casing and cementing program (including the type of casing and surface seal); logging procedures; the drilling, testing, cuttings and coring program; the total depth; and the screened interval(s). Submit preliminary schematic or other appropriate drawings of the surface and subsurface construction details of the injection well and/or infiltration trench. Pursuant to NAC 445A.8355, subsurface fluid distribution systems (infiltration trenches) are classified as Class 5 injection wells. Also required with all applications is a schematic of the complete groundwater treatment system, including all process/treatment systems, surface/subsurface conveyance systems, additive ports, valves and gauges, pumps, etc.

For large groundwater treatment systems, submit engineering plans stamped by a State of Nevada P.E. These plans must be reviewed and approved by the Bureau of Water Pollution Control's Technical Services Group prior to construction.

Pursuant to NAC 445A.909, **within 30 calendar days after completion of an injection well**, submit a notice of completion for each injection well containing the following information:

- a. Plans and drawings of the completed well as constructed (include well head configuration, pipeline connection, sampling port, pressure gauges, flow meter, static water level, etc.).
- b. Copies of appropriate logs and other tests conducted during construction of the well and a descriptive report interpreting the results of that portion of the logs and tests related specifically to the zone for injection and adjacent formations (e.g. geophysical logs, etc.).

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Note if groundwater is within, above, or below the screened interval. NDEP does not recommend injection where groundwater is below the screened interval. Enter the screened intervals of each monitoring well. Note if groundwater is within, above, or below the well screen. NDEP typically does not recommend using monitoring wells if groundwater is above the well screen. Obviously, if groundwater is below the well screen, the well is not suitable for monitoring.

Discuss planned workovers to the injection wells including the well rehabilitation and preventative maintenance procedures.

FOR RENEWAL

Submit a current schematic for each injection well constructed. Include a list of workovers on each well, with type, and date of work. Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

- E. **INJECTION PROCEDURES** - Describe the proposed injection procedures including information on how and where the injectate is mixed; the source of potable water that meets Federal and State Drinking Water Standards; dechlorination procedures for the potable water (e.g. use of sodium thiosulfate); the type of pump, hose, tremie pipe, subsurface fluid distribution system (infiltration trench) and the piping to the trench that is used for injection; injection procedures that minimize chemical changes to the injectate; monitoring equipment (gauges); equalization tanks, etc. Discuss the radius of influence (ROI). Provide the make/model and operating parameters (e.g. maximum pump rate and pressure) of the injection pumps that will be used. Submit modeling results and schematics if modeling has been conducted to predict plume capture and/or groundwater mounding. For deeper injection wells, discuss the injection procedure and whether there is a confining layer. Discuss the possibility of off-site movement of any part of the contaminant plume due to injection.

Document whether there has been any observance of Light Non-Aqueous Phase Liquid (LNAPL or “free product”) or Dense Non-Aqueous Phase Liquid (DNAPL) within the last three months at the site. Injection is prohibited in these wells.

For all injections that are exothermic and increase the temperature in an injection well over 20°F, discuss the following:

- a. If the surface is paved, NDEP may require a negative pressure system;
- b. Utility surveys should be conducted to account for the effect of underground piping, utilities, trenches, or preferential pathways and/or pockets for organic decomposition, explosive liquids, vapors, and oxygen; and
- c. the need for monitoring off-gasing vapors with PIDs and/or FIDs to maintain nonexplosive levels.

FOR RENEWAL

Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

- F. **OPERATING DATA** - Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure (data on fracture pressure may be required for high volume injection wells or injection pressures greater than 50 psi); (3) source and analysis of the physical and chemical characteristics of the injection fluid (include MSDS sheets) and the concentration proposed; and (4) the purpose of the injection fluids and the anticipated results. Injection of **reagent grade** chemicals may

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be requested to minimize metal contaminants in the injectate. Laboratory grade chemicals may be prohibited.

For tracers, disinfectants, and well rehabilitation chemicals, include information on whether the chemicals are National Sanitation Foundation (NSF) certified or whether an approved American Water Works Association (AWWA) method will be followed. For all chemicals, document whether trace contaminants (e.g. metals) are present in the chemical solution. The chemical analysis shall be for the primary and secondary drinking water constituents (UIC Sample List 1) unless specified otherwise by UIC staff. If a tracer is considered to be radioactive or slightly radioactive, provide a description of any federal guidelines and standards including the maximum Derived Concentration Guidance (DCG).¹

FOR RENEWAL

Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

- G. **CHANGES and FATE IN INJECTED FLUID** - Discuss expected changes in pressure, chemistry, native fluid displacement, potential for aquifer degradation, and direction of movement of injected fluid.

Describe any chemical(s) that will come in contact with the injected fluids, including why are they used and how they are used (where are they injected, rate, frequency, etc.) Provide detailed information on these chemicals with environmental data sheets and MSDS. If the information is not provided, the chemical(s) will not be allowed. Potassium permanganate shall not be mixed with concentrated hydrogen peroxide because the former acts as a reducing agent; the latter acts as an oxidizing agent, and a reaction ensues.

FOR RENEWAL

Please review monitoring data of the life of the permit along with the original application to discuss what observations can be made regarding the chemistry of injected fluid and receiving ground water; and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application. List the name of all chemicals currently being used, and include their application rate, concentration and frequency applied.

- H. **OPERATIONS & MAINTENANCE MANUAL: SAMPLING (QA/QC) & CONTINGENCY PLAN**– A basic O&M Manual shall be submitted as part of the UIC application package. The manual should include standard sampling and QA/QC practices for field sampling; discussion of standard routine operating instructions and maintenance procedures (e.g. how and when activated carbon is changed out). Outline contingency plans to cope with all shut-ins or well failures, so as to prevent migration of fluids to the surface. Existing groundwater and/or injectate is prohibited from surfacing at or near the injection wells. The contingency plan should include provisions for reporting violations and a statement assuring injection will cease in the event of a well failure or if the receiving water is degraded.

FOR RENEWAL

Please update the manual to reflect current conditions and activities at the time of renewal. If an O&M Manual has never been submitted for a permitted well/facility, a manual will be required at the time of the renewal.

- I. **MONITORING PROGRAM** - Discuss the proposed monitoring program in detail. This should be thorough, including maps showing the number, location, and identifications of the monitoring wells a discussion of monitoring devices, sampling frequency, and parameters measured. All measurements documenting the height of LNAPL or DNAPL (“free product”) in all wells must be reported for every sampling event during the quarter. Wells with ½ inch or more of LNAPL or DNAPL will not be required to

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be sampled for laboratory analyses.

FOR RENEWAL

Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application; please summarize in the renewal application.

- J. **PLUGGING COST ESTIMATE AND PLAN** - Submit a current **Cost Estimate** and **Plan** to plug all wells once they become abandoned pursuant to NAC 445A.923 through 925. First: (1) describe the type and placement of plugs to be used; (2) describe the type, grade, and quantity of grout or cement to be used; and (3) describe the method to be used to place plugs. Second, based on 1, 2, and 3 above, provide a cost estimate of materials, equipment and labor for plugging and abandonment of the well. Wells must be plugged according to regulations of the Division of Water Resources. A plugging and abandonment plan must be submitted by attaching the *Affidavit of Intent to Abandon Well* from the Division of Water Resources. Subsurface fluid distribution systems should be disconnected and the pipe removed if possible.

FOR RENEWAL

Please review the previous application, and update the cost estimate and plugging plan. Be sure to note any changes in well completion in any existing wells that needs to be addressed in plugging plan.

- K. **DESCRIPTION OF BUSINESS** - Give a brief description of the nature of the business. If the injection activity is used as a remediation effort, provide a brief historical summary of how the site was impacted. List all permits issued by the Bureau of Water Pollution Control. Briefly describe the business at the remediation site, the cause and nature of the contamination and the steps taken to eliminate or reduce further contamination.

FOR RENEWAL

No action required, unless necessary.

NOTES:

Federal and State regulations prohibit the injection of fluids that degrade the physical, chemical or biological quality of the receiving aquifer. This is a major consideration in determining whether injection will be permitted.

Please be advised that permits may also be required from the Division of Water Resources (775-687-4380) and the agency having jurisdiction for Air Quality Permits (NDEP, Washoe County, Clark County, and Carson City). For further information, contact Russ Land at (775) 687-9428.

¹ "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," National Bureau of Standards (NBS) Handbook 69 as amended August 1963. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161 (toll-free number is 800-553-6847). See Appendix I in http://www.epa.gov/safewater/rads/final_rads_implementation_guidance.pdf and http://www.epa.gov/safewater/rads/final_rads_implementation_guidance_appendices.pdf.