

EPA REGION 6  
NO MIGRATION PETITION REISSUANCE SUBMITTAL  
January 14, 1998

The following is a general list of items that an operator should submit or consider when submitting a petition reissuance to EPA Region 6 for review. Because each site is unique and computer models vary, the listing is only a general guide. The complexity of the site and/or the complexity of the petition request will impact the information needed for the no migration demonstration. Operators are encouraged to schedule a meeting with Region 6 prior to the initiation of work on a reissuance submittal to ensure a clear understanding by both sides of the issues that should be addressed. Region 6 has found that stand alone petition reissuance documents improve the efficiency of EPA's review time because of the ease in locating supporting documentation. If the reissuance document relies on previously submitted documentation, a reference to the specific document in addition to the location of the information within the document should be included. Demonstrations relying on special considerations, e.g., chemical fate, may require longer review times, especially if the Agency sends it to an outside contractor for review.

GENERAL

1. Summarize the specifics of the reissuance request in the early portion of the document. (e.g. injection interval, rates, new wells, operational life, etc.)
2. Include a master table of contents at the front of the document. Provide other table of contents as needed including a table of contents for appendices containing several different items.
3. Each table and figure should be uniquely identified within the reissuance document and reference documents.
4. Entire document should be checked for consistency. For example, if the density value is changed in one location, confirm that it is changed globally within the document.
5. Include a signed certification identical to 40 CFR §148.22(a)(4).
6. Update the adjacent landowners listing.
7. Include the current UIC State permit for each well.
8. Provide a discussion on the injection wells. Include past and present completions, well schematics, logs, etc. Identify any changes since the last approved petition submittal. If documentation is not provided in the reissuance, include the specific location of this information in the reissuance document. Provide proposed construction and completion information for undrilled wells.

9. The information contained in the NOD responses should be integrated into the appropriate portions of the text, figures, tables, and appendices.

## GEOLOGY

1. Include latest MITs for all injection wells.
2. Update the well search for the AOR, plume areas, and COI. Provide appropriate information for new wells or any changes to existing wells. Include information for old wells or specifically reference where the information for wells is located. Provide revised map(s) with additional wells. Include updated tables summarizing wells within the AOR and plume areas. Make sure well ID numbers are consistent within all documentation.
3. Confirm net sand isopachs for each injection interval are included. These should be reviewed to ensure the modeled thicknesses are conservative.
4. In geology section of the reissuance, if the complete geology section, maps, logs, cross-sections, etc. are not provided, provide a reference naming the document and location in the document where the information is located. Include a Table of Contents from original petition if appropriate. Review the geology discussions and provide adequate documentation defining any geologic features that impact the modeling, especially if a geologic feature was included in the modeling.
5. Demonstrate that the requested changes to the no migration petition do not induce seismicity in the area that will alter the confining capability of the confining strata in the injection zone and confining zone.
6. Update pressure sinks and sources.
7. If modeling results in an increased plume area, expand maps and cross-sections as necessary.
8. Demonstrate that the injection interval does not interface with a USDW throughout the area of the 10,000 year plumes.
9. All depths should be referenced to a datum (KB, GL, etc.).

## MODELING

1. Thoroughly discuss the modeling strategy, outlining the model(s) employed, assumptions made, integration of the geology into the model, how boundaries were handled, how modeling satisfies the no migration standard, etc.

2. All input parameters for both the waste transport and pressure buildup modeling runs, should be summarized in a table. Indicate which of these parameters have changed from the last approved petition demonstration. Provide documentation for all reservoir parameters and historical injection rates used in the model. If documentation is not provided in the reissuance, reference the specific location of the documentation. Identify any parameters that have changed, document the new value and provide an explanation for the change. Provide injection reports to support injection rate history.
3. Integrate the past falloff testing into the parameter assignments for both the pressure buildup and waste transport modeling. Include a tabulation of all falloff test results in the modeling section. Provide a hard copy of the report summary and the data on diskette in the reissuance document. The modeling section should include a discussion relating the falloff test results with the parameters assigned in the modeling demonstrations. If necessary, the reservoir parameters should be modified and the modeling revised.
4. All reference data such as pressure and temperature should be listed with each appropriate reservoir parameter. Any calculations, references, nomographs, etc., necessary to support the fluid density and viscosity values should be supplied. Density values should be provided at both downhole and surface conditions.
5. Update the waste constituents and waste code listings. Remove any waste codes that were not finalized and update concentrations based on the most current Region 6 HBL table.
6. Provide a waste analysis to demonstrate no constituent exceeds the maximum concentration. Explain how current waste analysis plan or testing procedures will allow measurement of constituents with low maximum concentrations.
7. Address compatibility if changes are made to waste constituents or waste codes.
8. Any boundary (e.g. fault or pinchout) should be addressed. A discussion should explain if and how the boundary was included in the model. Provide a boundary map to illustrate location of model boundary.
9. Summarize all the modeling results in one location within the reissuance document.
10. Provide a detailed explanation of the input and output files for all computer simulations used in the demonstration. This may be done by annotating the input and output files for each type of model employed. Insert tabbed divider sheets imprinted with the title and description of the run/file.

11. Identify and document any changes made in the code to vary parameters.
12. Provide calculations justifying each multiplying factor, if applicable.
13. If demonstrating a maximum injection rate per injection interval instead of per well, inject the total requested volume into one well. Take the output results and apply to all existing and proposed well locations to determine a worse case COI and operational plume.
14. Maximize pressure buildup in the injection interval. Do not allow bleedoff of pressure into overlying sands.
15. No background gradient should be used to model the lowest density waste scenario. A stabilized zero background velocity should be demonstrated prior to injection for the SWIFT model.
16. The Region is no longer requiring full lateral waste transport modeling outside of the cone of influence for cases in which the injectate is more dense than that of the resident formation fluid. The 10,000 year requirements of 40 CFR §148.20 must still be addressed. However, instead of modeling the heavy waste plume for 10,000 years, operators may demonstrate there is no force to drive the waste stream out of the injection zone. Specifically, 10,000 year modeling would not be required if the following criteria are met.
  - a) The specific gravity of the waste stream is greater than that of the injection interval formation fluid;
  - b) The dense waste plume is modeled (numerically or analytically) within the worst case cone of influence or 2 mile area of review, whichever is greater, and;
  - c) Potential impacts (if any) of future oil and gas production wells in the vicinity of the facility are addressed.

This decision is based on the assumption there is no upward force acting on the waste stream once it is beyond the cone of influence, provided the density of the waste is greater than that of the resident formation fluid, and no production wells exist or will exist which would cause waste migration out of the injection zone. Both buoyant 10,000 year waste plume modeling and worst-case pressure buildup calculations will still be required.