



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6  
1445 ROSS AVENUE  
DALLAS, TEXAS 75202-2733

January 14, 1999

*Name*

*Title*

*Company*

*Street/P.O. Address*

*City, State Zip*

Dear *Name*:

Region 6 recently conducted inspections on several Class I hazardous waste injection well facilities granted exemptions to the land disposal restrictions (approved no migration petitions). As a result of these inspections, and based on the review of current no migration petition reissuance documents, EPA Region 6 has identified three areas of concern that should be addressed in any ongoing or future petition related submittal:

- a) Waste specific gravity/density measurement.
- b) Implementation of and compliance with petition approval conditions.
- c) Requests for an average running three-month specific gravity/density range.

Each area of concern is addressed individually by subject heading in the following paragraphs.

### **Waste Stream Specific Gravity/Density Measurement**

Recent inspections have uncovered numerous problems associated with the measurement of waste stream specific gravity/density. Some of these problems were related to a lack of detail in past petition approval conditions regarding the waste's specific gravity/density. Other problems observed have included:

- measurement methodology and procedures;
- frequency and accuracy of measurement;
- waste mixing and sampling points in waste handling systems; and
- record keeping documentation for confirmation of compliance with petition approval conditions.

To eliminate or minimize these problems, EPA Region 6 will modify approval conditions related to the waste specific gravity/density associated with all petitions or reissuances currently under review or submitted in the future to a format that should permit easier verification of compliance. Adjustments to petition approval conditions will include the following:

- a) The specific waste gravity/density values listed in the petition approval condition will have a measurement temperature associated with them.
- b) Petition approval conditions for specific gravity/density will reference the specific gravity/density values to at least two places to the right of the decimal point. Consequently, operators should ensure that the specific gravity/density measuring instrument used to document compliance has this degree of accuracy and precision. If not, it will be assumed that the error of the measurement device will be added or subtracted from the reading in the least favorable direction. For example, if a facility is conditioned to stay within a specific gravity range from 1.00 to 1.15, and the reading in question is  $1.0 \pm 0.05$ , EPA Region 6 will assume that the resulting reading is 1.00 - 0.05, or 0.95.

### **Implementation of and Compliance with Petition Approval Conditions**

To ensure that a facility can comply with petition approval conditions, in terms of adequate instrumentation and record keeping, EPA Region 6 will require the addition of a new section to all no migration petitions or reissuances either currently under review or submitted in the future. This section should be entitled “Implementation and Compliance” and should address how the facility will comply with requested specific gravity/density and injection rate limitations. Facilities should note that information required to demonstrate no migration petition compliance may be different from the documentation maintained for compliance with state UIC permits.

The Implementation and Compliance Section should include a facility waste stream flow diagram identifying all injected waste streams, their collection and storage points, pumps and filters associated with waste injection, waste flow meters, and mixing and sampling locations. The flow diagram should also clearly show waste flow distribution, including headers and control valves, to each well. The diagram should reflect operations consistent with the requested petition approval conditions. Any operational modes that are possible, but not consistent with petition conditions, should be noted on the diagram.

Information should also be provided concerning the instrumentation and measurement methodology used to determine the specific gravity/density, and injected volumes of each waste stream. Instrumentation and measurement information should include both the manufacturer’s recommended and facility equipment calibration schedules. The reference temperature should also be provided for the measurement device. Measurement and conversion documentation including instrument calibrations must be maintained by the facility for verification of compliance with requested petition values.

Waste specific gravity/density values are converted to density values at the injection

interval temperature when performing a waste transport modeling run. However, for ease of compliance verification, the specific gravity/density range in a petition condition must be referenced to a specific surface temperature. Consequently, the specific gravity/density temperature conversion should appear in the petition or reissuance document. In addition, operators should work with EPA Region 6 staff to ensure that the specific gravity/density range temperature to be cited in the petition approval condition (e.g., 0.99 to 1.10 at 68°F) corresponds to the reference temperature of the measuring device. No sample measurement parameter corrections would be necessary if the daily grab sample is analyzed for specific gravity at the same measurement temperature as listed in the petition approval conditions. If this is not possible or if possible future operational changes preclude this, any temperature corrections performed on measured values to convert them to petition condition values should be discussed, and sample calculations included as part of the Implementation and Compliance Section.

If, for purposes of compliance, an operator employs specific gravity measurements, then that facility should ensure that a specific gravity range appears in its petition condition (as opposed to a density range). If this is not possible, then that operator should ensure that an appropriate density to specific gravity conversion, thoroughly discussed with sample calculations, is included in the Implementation and Compliance Section.

A sample format of the daily record keeping of those parameters necessary to demonstrate compliance with the petition conditions should be included in the Implementation and Compliance Section. A facility requesting a running three-whole calendar month, volume-weighted average, specific gravity/density range, must include an explanation of how the facility will record and monitor compliance with the petition condition specific gravity/density range.

### **Requests for an Average Running Three-Month Specific Gravity/Density Range**

The methodology for computing a running three-whole calendar month, volume-weighted average is detailed in the sample petition condition in Enclosure 1. This condition will only be granted to facilities having relatively consistent waste stream specific gravity/density properties. This would exclude most commercial facilities. Facilities requesting such a condition, in lieu of an instantaneous specific gravity/density range, should demonstrate the consistency of the waste streams and that compliance with the requested range has been historically possible. This can be accomplished by submitting a minimum of thirty-six months of historical daily specific gravity/density and volume data from each waste stream. Thirty-three running three-whole calendar month, volume-weighted averages should be computed, using the information from Enclosure 1, for the thirty-six months of data. For example, the running three-whole calendar month, volume-weighted average for April 1996 would be calculated from the data for January, February and March 1996. If this is not feasible, EPA Region 6 may allow the use of a three-whole calendar month, volume-weighted average, if sufficient documentation is submitted to demonstrate that future compliance is likely.

Facilities having multiple wells, a single injection interval, and multiple injection waste streams will be required to volume weight each waste stream, and should justify that mixing of the waste streams, given the proximity of the injection wells, is likely to take place in the subsurface. The volume weighting of each waste stream will enable verification of compliance with the specific gravity/density range assigned to the injection interval.

Facilities requesting approval for multiple injection wells, multiple injection intervals, and multiple waste streams, may be assigned an average specific gravity/density range for each interval and required to show how compliance with each individual interval's volume-weighted specific gravity/density range can be verified over time. EPA Region 6's concern in this regard is that individual waste streams may be segregated into separate injection intervals within the injection zone resulting in either no mixing or unquantifiable mixing. Determination of the volume-weighted specific gravity/density in each interval would require accurate flow profile information over time. Defining the flow profile may be impractical or impossible, considering factors such as changing wellbore fill and other wellbore conditions. In such an instance, a running three-whole calendar month, specific gravity/density range, based on surface waste stream volume averaging, may not be appropriate.

This letter is intended to aid you and your contractor in dealing with the previously outlined issues. If you have any questions or concerns, please contact Brian Graves at 214-665-7193.

Sincerely yours,

*/s/Larry Wright*

Larry Wright  
Chief  
Source Water Protection Branch

Enclosure

## Enclosure 1

Sample petition approval condition for an average specific gravity/density range:

The characteristics of the injected waste stream shall at all times conform to those of Section XX of the petition. The running three-month average specific gravity/density of the waste stream shall remain within a range from SG/DEN1 to SG/DEN2 measured at (temp) °F with a reference temperature of (temp) °F. The running three-month average shall be calculated by multiplying each day's specific gravity/density value per waste stream by that day's injected volume per corresponding waste stream, totaling those values for the previous three-whole calendar month period, and dividing by that three-calendar month injected volume. For the purpose of the above calculation, each day's specific gravity/density value shall be obtained by at least one representative grab sample per waste stream.

The waste stream feed for the injection pump should be the source for the grab sample. If separate waste streams are combined prior to injection, then grab samples should be taken from that single waste stream and applied to the waste stream's volume to verify compliance with the specified gravity/density range. If waste streams are not combined, measured grab samples will be required from each waste stream and applied to the volume of the respective waste stream to verify compliance with the corresponding specific gravity/density range. Facilities requesting approval for multiple injection wells, multiple injection intervals, and multiple waste streams, will be assigned an average specific gravity/density range for each interval.

Specific gravity is a ratio of the waste sample density to a pure water density at a fixed specific temperature. The specific gravity measurement is made with an instrument, usually a hydrometer, that is referenced to a specific temperature. Accordingly, specific gravity has two temperatures associated with it, the waste sample temperature and the instrument reference temperature. Both temperatures should be specified in the petition approval condition relating to the specific gravity range. No sample measurement parameter corrections would be necessary if the daily grab sample is analyzed for specific gravity at the same measurement temperature as listed in the petition approval conditions.

If electronic instrumentation is used to analyze the waste steam, a description of the instrument calibration methodology, the instrument specific gravity/density measurement mechanism, reference temperature and sample measurement temperature correction procedures should be specified in the petition.

Records of waste sample measurement temperatures, sample temperature adjustment methodology, and resulting specific gravity/density measurements must be made available for review during a petition compliance evaluation inspection. Documentation to verify the measurement system calibration must be maintained showing that, at a minimum, the manufacturer's instrument calibration guidelines were followed. Calibration data and maintenance records should be available for review during an inspection. In general, the specific gravity/density measurement records should include sufficient documentation for easy verification of compliance with the facility's corresponding specific gravity/density range.