

EPA's Response To Comments on the Draft Class I Underground Injection Control Permit for Hilmar Cheese Company

As required by Title 40 of the Code of Federal Regulations (CFR), Part 124.17(a), the United States Environmental Protection Agency, Region 9 (EPA) shall briefly describe and respond to all significant comments on the Hilmar Cheese Company's (Hilmar) draft Class I Underground Injection Control (UIC) permit or the permit application raised during the public comment period, including the public hearing held on September 8, 2005. What follows is EPA's response to the comments received. All comments received and the proceedings from the public hearing are attached.

In summary, EPA determined that no changes to the draft permit are necessary in response to comments received. The final decision to approve the permit is based on EPA's determination that all activities allowed under the permit will be in compliance with the Safe Drinking Water Act's UIC Program regulations.

I. Response to Significant and Applicable Comments

Comment 1: *Several commenters stated their belief that the Regional Water Quality Control Board had no official knowledge of the well proposal, and suggested that EPA should have alerted the Regional Board to EPA's permitting activity.*

Response: EPA did in fact alert the Central Valley Regional Water Quality Control Board (CVRWQCB) to Hilmar's UIC permit application. In particular, we coordinated with the CVRWQCB's Land Discharge Unit throughout the development of the permit. In addition, we provided the CVRWQCB with an opportunity to comment on the draft permit prior to the commencement of the public comment period. CVRWQCB employees from the staff level up to and including senior executives were contacted on multiple occasions throughout our process to ensure adequate coordination and cooperation between EPA and CVRWQCB.

EPA also contacted the California Division of Oil, Gas, and Geothermal Resources (CDOGGR) on several occasions during the development of the draft permit. CDOGGR, which has oversight authority in California for another type of deep injection well (UIC Class II) was also provided the opportunity to comment on the draft permit prior to the opening of the public comment period.

Comment 2: *A commenter inquired as to whether or not the Regional Water Quality Control Board has authority to regulate Hilmar's Class I well.*

Response: As noted above, the State of California (CDOGGR) has applied for, and received, primary authority to regulate Class II injection wells, which are injection wells associated with oil and gas production. The State has not, however, elected to pursue primary regulatory authority for the Class I UIC program. Thus, EPA Region 9 is

required to implement the Class I UIC program, including the issuance of Class I UIC permits, in the State of California. Notwithstanding the formal lines of jurisdictional authority, EPA Region 9 has a history of cooperating with the State (i.e., State Water Board, CDOGGR) on matters of mutual interest in a manner that does not duplicate our efforts.

Comment 3: *Commenters requested information on 1) the expected chemistry and density of both the injection fluid and the targeted injection aquifer, and 2) the salinity of the aquifers around the targeted injection aquifer as described under the permit.*

Response: Based on the information provided by Hilmar Cheese Company in their permit application, and EPA's knowledge of the proposed injection zone characteristics, we anticipate the chemistry of the injection fluid and the injection aquifer to be compatible. Moreover, Hilmar's permit includes initial and ongoing testing requirements to ensure that there are no adverse reactions between the injectate and the formation fluid.

The following are the anticipated major chemical parameters of the injectate (as reported by Hilmar Cheese Company):

Chemical Oxygen Demand	<800 milligrams per liter (mg/L)
Biological Oxygen Demand	<20 mg/L
Fats, Oils, Greases	<5 mg/L
pH	6.7 to 7.3
Nitrates	<2 mg/L
Total Kjeldahl Nitrogen	<10 mg/L
Total Phosphorus	<5 mg/L
Total Dissolved Solids	<1,250 mg/L
Suspended Solids	<20 mg/L

Hilmar's permit requires them to analyze on a quarterly basis for total dissolved solids, sodium, calcium, magnesium, barium, iron, chloride, sulfate, carbonate, bicarbonate, sulfide, pH, conductivity, metals, volatile organic compounds, semi-volatile organic compounds, and solids (Part II, Section D.1(c)).

The densities (specific gravity) of the injection fluid and the injection aquifer fluid are not known at this time. However, the injection aquifer fluid will be analyzed for specific gravity during drilling activities. The injection fluid will be analyzed for specific gravity prior to authorization to inject, and on a quarterly basis thereafter.

Since EPA's UIC regulations protect underground sources of drinking water up to 10,000 mg/L total dissolved solids, the injection aquifer must have a concentration of at least 10,000 mg/L for Hilmar Cheese Company to receive authorization to inject (see Part II, Section C.2(d) of the permit). The total dissolved solids concentration of the injection aquifer must be determined by a physical sample of the formation water taken during drilling activities. Electrical logs from a previously drilled oil exploratory well near the proposed site indicate that various intervals exceed 10,000 mg/L total dissolved solids

beginning at 1,500 feet below the ground surface (bgs) and continuing through 4,800 feet bgs (the logs were not continued below 4,800 feet).

Comment 4: *Several commenters had concerns that a pressure build-up in the injection aquifer could potentially cause a migration of highly saline water into drinking water aquifers several thousand feet above the injection aquifer. One commenter suggested that this scenario was likely to happen due to the incompressibility of water, and requested that an extensive monitoring well network be established to ensure protection of the area's drinking water aquifers. The commenters emphasized that extensive aquifer testing (including the vertical hydraulic conductivities of the aquifers above the injection aquifer) and modeling should be carried out prior to allowing any injection activities.*

Response: The UIC program is charged with ensuring that injection activities will not cause a migration of fluids into underground sources of drinking water. EPA agrees that pressure increases in aquifers result from injection activities. Therefore, monitoring the pressure effects of injection activities is a fundamental element of the Class I UIC regulations. EPA believes that adequate pre-injection testing and stringent operational requirements exist within the permit to prevent any migration of fluids (pressure-induced or otherwise) out of the targeted injection aquifer.

The Hilmar permit provides a phased approach to the use of injection wells. The permit initially allows the construction of only one well from which analyses will be conducted to determine critical aquifer parameters. The parameters determined during the initial analyses (i.e. permeability, porosity, pressure) will be paired with factors such as the compressibility and viscosity of the aquifer using published and peer-reviewed calculations designed to quantify the pressure front radius around any injection well(s). No injection will be authorized until this analysis is completed.

The permit's annual pressure transient testing program and the continuous injection pressure monitoring provide a direct reflection of the injection zone and how it behaves. EPA will closely examine the results of the first testing well to ensure the areal extent of the "reservoir" (the interconnected, continuous portion of the injection zone) is large enough to accommodate the entire volume of injectate as projected at the maximum injection rate for the life of the operation. If it is not, then the pressure limitations in the permit will serve to limit the injection, so that fluids do not migrate out of the targeted injection aquifer.

The geologic location of the well serves to decrease the chance that increased pressure will cause fluid migration into underground sources of drinking water. Specifically, as stated in the permit application, the confining layer above the injection zone (Kreyenhagen Formation, a marine shale) is estimated to be 100 feet thick, regionally extensive, and essentially impermeable (1 millidarcy). Another indication of the sealing properties of this Formation is that it has effectively contained oil and gas reserves in nearby formations for millions of years. Logging during drilling activities and an analysis of the pressure transient testing, which is required to be performed prior to injection (and annually thereafter), will serve to verify the application's estimations and

will detect any discontinuities (areas for potential leakage with increased aquifer pressure) in the confining zone.

Finally, the highest pressures within the Injection-Well-Injection-Zone system will occur at the location of the injection well. The logging, testing, and monitoring programs required under the permit are adequate to detect potential problems prior to any migration of injection or aquifer fluids out of the targeted injection aquifer.

Incidentally, the compressibility of water is very small, so its effect on small volumes of water is not significant. However, the effect of the small compressibility of water in large volumes of water can be significant. For example, according to a National Geospatial Intelligence Agency publication, it's estimated that the elevation of the oceans would be about 90 feet higher if water was not compressible. Aquifer materials (e.g. sandstone, etc.) are also compressible. The compressibility of water and the aquifer material significantly adds to the storage capacity of large, deep underground aquifers (such as the proposed injection zone for Hilmar's permit).

Comment 5: *Several commenters requested clarification on the volume of injection fluid that will be allowed under the permit.*

Response: The injection volume authorized under this permit will be governed by the anticipated aquifer pressure created by the injection activities. Aquifer pressure generally increases as the volume of injection fluid increases. Accordingly, we cannot determine the exact amount of injection fluid until Hilmar has conducted the required aquifer testing.

Hilmar Cheese Company applied for a permit to inject 2.2 million gallons of treated wastewater per day, which equates to just under 2,500 acre-feet per year. However, the permit EPA is issuing to Hilmar Cheese Company does not authorize that injection volume. Rather, EPA's permit authorizes the construction of a test well which will be used to analyze the characteristics of the targeted injection aquifer in order to determine the maximum injection volume and pressure that will be allowed under the permit. This test well will be constructed to the injection well standards outlined in the permit, and will be utilized as an injection well only if the initial aquifer analyses prompt EPA to give Hilmar approval to inject.

Under the terms of the permit, Hilmar is required to conduct analyses of the test well. Using the results of the analyses, EPA will determine an injection volume that is protective of underground sources of drinking water. First, as previously mentioned, pressure transient testing will be conducted to determine critical aquifer parameters. These parameters will be used to model pressure front radii created by various theoretical injection volumes less than or equal to what Hilmar has proposed in their permit application. Second, step-rate testing will be used to determine the aquifer pressure at which fractures will form. These analyses will also indicate if the targeted injection aquifer is not adequate to accept any appreciable volume of injection fluid. Thus, until

the testing authorized by the permit is completed, and the results are evaluated by EPA, it is not possible to say what the injection volume will be.

Comment 6: *Multiple commenters expressed concern about Hilmar Cheese Company's wastewater disposal practices over the past decade. These commenters believe that Hilmar will not comply with the required permit conditions, especially where the disposal area can not be seen or monitored.*

Response: Although a discharge at 3,300 feet below the ground surface cannot be seen, there are a variety of tools and tests which offer a picture of what is occurring in the injection aquifer.

Any injection allowed under the permit will be closely monitored as described under Part II, Section D (titled Monitoring, Record Keeping, and Reporting of Results) of the permit. The permit requires both careful monitoring of activities by Hilmar Cheese Company and submittal of monitoring data to EPA for review and evaluation. See the responses to Comments 4 and 5 above for a discussion of some of the permit's extensive testing, monitoring, and reporting requirements.

EPA will strictly oversee all injection activities for compliance with the permit in order to ensure the protection of underground sources of drinking water. Any violations of permit conditions would subject Hilmar Cheese Company to potential enforcement action, which could include the suspension or cessation of injection activities as well as monetary penalties.

Comment 7: *One commenter requested that Hilmar Cheese Company be required to perform an environmental review of the project under the National Environmental Policy Act (NEPA).*

Response: The UIC permitting process involves public participation and a thorough review of all environmental considerations. The pertinent federal regulations (40 C.F.R. 124.9(b)(6)) provide that the UIC permitting process is not subject to the environmental impact statement provisions of NEPA. As a result, case law has established the UIC permitting process to be functionally equivalent to NEPA's environmental impact statement requirements. In addition, pursuant to EPA's UIC regulations at part 144, the Agency's permitting process has ensured that this project is in compliance with other federal statutes, including the Endangered Species Act and the National Historic Preservation Act.

Comment 8: *One commenter requested information on the results of any seismic activity analyses conducted as part of the permit application or EPA's review of the permit application.*

Response: The seismic activity of the area is rated as "Seismic Zone 3", on a scale of 0 to 4 (with 4 being the highest) as defined by the California Uniform Building Code. Based on the California Geological Survey's database of magnitude 4 earthquakes or

greater from 1769 to 2000, the nearest epicenter was located 17 miles south southeast of the project site and was listed as a magnitude 4.1 event.

Deep injection wells are common in the San Joaquin Valley. CDOGGR regulates hundreds of Class II injection wells in the area surrounding the proposed well location(s) in Hilmar's permit. Class II injection wells are very similar in design and function to Class I injection wells. According to CDOGGR, seismic activity has never impacted Class II injection activities in the surrounding area.

Comment 9: *Several commenters requested that EPA require Hilmar Cheese Company to treat and recycle their wastewater in lieu of disposing of it underground.*

Response: Underground injection is one of the disposal options that Hilmar Cheese Company is currently considering. EPA does not have the authority to require a specific treatment and disposal procedure. Rather, the UIC program's role is limited to evaluating whether or not proposed underground injection activities are in compliance with the Safe Drinking Water Act and other federal statutes. We believe the injection activities allowed under Hilmar's permit will not impact underground sources of drinking water, and comply with the requirements of the Safe Drinking Water Act.

II. Comments Outside the Scope of EPA's Permit Determination

A commenter had concerns about ground water supply issues in the Hilmar area given recent uncontrolled rapid growth and development.

This topic falls outside of EPA's UIC permitting authority as defined under 40 C.F.R. Parts 124, 144, 145, 146, 147, and 148. Since this issue is beyond the scope of our permitting determination, we are not providing a specific response.