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DIVISION OF OIL & GAS
BAKERSFIELD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

Mr. Tom Cornwell
Western Oil and Gas Association
727 West 7th Street
Los Angeles, CA 90017

17 MAY 1985

Dear Mr. Cornwell:

The staffs of EPA-Region 9 and the California Division of Oil and Gas (CDOG) have been meeting with members of the Western Oil and Gas Association (WOGA), the California Independent Producers Association (CAIPA), and the Independent Oil Producers Agency (IOPA) to determine how wells injecting specific types of oil field fluids will be regulated under the Underground Injection Control (UIC) program in California. The purpose of this letter is to clarify:

1. how wells injecting filter backwash (diatomaceous earth or multi-media filter backwash), water softener regeneration brine, or air scrubber waste will be classified and regulated under the UIC program in California;

2. the requirements, especially the regulatory deadlines for the submission of permit applications and inventory information for existing wells, for different classes of wells; and

3. which formations identified by CDOG in its primacy application were verified as Underground Sources of Drinking Water (USDW) and exempted and which formations were determined not to be USDWs and did not need to be exempted when primacy for CDOG was approved.

In general, the classification and regulation scheme for wells injecting filter backwash, water softener regeneration brine, or air scrubber wastes under the UIC program in California is:

- wells which inject filter backwash are Class II wells and are regulated by CDOG;

- wells which inject either water softener regeneration brine or air scrubber wastes for the purpose of enhancing oil or natural gas recovery are Class II wells and are regulated by CDOG; and

- wells which inject either water softener regeneration brine

or air scrubber wastes for disposal are either Class I or Class V wells and are regulated by EPA.

Attachment 1 provides: a precise statement about these well classifications; a brief description of each of the fluids being injected; clarification of how wells used to inject commingled fluids will be regulated; and a diagram which outlines how wells injecting the different types of fluids will be regulated and by whom in California.

Some, but not all, of the relevant requirements for Class I, II, and III wells under the UIC program implemented in California are:

- Class I wells - for existing wells (wells in operation prior to June 25, 1984) complete permit applications must be submitted to EPA by June 25, 1985 (40 CFR 144.31[c][1] and 147.251[B])

  - for new wells, permits must be in effect prior to any construction (40 CFR 144.11)

- Class II wells - CDOG has been delegated this portion of the UIC program and regulates this class of wells

- Class V wells - for existing wells, a completed inventory form and the required additional information must be submitted to EPA by June 25, 1985 (40 CFR 144.26[d][1] and 147.251[B])

  - for new wells, a complete inventory form and the required additional information should be submitted to EPA prior to construction.

Complete permit applications for existing Class I wells must be submitted to EPA by June 25, 1985. Considering the delays in classifying wells injecting filter backwash, water softener regeneration brine, or air scrubbing waste, allowances may be made for the submission of additional clarifying information after June 25, 1985. However, allowances can only be considered if an application has been been submitted by June 25, 1985 and if the application represents a reasonable and substantial effort toward a complete permit application.

Attachment 2 provides the exact definitions for the different classes of wells and other pertinent definitions in the UIC program. Attachment 3 and 4 are copies of the permit application and Class V Inventory Notification, respectively.

There appears to be some confusion about which formations in oil and gas fields are USDWs and which formations in oil and gas fields are not USDWs under the UIC program. When CDOG submitted

its application for the Class II portion of the UIC program, it submitted information about a large number of formations in oil fields to be considered for aquifer exemptions. These included formations which produced oil or gas and formations which did not produce any oil or gas. After reviewing the information from CDOG supporting the aquifer exemptions requests, all formations which were USDWs and produced oil or gas were exempted but only some of the formations which did not produce any oil or gas were granted aquifer exemptions. These latter formations were not exempted because the supporting information demonstrated that they were not USDWs as defined by the UIC program. They yielded water which had a Total Dissolved Solids concentration greater than 10,000 milligrams per liter.

Maps showing the lateral extent of any formation which was exempted can be found in California Oil and Gas Fields (Volumes I, II, and III) and Appendix B of CDOG's primacy application. They are available for review at the EPA office in San Francisco or at any of the CDOG district offices. A list of those formations, which did not produce any oil or gas and were considered for aquifer exemptions, is provided as Attachment 5. A list of those formations, which did not produce any oil or gas and which were USDWs and exempted, is provided as Attachment 6.

I would like to take this opportunity to thank those of your members who met and worked with us to clarify these points in the UIC program. If you have any further questions or need other points of clarification, please call Pete Uribe of my staff at (415) 974-7285.

Sincerely,

Frank M. Covington, Director
Water Management Division

ATTACHMENTS

1 - Well Classification and Regulation Scheme	(3 pages)
2 - UIC Definitions	(3 pages)
3 - Permit Application	(10 pages)
4 - Class V Inventory Notification	(7 pages)
5 - List of Formations Considered for Exemption	(3 pages)
6 - List of Formations Exempted	(1 page)

cc: M.G. Mefferd, CDOG
J. B. Braden, CAIPA
Les Clark, IOPA
Jim Cornelius, SWRCB
Bill Pfister, CVRWQCB
John Atcheson, EPA HQ

Policy Statement on Well Classifications

Wells which inject filter backwash (diatomaceous or multi-media filter backwash) are Class II wells.

Wells which inject water softener regeneration brine or air scrubber waste are not Class II wells, unless injection is for enhanced recovery, in which case the wells are Class II wells.

Wells which inject water softener regeneration brine or air scrubber waste commingled with other fluids (e.g. produced water or filter backwash) are not Class II wells, unless injection is for enhanced recovery, in which case the wells are Class II wells.

Description of Fluids being Injected

Filter backwash is a fluid with an elevated concentration of suspended solids which were removed from produced water. In general, produced water is passed through either diatomaceous or multi-media filters to remove suspended solids. Periodically, these filters are washed with either fresh or produced water, which has no additives, to remove the suspended solids concentrated in the filter resulting in a filter backwash.

Water softener regeneration brine is a fluid with high concentrations of total dissolved solids, especially calcium, magnesium, and chloride. In general, produced water is softened by passing it through a resin which replaces calcium and magnesium ions in the water with sodium ions. Periodically, the resin in the water softener unit is regenerated with concentrated solutions of sodium chloride, which replaces the calcium and magnesium ions captured on the resin with sodium ions in the solution, yielding a water softener regeneration brine.

Air scrubber waste is sulfur dioxide scrubber blowdown (also commonly known as scrubber liquor) with high concentrations of total dissolved solids (much greater than 10,000 ppm) In general, crude oil is burned for power to produce steam, which is injected to enhance the recovery of extremely heavy crude oil. Air scrubbers are required when the crude oil is burned because Kern County is a Non-Attainment Area for air quality with respect to sulfur dioxide.

Clarifying the Classification of Wells

Injecting Commingled Fluids

Wells injecting only filter backwash or filter backwash commingled with produced water will be Class II wells and will be regulated by CDOG.

Wells injecting fluids with either water softener regeneration brine or air scrubber wastes into oil and gas producing formations for the purpose of enhanced recovery will be Class II wells and will be regulated by CDOG.

Wells injecting only water softener regeneration brine or only air scrubber wastes into non-oil and gas producing formations are not Class II wells and will be directly regulated by the regional office as a Class I or V well.

Wells injecting either water softener regeneration brine or air scrubber wastes together with produced water into non-oil and gas producing formations are not Class II wells and will be directly regulated by the regional office as a Class I or V well.

On the next page is chart which summarizes whether CDOG or EPA is responsible for any given well based on the type of injectate and the injection formation.

FLUID INJECTED	PURPOSE OF INJECTION	INJECTION ZONE	WELL CLASSIFICATION	UIC PERMIT AGENCY
A. Diatomaceous Earth Filter Backwash	Disposal or Enhanced Recovery	Above or into a USDW* Below lowermost USDW	Class II	CDOG
B. 1. Water Softener Regeneration Brine 2. Air Scrubber Waste	Disposal	Above or into a USDW	Class V	EPA**
		Below lowermost USDW	Class I	EPA
	Enhanced Recovery		Class II	CDOG
C. The following wastes commingled with with produced fluids: 1. Water Softener Regeneration Brine 2. Air Scrubber Waste	Disposal	Above or into a USDW	Class V	EPA**
		Below lowermost USDW	Class I	EPA
	Enhanced Recovery		Class II	CDOG

* USDW (Underground Source of Drinking Water)- an aquifer or its portion that contains fewer than 10,000 mg/l total dissolved solids and is not an exempted aquifer (see 40 CFR 144.3 for full definition)

** EPA requirements for Class V wells are: submission of inventory information to EPA by operator (40 CFR 144.26) and that EPA assessment of those wells to determine the need for requirements or regulations (40 CFR 146.52(b)) There are currently no permitting requirements for Class V wells under EPA's UIC program. However, EPA has the option to require and the operator has the option to request a permit. EPA cannot preclude the State (CDOG) from regulating these wells under State laws or regulations, so CDOG's existing state program applies.

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Region 9 UIC Program Information Sheet

General Information about the Underground Injection Control Program

The Safe Drinking Water Act (SDWA) of 1974, as amended, requires the U.S. Environmental Protection Agency (EPA) to establish a program which provides for the safety of our nation's drinking water. One part of this program, Underground Injection Control (UIC), has been established to prevent contamination of underground sources of drinking water due to improper design, construction and operation of injection wells. Although not recognized, the injection of waste materials is a very common practice. For example, the oil and gas industry operates tens of thousands of wells nationwide which inject brine or brackish wastewater in the production of oil and gas. Other types of injection wells include hazardous waste disposal operations wells, industrial waste disposal wells, municipal disposal operations wells, and nuclear storage and disposal wells.

Underground Sources of Drinking Water

By definition, an Underground Source of Drinking Water (USDW) is an aquifer or a portion of an aquifer:

which supplies any public water system; or

which contains significant quantity of ground water to supply a public water system; and

currently supplies drinking water for human consumption; or

contains fewer than 10,000 mg/l total dissolved solids (TDS) and is not an exempted aquifer.

An aquifer is a geological formation that is capable of yielding a significant amount of water to a well or to a springs. An exempted aquifer is an aquifer that cannot now and will not in the future serve as a source of drinking water, as determined by EPA.

Well Classification

A well is defined as a bored, drilled or driven shaft or dug hole whose depth is greater than the largest surface dimension. There are five classes of injection wells which are regulated by the UIC program. A specific well classification is made by determining the type of fluid to be injected and the geologic area into which the fluid is to be injected. Injection well classes are summarized as follows:

Class I — Class I wells are municipal and industrial disposal wells (including wells used by generators of hazardous waste and owners of hazardous waste management facillities) which inject fluids below the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.

Class II — Class II wells are associated with oil and gas production or liquid hydrocarbon storage. These wells inject fluids which are brought to the surface for the enhanced recovery of oil and natural gas and for the storage of hydrocarbons.

Class III — Class III wells inject fluids for the extraction of minerals and are used in conjunction with solution mining of minerals.

Class IV — Class IV wells are used by generators of hazardous and radioactive wastes. These wells inject into a formation which within one quarter of a mile of the well contains an underground source of drinking water. Class IV wells are prohibited.

Class V — Class V wells are wells which do not meet the criteria listed for classes I through IV. Generally, wells covered under this classification inject non-hazardous fluids into or above formations that contain underground sources of drinking water. Class V wells include the following, but are not limited to these types of wells:

1. air conditioning return flow wells used to return to the supply aquifer the water used for heating or cooling in a heat pump (Questionnaire II);

2. cesspools including multiple dwelling, community or regional cesspools, or other devices that receive wastes which have an open bottom and sometimes have perforated sides. The UIC requirements do not apply to single family residential cesspools nor to non-residential cesspools which receive solely sanitary wastes and have the capacity to serve fewer than 20 persons a day (Questionnaire II);

3. cooling water return flow wells used to inject water previously used for cooling (Questionnaire II);

4. dry wells used for injection of wastes into a subsurface formation (Questionnaire II);

5. drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation (Questionnaire II);

6. recharge wells used to replenish the water in an aquifer (Questionnaire II);

7. salt water intrusion barrier wells used to inject water into a fresh water aquifer to prevent the intrusion of of salt water in the fresh water (Questionnaire II);

8. sand backfill and other backfill wells used to inject a mixture of water and sand, mill tailings or other solids into mined out portions of subsurface mines regardless of whether or not it is a radioactive waste (Questionnaire II);

9. septic system wells used to inject the waste of effluent from a multiple dwelling, business establishment, community or regional business establishment septic tank. The UIC requirements do not apply to single family residential septic system wells, nor to non-residential septic system wells which are used solely for the disposal of sanitary wastes and have the capacity to serve fewer than 20 persons a day (Questionnaire II);

10. subsidence control wells (not used for the purpose of oil or natural gas production) used to inject fluids into a non-oil or gas producting zone to reduce or eliminate subsidence associated with the overdraft of fresh water (Questionnaire II);

11. radioactive waste disposal wells other than Class IV (Questionnaire I);

12. injection wells associated with the recovery of geothermal energy for heating, aquaculture, and production of electric power (Questionnaire I);

13. wells used for solution mining of conventional mines such as stopes leaching (Questionnaire I);

14. wells used to inject spent brine into the same formation from which it was withdrawn after extraction of halogens or their salts (Questionnaire I);

15. injection wells used in experimental technologies (Questionnaire I);

16. injection wells used for in situ recovery of lignite, coal, tar sands, and oil shale (Questionnaire II);

17. agricultural drainage wells (Questionnaire II);

18. air scrubber waste disposal wells (except if injection is for enhanced recovery of oil and gas in California); and

19. water softener regeneration brine waste disposal wells (except if injection is for enhanced recovery of oil and gas in California).

Attachment 3

Form Approved. OMB No. 2000-0042. Expires 9-30-86
GSA No.

Form 4 UIC

EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT APPLICATION
(Collected under the authority of the Safe Drinking Water Act, Sections 1421, 1422, 40 CFR 144)

I. EPA ID NUMBER

		T/A	C
U			

READ ATTACHED INSTRUCTIONS BEFORE STARTING
FOR OFFICIAL USE ONLY

Application approved mo	day	year	Date Received mo	day	year	Permit/Well Number	Comments

II. FACILITY NAME AND ADDRESS

Facility Name

Street Address

City | State | ZIP Code

III. OWNER/OPERATOR AND ADDRESS

Owner/Operator Name

Street Address

City | State | ZIP Code

IV. OWNERSHIP STATUS *(Mark 'x')*

☐ A. Federal ☐ B. State ☐ C. Private
☐ D. Public ☐ E. Other *(Explain)*

V. SIC CODES

VI. WELL STATUS *(Mark 'x')*

☐ A. Operating | Date Started mo | day | year | ☐ B. Modification/Conversion ☐ C. Proposed

VII. TYPE OF PERMIT REQUESTED *(Mark 'x' and specify if required)*

☐ A. Individual ☐ B. Area | Number of Existing wells | Number of Proposed wells | Name(s) of field(s) or project(s)

VIII. CLASS AND TYPE OF WELL *(see reverse)*

A. Class(es) *(enter code(s))*	B. Type(s) *(enter code(s))*	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)

IX. LOCATION OF WELL(S) OR APPROXIMATE CENTER OF FIELD OR PROJECT

C	A. Latitude			B. Longitude			Township and Range							
	Deg	Min	Sec	Deg	Min	Sec	Twsp	Range	Sec	¼ Sec	Feet from	Line	Feet from	Line
I														

X. INDIAN LANDS *(Mark 'x')*

☐ Yes ☐ No

XI. ATTACHMENTS

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

FOR CLASSES I, II, III (and other classes) complete and submit on separate sheet(s) Attachments A — U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application:

XII. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (Ref. CFR 122.6)

A. Name and Title *(Type or Print)*	B. Phone No. *(Area Code and No.)*
C. Signature	D. Date Signed

EPA Form 7520-6 (12-83)

Continued on Reverse

Well Class and Type Codes

Class I	Wells used to inject waste below the deepest underground source of drinking water.
Type "I"	Nonhazardous industrial disposal well
"M"	Nonhazardous municipal disposal well
"W"	Hazardous waste disposal well injecting below USDWs
"X"	Other Class I wells (not included in Type "I," "M," or "W")
Class II	Oil and gas production and storage related injection wells.
Type "D"	Produced fluid disposal well
"R"	Enhanced recovery well
"H"	Hydrocarbonn storage well (excluding natural gas)
"X"	Other Class II wells (not included in Type "D," "R," or "H")
Class III	Special process injection wells.
Type "G"	Solution mining well
"S"	Sulfur mining well by Frasch process
"U"	Uranium mining well (excluding solution mining of conventional mines)
"X"	Other Class III wells (not included in Type "G," "S," or "U")
Other Classes	Wells not included in classes above.
	Class V wells which may be permitted under §144.12
	Wells not currently classified as Class I, II, III, or V.

EPA Form 7520-6 (12-83) Reverse

INSTRUCTIONS - Form 4 - Underground Injection Control (UIC) Permit Application

Form 4 must be completed by all owners or operators of Class I, II, and III injection wells and others who may be directed to apply for a UIC permit by the Director.

I. EPA I.D. NUMBER - Fill in your EPA Identification Number. If you do not have a number, leave blank.

II. FACILITY NAME AND ADDRESS - Name of well, well field or company and address.

III. OWNER/OPERATOR NAME AND ADDRESS - Name and address of owner/operator of well or well field.

IV. OWNERSHIP STATUS - Mark the appropriate box to indicate the type of ownership.

V. SIC CODES - List at least one and no more than four Standard Industrial Codes (SIC) that best describe the nature of the business in order of priority.

VI. WELL STATUS - Mark Box A if the well(s) were operating as injection wells on the effective date of the UIC Program for the State. Mark Box B if the well(s) existed on the effective date of the UIC Program for the State but were not utilized for injection. Box C should be marked if the application is for an underground injection project not constructed or not completed by the effective date of the UIC Program for the State.

VII. TYPE OF PERMIT - Mark "Individual" or "Area" to indicate the type of permit desired. Note that area permits are at the discretion of the Director and that wells covered by an area permit must be at one site, under the control of one person and do not inject hazardous waste. If an area permit is requested the number of wells to be included in the permit must be specified and the wells described and identified by location. If the area has a commonly used name, such as the "Jay Field", submit the name in the space provided. In the case of a project or field which crosses State lines, it may be possible to consider an area permit if EPA has jurisdiction in both States. Each such case will be considered individually, if the owner/operator elects to seek an area permit.

VIII. CLASS AND TYPE OF WELL - Enter in these two positions the Class and type of injection well for which a permit is requested. Use the most pertinent code selected from the list on the reverse side of Form 4. When selecting type X please explain in the space provided.

IX. LOCATION OF WELL - Enter the latitude and longitude of the existing or proposed well expressed in degrees, minutes, and seconds or the location by township, and range, and section, as required by 40 CFR 146. If an area permit is being requested, give the latitude and longitude of the approximate center of the area.

X. INDIAN LANDS - Place an "X" in the box if any part of the facility is located on Indian lands.

XI. ATTACHMENTS - Note that information requirements vary depending on the injection well class and status. Attachments for Class I, II, and III are described on pages 3-7 of this document and listed by Class on page 8. Place EPA ID number in the upper right hand corner of each page.

XII. CERTIFICATION - All permit applications (except Class II) must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, and by a principal executive or ranking elected official for a public agency. For Class II, the person described above should sign, or a representative duly authorized in writing.

INSTRUCTIONS - Attachments to Form 4

Attachments to be submitted with permit application for Class I, II, III and other wells.

A. AREA OF REVIEW METHODS - Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation). The area of review shall be a fixed radius of 1/4 mile from the well bore unless the use of an equation is approved in advance by the Director.

B. MAPS OF WELLS/AREA AND AREA OF REVIEW - Submit a topographic map, extending one mile beyond the property boundaries, 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) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:

Class I

The number, or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features, including residences and roads, and faults, if known or suspected. Only information of public record is required to be included on this map;

Class II

In addition to requirements for Class I, include pertinent information known to the applicant. Requirement does not apply to existing Class II wells;

Class III

In addition to requirements for Class I, include public water systems and pertinent information known to the applicant.

C. CORRECTIVE ACTION PLAN AND WELL DATA - 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 on the map required in B, which penetrate the proposed injection zone.

Such data shall include the following:

Class I

A description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require. In the case of new injection wells, include the corrective action proposed to be taken by the applicant under 40 CFR 144.55.

Class II

In addition to requirements for Class I, in the case of Class II wells operating over the fracture pressure of the injection formation, all known wells within the area of review which penetrate formations affected by the increase in pressure. This requirement does not apply to existing Class II wells.

Class III

In addition to requirements for Class I, the corrective action proposed under 40 CFR 144.55 for all Class III wells.

D. MAPS AND CROSS SECTIONS OF USDW'S - Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), 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. (Does not apply to Class II wells.)

E. NAME AND DEPTH OF USDW'S (CLASS II) - For Class II wells, submit geologic name, and depth to bottom of all underground sources of drinking water which may be affected by the injection.

F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA - Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)

G. GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES (CLASS II) - For Class II wells, submit appropriate geological data on the injection zone and confining zones including lithologic description, geological name, thickness, depth and fracture pressure.

H. 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; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for Class III wells, a qualitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

I. FORMATION TESTING PROGRAM - Describe the proposed formation testing program. For Class I wells the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

For Class II wells the testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone. (Does not apply to existing Class II wells or projects.)

For Class III wells the program must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the formation is not water bearing. (Does not apply to existing Class III wells or projects.)

J. STIMULATION PROGRAM - Outline any proposed stimulation program.

K. INJECTION PROCEDURES - Describe the proposed injection procedures including pump, surge, tank, etc.

L. CONSTRUCTION PROCEDURES - Discuss the construction procedures (according to §146.12(b) for Class I) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring programs, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to a packer for Class I.)

M. CONSTRUCTION DETAILS - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

N. CHANGES IN INJECTED FLUID - Discuss expected changes in pressure, native fluid displacement, and direction of movement of injected fluid. (Class II and III wells only.)

O. PLANS FOR WELL FAILURES - Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or well failures, so as to prevent migration of fluids into any USDW.

P. MONITORING PROGRAM - Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and a discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

Q. PLUGGING AND ABANDONMENT PLAN - Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDW's.

R. NECESSARY RESOURCES - Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug or abandon the well are available.

S. AQUIFER EXEMPTIONS - If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria: (1) does not serve as a source of drinking water; (2) cannot now and will not in the future serve as a source of drinking water; and (3)

the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and time table for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR 144.7 and 146.04.

T. EXISTING EPA PERMITS - List program and permit number of any existing EPA permits, for example, NPDES, PSD, RCRA, etc.

U. DESCRIPTION OF BUSINESS - Give a brief description of the nature of the business.

Attachments to Permit Application

Class	Attachments
I	
new well	A, B, C, D, F, H - S, U
existing	A, B, C, D, F, H - U
II	
new well	A, B, C, E, G, H, M, Q, R; optional - I, J, K, N, O, P, U
existing	A, E, G, H, M, Q, R - U; optional - J, K, N, O, P, Q
III	
new well	A, B, C, D, F, H, I, J, K, M - S, U
existing	A, B, C, D, F, H, J, K, M - U
Other Classes	To be specified by the permitting authority

Attachment 4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

Re: Information on Class V Injection Wells for Underground Injection Control Program of the Environmental Protection Agency (EPA)

To whom it may concern:

As required by EPA regulations [Title 40 of the Code of Federal Regulations (CFR), Section 144.26], owners and operators of all Class V injection wells in American Samoa, Arizona, California, Hawaii, Nevada, and the Trust Territories must submit information about these wells to the EPA by June 25, 1985.

A well is defined as a "bored, drilled or driven shaft, or dug hole, whose depth is greater than the largest surface dimension (40 CFR 146.3)." Class V wells include a diverse group of wells used for residential, municipal or industrial purposes. A more detailed list of the types of Class V wells is enclosed (see attachment A).

Please provide EPA, Region 9 with information regarding Class V wells within your jursidiction or operation. Include information on all injection wells located in the states mentioned above. Questionnaire I should be completed for radioactive waste disposal wells, geothermal energy recovery wells, brine return flow wells, municipal and industrial disposal wells (other than those classified as Class I as defined in the enclosed attachment), air scrubbers waste disposal wells (except if injection is for enhanced recovery of oil and gas in California), water softener regeneration brine waste disposal wells (except if injection is for enhanced recovery of oil and gas in California), wells used in experimental technologies and solution mining. Questionnaire II should be completed for all other well types of Class V wells.

Please complete either or both of these questionnaires to the best of your ability and return the information in the self-addressed envelope by June 25, 1985. If you do not have any or know of any Class V wells, please note on the questionnaires that you have no or know of no Class V wells. Your cooperation in this effort will be greatly appreciated. This information could result in the prevention or improvement of a water quality problem in the ground water in your area. If you have any questions, please contact Jayne Carlin of my staff at (415) 974-7116.

Sincerely,

Pete Uribe, Chief
Underground Injection Control Section
Water Management Division

Enclosures

QUESTIONNAIRE I

1. Facility Name: _____

Facility Address: _____

(Include County) _____

Telephone Number: ( ) _____

Name of Legal Contact: _____

Address of Legal Contact: _____

_____

Name of Owner: _____

Address of Owner: _____

_____

If subsidiary, name of parent co.: _____

Address of parent company: _____

_____

2. Ownership: ____ Private ____ Public ____ State ____ Federal ____ Indian Lands

3. Provide general information about the well(s):

Name or Identification of the well	Exact Location of Well*	Type of Well**	Status of Well***

****

* Exact Location of Well by Latitude and longitude to the nearest second; or by Township, Range, Section, Quarter-Sections; or by street address if located at a private address.

** For assistance in determining type of well, see Attachment A - pages 2 and 3.

***Codes for Well Status:
UC = under construction
AC = active
TA = temporarily plugged (no longer used but not plugged)
PA = permanently plugged & abandoned and approved by state

4. Explain the construction features of the well(s):

Name or Identification of Well	Date of Completion of Well	Casing and Cementing Records	Total Depth of Well	Average and Maximum Injection Pressure at Well Head	Date of Last Mechanical Integrity Test*

5. List the nature and volume of the fluids injected into the well:

Name or Identification of Well	Description of Injected Fluids**	Identification and Depth of Formation into which well is injected	Average and Maximum Injection Rate

6. Are any of the following fluids injected into the well(s)? If so, what is the volume and frequency of the injected fluid?

Washdown:

Stormwater:

Spills:

7. Identify and discuss each location, purpose, frequency of use and depth of all disposal wells on the site:

_____

_____

_____

8. Name and Title of Preparer of Questionnaire _____

* Liquid and gas pressure tests, annulus pressure tests etc. which test for leaks in casing, tubing or packer or significant movement into an underground source of drinking water through vertical channels adjacent to injection well bore.

** Include in your answer the process or business that produces the fluid and the chemical constituents of the fluid.

QUESTIONNAIRE II

Facility Name: _____

Facility Address: _____

(Include County) _____

Telephone Number: ( ) _____

Name of Legal Contact: _____

Address of Legal Contact: _____

_____

Name of Owner: _____

Address of Owner: _____

_____

Ownership: ____ Private ____ Public ____ State ____ Federal ____ Indian Lands

Number of Well(s)	Type of Well(s)*	Location of Well(s)	Status of Well(s)**

Name and Title of Preparer of Questionnaire _____

****

* For assistance in determining type of well, see Attachment A - page 2 and 3.

**Codes for Well Status:
UC = under construction TA = temporarily abandoned (no longer used but not plugged)
AC = active PA = permanently plugged & abandoned and approved by state

ATTACHMENT A

Region 9 UIC Program Information Sheet

General Information about the Underground Injection Control Program

The Safe Drinking Water Act (SDWA) of 1974, as amended, requires the U.S. Environmental Protection Agency (EPA) to establish a program which provides for the safety of our nation's drinking water. One part of this program, Underground Injection Control (UIC), has been established to prevent contamination of underground sources of drinking water due to improper design, construction and operation of injection wells. Although not recognized, the injection of waste materials is a very common practice. For example, the oil and gas industry operates tens of thousands of wells nationwide which inject brine or brackish wastewater in the production of oil and gas. Other types of injection wells include hazardous waste disposal operations wells, industrial waste disposal wells, municipal disposal operations wells, and nuclear storage and disposal wells.

Underground Sources of Drinking Water

By definition, an Underground Source of Drinking Water (USDW) is an aquifer or a portion of an aquifer:

which supplies any public water system; or

which contains significant quantity of ground water to supply a public water system; and

currently supplies drinking water for human consumption; or

contains fewer than 10,000 mg/l total dissolved solids (TDS) and is not an exempted aquifer.

An aquifer is a geological formation that is capable of yielding a significant amount of water to a well or to a springs. An exempted aquifer is an aquifer that cannot now and will not in the future serve as a source of drinking water, as determined by EPA.

Well Classification

A well is defined as a bored, drilled or driven shaft or dug hole whose depth is greater than the largest surface dimension. There are five classes of injection wells which are regulated by the UIC program. A specific well classification is made by determining the type of fluid to be injected and the geologic area into which the fluid is to be injected. Injection well classes are summarized as follows:

Class I — Class I wells are municipal and industrial disposal wells (including wells used by generators of hazardous waste and owners of hazardous waste management facillities) which inject fluids below the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.

Class II — Class II wells are associated with oil and gas production or liquid hydrocarbon storage. These wells inject fluids which are brought to the surface for the enhanced recovery of oil and natural gas and for the storage of hydrocarbons.

Class III — Class III wells inject fluids for the extraction of minerals and are used in conjunction with solution mining of minerals.

Class IV — Class IV wells are used by generators of hazardous and radioactive wastes. These wells inject into a formation which within one quarter of a mile of the well contains an underground source of drinking water. Class IV wells are prohibited.

Class V — Class V wells are wells which do not meet the criteria listed for classes I through IV. Generally, wells covered under this classification inject non-hazardous fluids into or above formations that contain underground sources of drinking water. Class V wells include the following, but are not limited to these types of wells:

1. air conditioning return flow wells used to return to the supply aquifer the water used for heating or cooling in a heat pump (Questionnaire II);

2. cesspools including multiple dwelling, community or regional cesspools, or other devices that receive wastes which have an open bottom and sometimes have perforated sides. The UIC requirements do not apply to single family residential cesspools nor to non-residential cesspools which receive solely sanitary wastes and have the capacity to serve fewer than 20 persons a day (Questionnaire II);

3. cooling water return flow wells used to inject water previously used for cooling (Questionnaire II);

4. dry wells used for injection of wastes into a subsurface formation (Questionnaire II);

5. drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation (Questionnaire II);

6. recharge wells used to replenish the water in an aquifer (Questionnaire II);

7. salt water intrusion barrier wells used to inject water into a fresh water aquifer to prevent the intrusion of of salt water in the fresh water (Questionnaire II);

8. sand backfill and other backfill wells used to inject a mixture of water and sand, mill tailings or other solids into mined out portions of subsurface mines regardless of whether or not it is a radioactive waste (Questionnaire II);

9. septic system wells used to inject the waste of effluent from a multiple dwelling, business establishment, community or regional business establishment septic tank. The UIC requirements do not apply to single family residential septic system wells, nor to non-residential septic system wells which are used solely for the disposal of sanitary wastes and have the capacity to serve fewer than 20 persons a day (Questionnaire II);

10. subsidence control wells (not used for the purpose of oil or natural gas production) used to inject fluids into a non-oil or gas producting zone to reduce or eliminate subsidence associated with the overdraft of fresh water (Questionnaire II);

11. radioactive waste disposal wells other than Class IV (Questionnaire I);

12. injection wells associated with the recovery of geothermal energy for heating, aquaculture, and production of electric power (Questionnaire I);

13. wells used for solution mining of conventional mines such as stopes leaching (Questionnaire I);

14. wells used to inject spent brine into the same formation from which it was withdrawn after extraction of halogens or their salts (Questionnaire I);

15. injection wells used in experimental technologies (Questionnaire I);

16. injection wells used for in situ recovery of lignite, coal, tar sands, and oil shale (Questionnaire II);

17. agricultural drainage wells (Questionnaire II);

18. air scrubber waste disposal wells (except if injection is for enhanced recovery of oil and gas in California); and

19. water softener regeneration brine waste disposal wells (except if injection is for enhanced recovery of oil and gas in California).

NONHYDROCARBON-PRODUCING ZONE INJECTION DATA

DIST.	FIELD	FORMATION & ZONE	TDS OF ZONE WATER PRIOR TO INJECTION	TDS OF INJECTED WATER	VOLUME INJECTED (Barrels)	INJECTI STARTEI
1	Belmont Offshore	Repetto	30,800			
1	Huntington Beach	Lakewood				
		Alpha 1	37,200			
		Alpha 2	12,500			
1	Sawtelle	Puente	25,500			
1	Seal Beach	Repetto	29,700			
		Recent Sands	30,200			
1	Wilmington	Gaspur	28,200			
1	"	River Gravels	30,800			
2	Ramona	Pico	5,000	15,300 ppm NaCl	1,793,000	6/51
2	South Tapo Canyon	Pico	1,900 ppm NaCl	600 ppm NaCl	1,903,000	1/48
2	Oat Mountain	Undiff.	4,800	23,800 ppm NaCl	91,000	4/56
2	Simi	Sespe	4,300	25,500 ppm NaCl	695,000	6/48
3	Guadalupe	Knoxville	30,500			
3	Lompoc	Lospe	119,000			
3	Lompoc	Knoxville	30,500			
3	Russell Ranch	Branch Canyon	13,000			
3	San Ardo	Santa Margarita	3,700	5,600	81,800,000	11/66
3	"	Monterey "D" Sand	4,600	5,600	13,795,000	7/59
3	"	Monterey "E" Sand	6,400	5,600	6,057,000	3/68
3	Santa Maria Valley	Lospe-Franciscan	119,000			
3	Monroe Swell	Santa Margarita	3,700 ppm NaCl	9,600	?	1981
3	Point Conception	Camino Cielo	26,200			
3	Guadalupe	Franciscan	30,500			
4	Bellevue	Etchegoin	26,500 (Analysis from adjacent field)			
4	Bellevue, West	Tulare	12,000*			
4	"	Etchegoin	26,500 (Analysis from adjacent field)			
4	Blackwell's Corner	Tumey	2,100 -2,600*	29,000 ppm NaCl	400,000	5/75
4	Buena Vista	Tulare	9,200	5,300-36,500	50,798,000	11/72
4	Cal Canal	Tulare-San Joaquin	Excess of 10,000*	22,000	537,000	5/79
4	Canfield Ranch	Etchegoin	≈12,800-26,500 (Analysis from adjacent fields)			

*"E" log calculation

17 MAY 19

Attachment 5
Page 1 of 3

DIST.	FIELD	FORMATION & ZONE	TDS OF ZONE WATER PRIOR TO INJECTION	TDS OF INJECTED WATER	VOLUME INJECTED (Barrels)	INJECT STARTE
4	North Coles Levee	Tulare	12,900			
4	"	San Joaquin	40,000-45,600			
4	"	Etchegoin	30,100			
4	South Coles Levee	Tulare	12,000-13,300			
4	"	San Joaquin	12,000-16,900			
4	Greeley	Etchegoin	26,500			
4	Kern Bluff	Kern River	≈ 400- 900 (From Kern River Field)	600	551,500	7/80
4	"	Vedder	≈ 7,800-16,100	" 11,700-213,000	4,099,000	3/80
4	Kern Front	Santa Margarita	2,300	1,100		9/75
4	Kern River	Chanac	238- 925	374- 865	1,071,000	6/77
4	"	Santa Margarita	600- 2,600	475- 16,200	154,994,000	9/73
4	"	Vedder	7,800-16,200		33,204,000	
4	Lakeside	San Joaquin	21,500			
4	Los Lobos	Tulare	33,300*			
4	Midway-Sunset	Alluvium	No water	3,600- 25,700		7/59
4	Mount Poso	Walker	2,800*	830- 1,440	22,632,000	9/75
4	Mountain View	Kern River	4,660*	1,200- 3,800	3,681,000	12/65
4	Pleito	Chanac & Kern River	7,900-11,800	12,800-30,800	889,000	8/74
4	Poso Creek	Vedder	12,500			
4	Rio Viejo	San Joaquin	21,000*			
4	Rosedale	Etchegoin	26,500 (Analysis from adjacent field)			
4	Round Mountain	Olcese	2,700	1,337- 1,965	29,797,000	7/74
4	"	Walker	1,930	1,600-2,100	203,319,000	8/72
4	Seventh Standard	Etchegoin	17,100-30,000 (NaCl only)			
4	Strand	Etchegoin	8,600 (NaCl only)		1,195,000	7/62
4	"	San Joaquin		16,500-25,600 (NaCl only)		
4	Ten Section	San Joaquin	33,400			
			12,900			
5	Burrel	Santa Margarita	35,000 (Analysis from Helm field)			
5	"	Tulare-Kern River	20,500 (Analysis from S.E. Burrel field)			
5	Southeast Burrel	Tulare-Kern River	20,500			
5	Coalinga	Santa Margarita	8,244	3,100- 3,500	(145,000,000	2/63
5	"	Etchegoin-Jacalitos	2,650- 2,900	2,650-2,700	(	2/63
5	Gill Ranch Gas	Zilch	14,500			

"E" log calculation

Attachment C
Page 2 of 3

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DIST.	FIELD	FORMATION & ZONE	TDS OF ZONE WATER PRIOR TO INJECTION	TDS OF INJECTED WATER	VOLUME INJECTED (Barrels)	INJECT STARTE
5	Guijarral Hills	Etchegoin-Jacalitos	9,400	20,500	931,000	4/67
5	Helm	Santa Margarita	35,900		(143,000,000	
5	"	Tulare-Kern River	5,100-23,900	11,600-43,400	(	12/52
5	Jacalitos	Etchegoin-Jacalitos	33,749	5,500 (Cl only)	180,000	10/78
5	Kettleman North Dome	San Joaquin-Etchegoin	10,000	23,800-31,200	48,608,000	8/64
5	Raisin City	Pliocene	12,800-34,000			
5	"	Santa Margarita	35,000	(Analysis from Helm field)		
5	Riverdale	Pliocene	4,788-16,200		(72,626,000	7/57
5	"	Santa Margarita	35,900	(Analysis from Helm field)	(	
5	San Joaquin	Pliocene	17,100			
5	San Joaquin,Northwest	Basal McClure	80,000	18,500	Test well-no injection	
5	Turk Anticline	San Joaquin	3,700- 4,440	9,500- 9,800	466,000	11/76
6	Bunker Gas	Undiff.	1,200	11,000	388,000	1/75
6	Grimes Gas	Kione	16,800			
6	Grimes, West, Gas	Kione	34,000*			
6	La Honda (South Area)	Vaqueros	41,000			
6	Lathrop Gas	Starkey	15,400*			
6	River Break Gas	Capay	6,900*	7,000	93,000	7/75
6	Roberts Island Gas	Undiff.	18,000*			
6	Sutter Buttes Gas	Kione	2,500	4,600-23,000	644,000	7/77
6	Union Island Gas	Mokelumne River	5,000-6,000*	7,800	471,000	7/77
6	Wild Goose	Undiff.	2,800-5,000*	21,400	823,000	11/69

* "E" log calculation

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Attachment 6
Page 3 of 3

Attachment 2

Exempted 1425 Demonstration Aquifers

All oil and gas producing aquifers identified in Volumes I, II, and III of the California Oil and Gas Fields submitted in the 1425 Demonstration dated April 20, 1981 are exempted.

In addition, the following aquifers are also exempted.

DISTRICT	FIELD	FORMATION/ZONE
2	Ramona	Pico
2	Oat Mountain	Undiff.
2	South Tapo Canyon	Pico
2	Simi	Sespe
2	San Ardo	Santa Margarita
3	San Ardo	Monterey "D" Sand
3	San Ardo	Monterey "E" Sand
3	Monroe Swell	Santa Margarita
4	Blackwell's Corner	Tumey
4	Kern Bluff	Kern River
4	Kern Front	Santa Margarita
4	Kern River	Chanac
4	Kern River	Santa Margarita
4	Mount Poso	Walker
4	Round Mountain	Olcese
4	Round Mountain	Walker
4	Buena Vista	Tulare
4	Kern Bluff	Vedder
4	Kern River	Vedder*
4	Mountain View	Kern River
4	Pleito	Chanac
4	Pleito	Kern River
4	Poso Creek	Santa Margarita
5	Coalinga	Santa Margarita
5	Coalinga	Etchegoin-Jacalitos
5	Guijarral Hills	Etchegoin-Jacalitos*
5	Helm	Tulare-Kern River
5	Riverdale	Pliocene
5	Turk Anticline	San Joaquin
6	Sutter Buttes Gas	Kione*
6	Bunker Gas	Undiff.
6	Wild Goose	Undiff.

*Oil and/or gas producing