

## **FACT SHEET**

December, 2016

EPA is proposing to approve a modification to the existing exemption from the land disposal restrictions for the following injection well facility:

**Applicant:** Occidental Chemical Corporation  
6200 South Ridge Road  
Wichita, Kansas 67215

**State Contact:** Kansas Department of  
Health & Environment (KDHE)  
Bureau of Water, Geology & Well Technology Section  
1000 SW Jackson St., Suite 420  
Topeka, Kansas 66612-1367  
Underground Injection Control (UIC)  
Permit Number: KS-01-173-011

**Issuing Office:** U.S. Environmental Protection Agency  
Region 7  
11201 Renner Blvd.  
Lenexa, Kansas 66219

**Occidental Chemical Contact**  
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Environmental Scientist  
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U.S. Environmental Protection Agency, Region 7  
11201 Renner Blvd.  
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## **I. Purpose of the Fact Sheet**

The purpose of this fact sheet is to briefly describe the principal facts and the considerations that went into preparing the proposed petition modification. To meet these objectives, this fact sheet contains background information on the petition process, a description of the facility, a brief description of the petition conditions and the reasons for these petition conditions.

## **II. Petition Process**

### *Application and Review Period*

The U.S. Environmental Protection Agency, Region 7 (EPA) Director has authority to issue petitions for underground injection activities under 40 CFR § 148.20. Occidental Chemical Corporation (Occidental) is applying for a Class I hazardous UIC petition modification to its existing petition. The petition modification would include a new well to replace Well Number 4, which was covered by the 2007 petition, but has since been permanently plugged.

The EPA land disposal restrictions promulgated under the Safe Drinking Water Act and Resource Conservation and Recovery Act authority as regulations in 40 CFR Part 148 prohibit the injection of hazardous waste unless a petitioner demonstrates to the EPA that there will be no migration of hazardous constituents from the injection zone and into an underground source of drinking water within 10,000 years or as long as the waste remains hazardous. Based on our review of the proposed well construction, operation standards, monitoring requirements and the existing geologic features, EPA believes the activities allowed under the proposed petition modification will prevent the migration of hazardous constituents from the injection zone for as long as the waste remains hazardous, which is 10,000 years as defined by 40 CFR 148.20.

### *Public Participation*

The public has 45 days to review and comment on the proposed Class I UIC petition modification (40 CFR § 124.10). The public comment period begins on December 12, 2016, and ends on January 25, 2017. During this period, all written comments on the proposed petition modification can be mailed, faxed or emailed to David Garrett of EPA Region 7, using the contact information listed on the first page of this fact sheet. David Garrett is also available by phone for any questions regarding the proposed petition modification.

All persons, including the applicant, who object to any condition of the proposed petition modification or EPA's decision to propose modifying the existing petition must raise all reasonably ascertainable issues and submit all reasonable arguments supporting their position by the close of the comment period on January 25, 2017 (40 CFR § 124.13). EPA has scheduled a

public availability session and public hearing at the following time and location (40 CFR § 124.12):

**January 11, 2017**  
**Availability Session: 5:00 pm – 6:30 pm**  
**Public Hearing: 7:00 pm – 8:30 pm**  
**The Learning Center, USD 261**  
**150 Stewart Ave.**  
**Haysville, Kansas 67060**

The public availability session will be structured as an open house and participants can arrive any time between 5:00 pm and 6:30 pm. EPA representatives will be available to answer questions and provide information about the proposed approval of the No Migration Petition Modification. The formal public hearing to follow will provide participants the opportunity to provide oral and written comments on EPA's proposed approval of the No Migration Petition Modification. Copies of the Fact Sheet and Information Sheet will also be available during the public meeting.

The Administrative Record (AR) contains all the materials and data submitted by Occidental and all materials upon which EPA has relied to make its proposed decision. It can be reviewed at the following locations and times during the public comment period:

Haysville Community Library  
210 Hays Ave, Haysville, Kansas 67060  
Phone: (316) 524-5242  
Hours: Monday through Thursday, 9:00 am–8:00 pm  
Friday & Saturday, 10:00 am–5:00 pm  
Sunday – Closed

U.S. Environmental Protection Agency, Region 7  
11201 Renner Blvd  
Lenexa, Kansas 66219  
Hours: Monday through Friday, 8:00 am–5:00 pm

All persons, including the applicant, who object to any condition of the proposed petition modification or EPA's decision to propose modification of the existing petition must raise all reasonably ascertainable issues and submit all reasonable arguments supporting their position by the close of the comment period (40 CFR § 124.13). In order to be considered, all comments must be received by EPA no later than January 25, 2017.

### *Final Decision Making Process*

After the close of the public comment period on January 25, 2017, EPA will review and consider all comments relevant to the proposed UIC petition modification and application. EPA will send a response to comments to the applicant and each person who has submitted written comments or requested notice of the final petition modification decision. The response to comments will contain a response to all significant comments received on the proposed petition modification, EPA's final decision, any petition conditions that are changed and the reasons for the changes and procedures for appealing the decision. EPA's final decision will also be published in the Federal Register.

### **III. Description of the Facility**

Occidental Chemical Corporation (Occidental) currently operates five hazardous waste disposal wells at the company's Wichita facility under an existing EPA exemption to the land disposal restrictions (also known as a No Migration Petition or Petition). Occidental Chemical is a chloroalkali and chlorosolvent and related operations manufacturing facility. The deep wells have been used to inject and dispose of hazardous wastes safely for over 50 years. The original exemption was granted to the previous owner, Vulcan Chemicals, on August 7, 1990, and brought the existing hazardous waste injection wells, in operation at the facility since 1957, into compliance with EPA's then-newly developed land disposal restrictions, which went into effect in 1988. In August 2001, Vulcan Chemicals submitted a single-well No Migration Petition request for a new injection well (Well No. 10) to EPA. The Petition sought an additional exemption from the RCRA land disposal restrictions for that well. During the review of that Petition request by EPA, ownership of Vulcan Chemicals changed hands when the facility was bought by and became a subsidiary of Occidental under the name Basic Chemicals, LLC. On January 1, 2007, Basic Chemicals, LLC, then changed its name to that of the parent company, Occidental.

As the transition of ownership occurred, the Petition went through several revisions, including the incorporation of all of the hazardous waste injection wells at the facility (which at the time brought the total number of wells addressed to six) into one single Petition. The change from two separate Petitions to one was brought about by the need to renew the Petition granted by EPA back in 1990. This Petition was approved by EPA with an effective date of May 2, 2007.

Occidental has now requested a modification of the existing Petition by EPA to include a new well to replace Well No. 4, which was covered in the 2007 No Migration Petition, but was plugged and abandoned in 2008. The construction of the new well, identified as Well No. 11, was completed in March 2012 and was drilled and constructed in accordance with a KDHE issued permit for non-hazardous injection. This modification request is only to allow the use of Well No. 11 as a hazardous waste injection well and would not increase the volume of fluids allowed either under the KDHE permit or the EPA Petition.

It is EPA's conclusion that the Petition modification application and supplemental materials which were provided by Occidental demonstrate that the well operations, geologic siting and waste stream characteristics would be in compliance with the requirements of 40 CFR Part 148. The demonstration included strategies which incorporated all the above mentioned information and utilized mathematical equations and modelling to predict pressure buildup and waste movement within the authorized injection interval.

Therefore, after a detailed and thorough review of Occidental's petition for exemption to the land disposal restrictions, the EPA proposes that Occidental has demonstrated, that there will be no migration of hazardous constituents from the injection zone for 10,000 years.

#### **IV. Summary of State-Specific Well Permit Conditions**

The EPA proposes to approve the Occidental Chemical Corporation's (Occidental) Well No. 11 No Migration Petition Modification request to inject restricted hazardous waste into Well No. 11 subject to the following state-specific conditions and limitations:

1. Define the following regulatory depth intervals (below ground level) in Well No. 11:  
    Confining Zone: 2000' - 2232'  
    Injection Zone: 2232' - 4951'  
    Injection Interval: 3835' - 4951' (Simpson and Arbuckle Groups)
2. Limit the waste stream to a 13-week running volume weighted specific gravity average range of 1.01 to 1.08 with an average value of 1.04 at 77° F/25° C, inclusive;
3. Limit the waste stream volume into Well No. 11 to a maximum daily injection rate of 864,000 gallons (600 gallons per minute) and a maximum combined daily injection rate of 2,520,000 gallons (1,750 gallons per minute) for all Occidental disposal wells injecting into the Arbuckle and Simpson Groups;
4. Approve injection of the following waste codes found at 40 CFR Part 261:  
D002 D004 D005 D006 D007 D013 D016 D018 D019 D021 D022 D028  
D029 D032 D033 D034 D037 D039 D040 D041 D042 D043 F001 F002  
F003 F020 F021 F023 F024 F025 F026 F027 F032 F039 K001 K016  
K043 K099 U029 U044 U045 U048 U075 U077 U079 U080 U081 U082  
U084 U121 U154 U188 U210 U211 U225 U226 U228  
(For a full listing of these codes and the wastes they represent, see Appendix A, attached.)
5. Limit the maximum allowable wellhead injection pressure to 20 pounds per square inch gauge (psig).

## **V. Factors Considered in the Formulation of Proposed Petition Decision**

### Hydrogeology

Petitioners must submit hydro-geologic information in order to study the effects of the injection well activity pursuant to 40 CFR 148.20(a). Occidental provided hydro-geologic information in the petition which demonstrates that Underground Sources of Drinking Water (USDWs) are properly protected. The base of the lowermost USDW is at approximately 496 feet below ground level while the injection zone begins at 2,232 feet below ground level. Above the injection zone for all of Occidental's injection wells, including Well No. 11, there is a laterally extensive confining zone between 2,000-2,232 feet below ground level comprised of more than 200 feet of layered carbonates and inter-bedded shale.

### Artificial Penetrations

Occidental submitted updated information on all artificial penetrations (wells) which penetrate the injection or confining zones within the area of review (area within a 2.0 mile radius of the injection well pursuant to 40 CFR 146.63) and the 10,000-year waste plume boundary. In fact, Occidental submitted information on all artificial penetrations within a 2.5 mile radius of the injection wells as required by KDHE's permit requirement for hazardous Class I wells. All of these wells were evaluated and were either plugged or constructed so that no waste would migrate from the injection zone due to pressure, buoyancy or molecular diffusion in an artificial penetration (40 CFR 148.20(a)(1) & (2)(i)-(iii)).

### Mechanical Integrity Testing (MIT) Information

To assure that the wastes will reach the injection interval, Occidental submitted the annulus pressure test results to demonstrate mechanical integrity of the well and oxygen activation (OA) logging results to demonstrate the integrity of the bottom-hole cement. Although EPA Region 7 recognizes the no migration requirements at 40 CFR 148.20(a)(2)(iv) refer to the radioactive tracer survey (RTS), the non-endangerment requirements at 40 CFR 146.68(d)(5) allow the EPA Regional Administrator discretion for alternative testing methods, the OA log being one such method.

After careful consideration, EPA Region 7 concluded that the OA log test satisfies Part 148 requirements based on the following rationale:

- (1) EPA's approval of the OA method in 1991 (Vol. 56, No. 22, pp 4063-4065 of the Federal Register) was intended to augment the current inventory of approved alternative mechanical integrity tests for determining significant fluid movement into an underground source of drinking water through vertical channels outside the casing, which is an indicator of bottom-hole cement integrity. The OA method affords an additional, reliable, state-of-the-art technique for confirming the absence or presence of significant fluid movement through vertical channels adjacent to the well bore, etc.;

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- (2) OA is essentially a radioactive tracer log where the gamma ray energy is manufactured down-hole (not introduced as in the case of RTS) with high energy neutrons and measured using gamma ray detectors at the appropriate depth. Both OA and RTS can identify, if present, water flow or channels behind the casing by detecting radioactive tracer materials released into the flowing stream;
- (3) The Schlumberger Water Flow Log (WFL) approach, used by Occidental's contractor (Petrotek) for MIT of the injection wells at the Occidental plant, meets EPA's definition of an OA log;
- (4) KDHE has approved the use of OA logging as part of the procedures for conducting the required annual MITs of Occidental's Class I injection wells, and KDHE considers OA to be a dependable test for checking the bottom-hole cement of the long-string casing; and
- (5) Taking into account the public's concerns about radioactive materials and the inherent dangers associated with the handling of radioactive tracer materials, EPA believes the OA log method is the best approach from a health and safety standpoint.

The OA log and annulus pressure test results demonstrate the mechanical integrity of a well's long-string casing, injection tubing, annular seal and bottom-hole cement, all of which are necessary to protect USDWs. These tests confirm that all injected fluids are entering the approved injection interval and that no fluids are channeling up the well-bore out of the injection zone near the well-bore. This petition modification request demonstrates that Occidental's disposal Well No. 11 was tested and satisfies the above criteria. In addition, the integrity of Well No. 11 was verified on the below dates:

<u>Well Number</u>	<u>Pressure Test</u>	<u>Oxygen Activation Log</u>
Well No. 11	09/30/2016	09/27/2016
	09/09/2015	09/10/2015
	07/25/2012	07/24/2012

Regional and Local Geology

Class I hazardous waste injection wells must be located in areas that are geologically suitable. The injection zone must have sufficient permeability, porosity, thickness and areal extent to prevent migration of fluids into USDWs. The confining zone must be laterally continuous and free of transmissive faults or fractures to prevent the movement of fluids into a USDW and must contain at least one formation capable of preventing vertical propagation of fractures. The Occidental facility is sited in an area meeting these geologic criteria.

Above the permitted Injection Zone, there exists a laterally extensive Confining Zone comprised of more than 200 feet of layered carbonates and inter-bedded shale throughout the area of review area with a top at approximately 2,000 feet RKB (rotary rig kelly bushing elevation). These geologic conditions and injection/confining zone characteristics are common to all of Occidental's injection wells, including Well No. 11.

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An evaluation of the structural and stratigraphic geology of the local and regional area determined that the Occidental plant is located at a geologically suitable site. The injection zone is of sufficient permeability, porosity, thickness and areal extent to ensure that no migration of injected waste will occur. The containment interval is laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids out of the injection zone.

The Arbuckle injection interval is thick and laterally continuous over a very large areal extent. The Arbuckle is naturally under-pressured and accepts injectate on a vacuum. The overlying intervals are higher pressured which would result in the downward flow of fluids into the Arbuckle if a conduit for such communication were to exist.

The geologic conditions for the Occidental site were described as part of the petition modification request and in the previous petition requests with extensive discussions of the depositional environments, well logs, cross-sections, well tests and geologic maps. The geologic cross-sections demonstrated the lateral relationships of the injection and confining zones. This information justified pressure buildup and 10,000-year modeling assumptions. Well pressure falloff tests support the injection zone permeability values used in the modeling.

Approximate depths to the tops of the geologic zones below ground level are as follows:

<u>Interval</u>	<u>Geologic Zone</u>	<u>Well No. 11</u>
Confining Zone	Shawnee/Heebner Shale	2000 feet
Injection Zone	Top of Heebner Shale	2232 feet
Injection Interval	Top of Simpson Sandstone	3835 feet

Seismic Information

Although not directly related to well operations, seismic information has been obtained both from the US Geological Survey (USGS) and the Kansas Geological Survey (KGS) indicating that, since 2007, several small earthquakes with a magnitude of less than 3.8 have occurred within 38 miles from the site. Subsequent review of the KGS earthquake database did not identify any earthquakes within an 18-mile radius of the Occidental site and well outside of the EPA area of review of 2.0 miles and the EPA monitoring radius of 10 miles from the site wells.

It is noteworthy that the largest seismic events that have occurred in southern Kansas and in neighboring Oklahoma have been felt in the Wichita area over the last few years. However, the epicenter of these seismic events have been significantly outside a 10-mile radius from well No. 11. The Occidental Wells are not at risk from such events due to the fact that none of the site wells, including Well No. 11 were drilled through faults or significant fault related structures, so no shear forces along such planes would impact well casing. In addition, engineering controls,



personnel inspections and automated safety systems have been installed and are operated by Occidental Chemicals at each of the disposal wells to ensure that injection would stop immediately in the unlikely event of any well failure. As a final safety measure, the wells are required by KDHE to be operated with no injection pump, such that injection pressures are minimized. This allows the site to take advantage of the natural conditions of the Arbuckle injection interval such that natural pressures in formations that overlie the injection zone including the shallow USDW have sufficient pressure that there are downward gradients that would tend to cause flow downward into the Arbuckle in the highly unlikely event of a significant seismic event near the plant that caused concerns regarding confinement.

In addition to the ongoing testing, operational practices and risk evaluations that Occidental undertakes with regard to the injection wells, the company has committed to joining the Kansas Seismic Monitoring Consortium that is being organized by the KGS. The goal of the Seismic Monitoring Consortium is to acquire and deploy additional seismic monitoring stations to obtain background seismic data and to analyze the data to provide useful information about Kansas seismicity and the potential for Class I wells to contribute to induced seismicity. As more seismic monitoring stations are installed, microseismic events not previously measurable or felt can be detected in various locations.

Recent investigations between increased seismicity and oilfield injection operations in Oklahoma and south-central Kansas indicate that increased seismicity appears to be linked with an increase in oilfield activity in Oklahoma and near the Kansas state line. Based on available scientific literature, lack of seismicity near the site and operational history, there appears to be no suggestion of, or probability for, any relationship between historic or current Kansas seismic events and Occidental injection well operations.

#### Modeling Strategy

The modeling strategy for Occidental's previous "no migration" demonstration consisted of a combination of numerical and analytical models. All the models used were identified as being verified and validated according to the information submitted in the petition request. This information consisted of actual model documentation or references of methods or techniques that are widely accepted by the technical community. The petition document described the predictive models used and demonstrated that the above criteria are met in accordance with 40 CFR 148.21(a)(3).

According to 40 CFR 148.21(a)(5), reasonably conservative values shall be used whenever values taken from the literature or estimated on the basis of known information are used instead of site-specific measurements. Many variables are required to be quantified in order to use the models used in petition requests. All parameters were conservatively assigned to produce worst-case conditions for pressure buildup and waste movement.

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According to 40 CFR 148.21(a) (6), a petitioner must perform a sensitivity analysis in order to determine the effect of uncertainties associated with model parameters. Occidental provided this sensitivity analysis in its petition request for well No. 10. Through conservative model parameter assignments within this analysis, worst-case scenarios for pressure buildup and waste movement were investigated and reported. Occidental incorporated two timeframes, the operational and post-operational periods, to complete the modeling demonstration for the petition request. The operational period included all historical injection at the facility and the maximum future injection volumes starting from the end of the historical injection through December 31, 2020. The 10,000-year post-injection period was modeled to predict the maximum vertical molecular diffusion and the horizontal drift of the waste plume.

To determine appropriate values to be used in the no migration demonstration, Occidental reviewed site specific data acquired during the drilling of Well No. 11, annual well tests and mechanical integrity tests. Occidental also reviewed offset well information and applicable literature. Appropriate estimation techniques and testing protocols were used in accordance with 40 CFR 148.21(a)(2). A range was assigned to some parameters to maximize their impact on the demonstration. For example, higher permeabilities were assigned to maximize the lateral waste plume movement while lower permeabilities were assigned to maximize the predicted pressure buildup from injection operations in the injection interval.

An analytical model was used to predict the maximum pressure buildup in the reservoir to evaluate offset artificial penetrations in the petition for Well No. 10. For the model, the maximum allowable rate for all facility wells combined (1,750 gpm) was injected at the Well No. 10 location to maximize the pressure buildup in the reservoir. Data obtained from Well No. 11 does not alter any modeling assumptions or parameters presented in the previously approved no migration petition demonstrations. The Well No. 10 model predictions are also applicable to Well No. 11. In summary, because actual injection volumes from 2005 to 2014 were less than volumes used in the Well No. 10 modeling, plume dimensions are smaller than projected, even with the movement of the injection centroid slightly to the N/NW caused by substituting Well No. 11 for plugged and abandoned Well No. 4. Since Well No. 11 is in proximity to previously modeled and approved Well No. 10, EPA Region 7 believes that additional modeling is not warranted for Well No. 11.

A conservative 10,000-year plume demonstration was constructed using reasonably conservative reservoir characteristics for the injection interval to project the maximum movement of both the low and high density waste plumes. To maximize plume movement, these demonstrations included thinner net thickness, conservative dip rates, all historical and maximum future injection volumes and higher mobility based on historical pressure transient test results. The low density plume used the low-end of the requested density range and did not include a background gradient to maximize the up-dip plume movement.

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In the state of Kansas, the KDHE permitting authority limits Class I hazardous waste disposal wells to a positive surface pressure of 20 psig without the use of injection pumps. The 20 psig maximum surface pressure allowed to the gravity feed disposal system was applied down-hole and added to the hydrostatic weight of a column of maximum specific gravity (1.22) waste fluid observed over the past decade in any facility well to maximize the pressure buildup in the reservoir. This pressure ignores friction loss in the wellbore and assumes no pressure loss due to near wellbore skin. This maximum pressure buildup was then presumed to be present for the historical and future operational life of the facility to calculate the maximum vertical extent of waste movement into the overlying strata resulting from advection.

A vertical diffusion demonstration was also included in this petition request that calculated the maximum vertical diffusive movement into intact strata and a brine-filled wellbore. The demonstrations (lateral plume and diffusion) demonstrated that the injected waste stream will not migrate vertically upward out of the injection zone or laterally within the injection zone to a point of discharge or interface with a USDW.

### Quality Assurance

According to 40 CFR 148.21(a)(4), the Occidental petition must demonstrate that proper quality assurance and quality control plans were followed in preparing the petition demonstrations. Specifically, Occidental followed appropriate protocol in identifying and locating records for artificial penetrations within the area of review. Information regarding the geology, waste characterization (40 CFR 148.21(a)(1)), hydrogeology, reservoir modeling and well construction was adequately verified or bounded by reasonably conservative scenarios within the no migration petition demonstration.

### Geochemistry and Injected Waste Compatibility

According to 40 CFR 148.21(b)(5), a petitioner must describe the geochemical conditions of the well site. The physical and chemical characteristics of the injection zone and the formation fluids in the injection zone were described in the petition. This description included a discussion of the compatibility of the injected waste with the injection zone. Occidental also provided evaluations which demonstrated that the waste stream would not adversely alter the confining capabilities of the injection and confining zones.

### Characteristics of Injected Fluids

According to 40 CFR 148.22(a), the characteristics of the injection waste stream must be adequately described. These characteristics are described in the petition and the descriptions are adequate and complete. The demonstration included injectate waste analysis that conformed to the standards outlined in 40 CFR 148.21(a)(1).

1. Operational Life

For the purpose of the required demonstration of no migration of hazardous waste out of the injection zone over a 10,000-year period, modeling and projections were based on an operational lifetime projection date of December 31, 2020.

Maximum Incremental Pressure Buildup: Maximum Incremental Pressure Buildup in Well No. 11 (the same as Well No. 10) is projected to be less than 121 psi based on SWIFT modeling and less than 492 psi anywhere in the injection interval based on the worst-case value used to maximize vertical penetration calculations.

The calculated distance to the cone-of-influence varies from 0 feet to less than 495 feet from Well No. 11 (the same as Well No. 10) with 225 psi in Well No. 11 for the cone of influence calculation.

2. 10,000 Year Post-Injection Period:

Background Gradient: 0 ft/yr to maximize projections since it acts opposite the up-dip density driven movement

Offset Oil and Gas Activity: Negligible as shown by sensitivity modeling

Waste Density Effects: Yes

Movement Due to Hydrocarbon Production: No

Waste Concentration Reduction Factor:  $1 \times 10^{-8}$

Maximum Lateral Waste Movement:

- Light Plume: Approximately 10.5 miles up-dip to the north

- Heavy Plume: Approximately 3.1 miles down-dip to the south

Maximum Upward Vertical Waste Movement:

- 34 feet into intact strata from advection

- 228 feet through the arrestment interval from diffusion

- 808 feet in a brine filled borehole from diffusion

## **VI. Proposed Petition Modification Approval Conditions**

This proposed petition modification to allow the injection of restricted hazardous wastes is subject to the following conditions, which are necessary to assure that the standard in 40 CFR 148.20(a) is met. Noncompliance with any of these conditions is grounds for termination of the approval for the injection of restricted hazardous wastes in accordance with 40 CFR 148.24(a)(1). This proposed petition modification is applicable to disposal Well No. 11, located at the Occidental Plant in Wichita, Kansas.

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1. Injection of restricted waste shall be limited by the following regulatory injection zone:  
2232' - 4951' below ground level  
The injection interval shall be defined by the following interval:  
3835' - 4951' (Arbuckle Group and Simpson) below ground level
2. The volume injected into Well No. 11 during any given month should not exceed that calculated by multiplying the following: (the maximum 600 gpm injection rate) (1,440 minutes/day) (number of days in that month). Additionally, the combined injection into all the Occidental facility wells, including Well No. 11, should not exceed the product of: (1,750 gpm injection rate) (1,440 minutes/day) (number of days in that month).
3. The characteristics of the injected waste stream shall at all times conform to those described in the petition request for Well No. 11. The specific gravity of the injected waste shall be based on a 13-week running volume weighted specific gravity average range of 1.01 to 1.08 at 77° F/77° F, inclusive. The weekly average specific gravity value shall be obtained by testing the cumulative sample containing at least one daily representative grab sample.
4. The proposed approval for injection is limited to the following hazardous wastes:  
D002 D004 D005 D006 D007 D013 D016 D018 D019 D021 D022 D028  
D029 D032 D033 D034 D037 D039 D040 D041 D042 D043  
F001 F002 F003 F020 F021 F023 F024 F025 F026 F027 F032 F039  
K001 K016 K043 K099  
U029 U044 U045 U048 U075 U077 U079 U080 U081 U082 U084 U121  
U154 U188 U210 U211 U225 U226 U228  
(For a full listing of these codes and the wastes they represent, see Appendix A, attached.)
5. The facility must petition for approval to inject any additional hazardous wastes which are not included above. The facility must also petition for approval to increase the concentration of any waste which would necessitate the recalculation of the limiting concentration reduction factor and the extent of the waste plume. Petition reissuances and modifications should be made pursuant to 40 CFR 148.20(e) or (f).
6. Occidental shall annually submit to EPA the results of a bottom-hole pressure survey for Well No. 11. The survey shall be performed after shutting in the well for a period of time sufficient to allow the pressure in the injection interval to reach equilibrium, in accordance with 40 CFR 146.68(e)(1). The annual report should include a comparison of reservoir parameters determined from the falloff test with parameters used in the approved no migration petition.

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7. Upon the expiration, cancellation, reissuance or modification of the KDHE's Underground Injection Control permit for Well No. 11, this exemption is subject to review. A new demonstration may be required if information shows that the basis for granting the exemption is no longer valid under 40 CFR 148.23 and 148.24.

In addition to the above conditions, this proposed petition modification is contingent on the validity of the information submitted in the Occidental request for an exemption to the land disposal restrictions. Any final decision is subject to termination when any of the conditions occur which are listed in 40 CFR 148.24, including noncompliance, misrepresentation of relevant facts or a determination that new information shows that the basis for approval is no longer valid.

## APPENDIX A

### Occidental Chemical Waste Codes

K001	Bottom sediment from treatment of wastewater from wood preservative (pentachlorophenol)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride;
K043	2,6-Dichlorophenol waste from production of 2,4-D
K099	Untreated wastewater from production of 2,4-D
F001	Degreasing activities (methanol)
F002	Spent halogenated solvents (trichlorofluoromethane)
F003	Spent non-halogenated solvents (methanol)
F020	Wastes from tri or tetrachlorophenol, or pesticide intermediates
F021	Waste from pentachlorophenol production
F023	Waste from tri or tetrachlorophenols
F024	Waste from chlorinated aliphatic hydrocarbons
F025	Desiccant & Filter Wastes; from the production of certain chlorinated aliphatic hydrocarbons;
F026	Waste from tetra, penta, and/or hexachlorobenzene
F027	Discarded/unused formulations of tri, tetra, and pentachlorophenols
F032	Waste from wood preserving (phenol)
F039	Multisource leachate;
U029	Bromomethane
U044	Chloroform;
U045	Methyl Chloride;
U048	o-Chlorophenol
U075	Dichlorodifluoromethane
U077	EDC; Ethylene dichloride
U079	1,2-Dichloroethylene
U080	Methylene Chloride;
U081	2,4-Dichlorophenol
U082	2,6-Dichlorophenol
U084	1,3-Dichloropropene
U121	Trichlorofluoromethane
U154	Methanol
U188	Phenol
U210	Perchloroethylene;
U211	Carbon Tetrachloride;
U225	Bromoform
U226	1,1,1-Trichloroethane (also known as methyl chloroform);
U228	Trichloroethylene;
D002	Corrosives, aqueous wastes with a pH of less than or equal to 2 or greater than or equal to 12.5;
D004	Arsenic;

D005	Barium
D006	Cadmium
D007	Chromium
D013	Lindane;
D016	2,4-D; (2,4-Dichlorophenoxyacetic acid)
D018	Benzene;
D019	Carbon Tetrachloride;
D021	Chlorobenzene;
D022	Chloroform;
D028	1,2-Dichloroethane;
D029	1,1-Dichloroethylene;
D032	Hexachlorobenzene;
D033	Hexachloro-1, 3-butadiene;
D034	Hexachloroethane;
D037	Pentachlorophenol;
D039	Tetrachloroethylene;
D040	Trichloroethylene;
D041	2,4,5-Trichlorophenol;
D042	2,4,6-Trichlorophenol; and
D043	Vinyl Chloride.