EPA Seeks Comments on Injection Well Permit

Applicant: Slawson Exploration Co., Inc.
Site Location: Mountrail County, North Dakota

Fact Sheet

Permit Number(s): ND22184-08837
Well Name: Big Bend 1-5 SWD

How to Comment:
The public notice and comments due date is posted at EPA Region 8 UIC program's website: https://www.epa.gov/node/99201#public-notices.

The public will have 30 days from the start of the public notice to provide comments on the proposed permit action.

Submit your comments in writing or by phone to the EPA contact listed below during the comment period. Please reference the applicant's name and permit number(s). You may also comment during a public hearing if one is held.

EPA Contact:
Omar Sierra-Lopez
Email: SierraLopez.Omar@epa.gov
Phone: (303) 312-7045

Public Hearing
No public hearing is planned at this time. During the comment period, you may ask EPA, using the methods described in the "How to Comment" section of this fact sheet, to hold a formal public hearing. Your request must identify issues to be raised. When there is significant public interest, EPA will hold a hearing to receive public comments and will publish a notice at least 30 days prior.

Additional Information
For additional information, please consult the EPA contact listed above. To learn more about EPA's Underground Injection Control program, or to join our mailing list, visit https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy.

Introduction

This Fact Sheet gives the derivation of site-specific UIC permit conditions and reasons for them. Referenced sections and conditions correspond to sections and conditions in ND22184-08837 (Permit).

EPA UIC permits regulate the injection of fluids into underground injection wells so that the injection does not endanger underground sources of drinking water (USDWs). EPA UIC permit conditions are based upon the authorities set forth in regulatory provisions at 40 CFR parts 2, 124, 144, 146 and 147, and address potential impacts to underground sources of drinking water. In accordance with 40 CFR § 144.35, issuance of this Permit does not convey any property rights of any sort or any exclusive privilege, nor authorize injury to persons or property or invasion of other private rights, or any infringement of other applicable Federal, tribal, state, or local laws or regulations. Under 40 CFR § 144 Subpart D, certain conditions apply to all UIC permits and may be incorporated either expressly or by reference. General permit conditions for which the content is mandatory and not subject to site-specific differences (40 CFR parts 144, 146 and 147) are not discussed in this document.

Upon the Effective Date when issued, the Permit authorizes the operation of injection well so that the injection does not endanger USDWs. The Permit is issued for the operating life of the facility unless terminated for reasonable cause under 40 CFR § 144.40 and can be modified or revoked and reissued under 40 CFR § 144.39 or § 144.41.

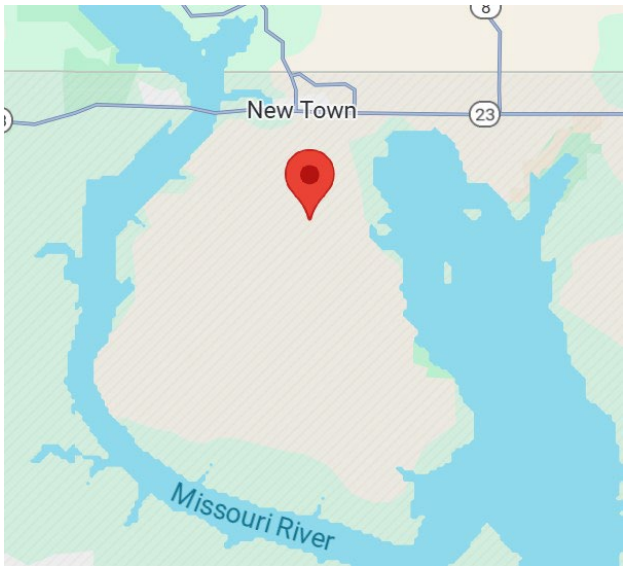
Final Decision and Right to Appeal

EPA will consider all comments received during the comment period and any hearing held and then issue a final decision. You have the right to appeal the decision if you make an official comment during the comment period or participate in a public hearing. If you have this right to appeal, the first appeal must be made to the Environmental Appeals Board within 30 days after the final permit decision has been issued. The final decision can be appealed in federal court only after all agency review procedures have been exhausted. Please refer to 40 CFR §124.19, which outlines the appeal process.

I. Background

EPA Region 8 is proposing to revoke and reissue the Class II commercial saltwater disposal (SWD) permit for the Big Bend 1-5 SWD well, operated by Slawson Exploration Co, Inc., to ensure compliance with current regional permitting standards and to remove the annual pore pressure requirement. The operator has formally requested removal of the pore pressure requirement, which is considered appropriate since pore pressure data is typically collected prior to authorization of injection activities to establish formation pressure before operations begin. Key updates include a maximum allowable injection pressure (MAIP) of 989 psi (based on site-specific parameters in Attachment II, Section B.4) and strengthened monitoring and reporting conditions. The initial UIC Class II permit was issued on December 15, 2011, establishing a cumulative injection volume limit of 71,500,000 barrels. The well was spudded on November 17, 2013, and the aquifer exemption was approved on September 19, 2014.

II. Site Characterization/Siting



Location: Section 5, Township 151 North, Range 92 West, Mountrail County, North Dakota.

A. Hydrogeologic Setting

1. Well Stratigraphy

Formation Name or Stratigraphic Unit	Top MD (ft)*	Base MD (ft)*	TDS (mg/l)	Lithology	Designation (USDW, IZ, CZ)
Coleharbor Formation	Surface	23	N/A	Sand, silt, clay	USDW
Bullion Creek Formation	23	558	2,110	Silt, sand, clay, lignite, limestone	USDW
Cannonball Formation	558	1,043	N/A	Sand, mudstone	USDW

Formation Name or Stratigraphic Unit	Top MD (ft)*	Base MD (ft)*	TDS (mg/l)	Lithology	Designation (USDW, IZ, CZ)
Hell Creek Formation	1,043	1,413	1,530	Sand, lignite shale	USDW
Fox Hills Formation	1,413	1,705	1,530	Silt, shale, sand, siltstone	USDW
Pierre Formation	1,705	3,604	N/A	Shale	CZ
Niobrara Formation	3,604	3,870	N/A	Shale	CZ
Carlile Formation	3,870	4,104	N/A	Shale	CZ
Greenhorn Formation	4104	4,504	N/A	Shale	CZ
Mowry Shale	4,504	4,870	N/A	Shale	Upper CZ
Inyan Kara Formation	4,870	5,274	6,150 - 9,170 exempted USDW	Sand	IZ
Swift Shale	5,274	5,706	N/A	Shale	Lower CZ

*****Approximate numbers

2. Underground Sources of Drinking Water

The Safe Drinking Water Act (SDWA) protects USDWs from contamination due to underground injection. Therefore, it is important to identify USDWs in the area of the proposed injection.

USDWs are aquifers or the portions thereof which 1) currently supply any public water system or 2) contain a sufficient quantity of groundwater to supply a public water system and currently supplies drinking water for human consumption or contain fewer than 10,000 mg/l total dissolved solids (TDS), are considered to be USDWs. See 40 C.F.R. § 144.3.

As indicated in the Well Stratigraphy table, the following formations are considered USDWs: Coleharbor Formation, Bullion Creek Formation, Cannonball Formation, Hell Creek Formation, and the Fox Hills Formation.

3. Injection Zone

An injection zone is a geological formation, group of formations, or part of a formation that receives fluids through a well. The proposed injection zone is the Inyan Kara Formation of the lower Dakota Group, characterized by marine sandstone in its upper part and nonmarine sandstone in its lower part. The injection zone is overlain by approximately 3,000 feet of impermeable sedimentary rocks from several Cretaceous formations and underlain by more than 400 feet of relatively impermeable sedimentary rocks of the Jurassic Swift Formation. Water sample from the Inyan Kara Formation at the Big Ben 1-4 SWD site after the well was drilled, indicated that the injection zone was between 6,000 – 9,000 mg/L TDS. To allow injection into a USDW, Slawson previously applied for and received an aquifer

exemption for a 0.35 mile from the wellbore between the depths of 4845 to 5274 feet, MD. The formation is adequately confined by the overlying Mowry Shale and underlying Swift Shale, which have no effective porosity or permeability.

4. Confining Zones

A confining zone is a geological formation, part of a formation, or a group of formations that limits fluid movement above and below the injection zone. The regulations at 40 C.F.R. § 146.22(a) require that Class II wells be sited in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review (AoR). The confining zones at this well site meet this requirement.

The upper confining zone is the Mowry Shale. This formation is described as a thick shale layer with a thickness of approximately 366 feet at the location of Big Bend 1-5. The Mowry Shale is composed of low-permeability shale, which provides a barrier to fluid migration, effectively isolating the injection zone from any overlying USDWs.

The lower confining zone is the Swift Shale. At this location, it is approximately 432 feet thick and, like the Mowry Shale, consists of low-permeability shale that acts as a barrier to downward fluid migration.

B. **Area of Review** 40 C.F.R. § 146.6

The AoR calculation is to determine the distance in which the pressures in the injection zone may cause the migration of the injection and/or formation fluids into a USDW. The AoR for each injection well must be determined by one of two methods: calculating the zone of endangering influence (ZEI) in accordance with 40 C.F.R. § 146.6(a) or determining a fixed radius in accordance with 40 C.F.R. §146.6(b).

A fixed AoR with a radius of 0.35 miles is appropriate for this commercial SWD operation because the injection zone is confined and there are no known transmissive faults within the AoR.

1. Wells in the AoR

EPA reviewed information about wells within the AoR consistent with 40 C.F.R. § 146.24(a). and identified seven production wells within the AoR. These wells do not penetrate the upper confining zone within the area of review; therefore, no corrective action is necessary at this time. These wells are horizontal, and the lateral section of the wells are located outside the AoR boundary. Any portions of these wells that cross the AoR are more than 10,000 feet below the surface at this location and more than 4,000 feet below the lower confining zone, and they do not penetrate the injection zone or the confining zone within the area of review. Updated well diagrams for these wells are included in the administrative record. Attachment II of the Permit mandates ongoing identification and reporting of any additional wells not previously documented within the AoR, along with updates to the AoR throughout the well's lifespan.

2. Faults/fractures in the AoR

EPA reviewed information about faults and fractures within the AoR consistent with 40 C.F.R. § 146.24(a). There are no known faults or fractures within the AoR that could serve as conduits for fluid migration. The geological assessments and seismic data indicate that the formations surrounding the injection zone are stable and free of significant structural weaknesses. To ensure continued protection of USDWs, the Permit includes conditions for regular monitoring and pressure testing of the injection well. These conditions are necessary to detect any unexpected changes in subsurface pressure that might indicate the presence of undetected faults or fractures. The Permit conditions are designed to comply with 40 C.F.R. § 146.22, which mandates that injection operations do not endanger USDWs.

Additionally, the Permit includes provisions for seismic monitoring to assess any potential for seismic activity, ensuring that any induced seismicity is promptly addressed to prevent risks to the integrity of the confining zones.

C. Assessment of Seismicity

Seismicity is not a concern at this site because there are no known active faults within the AoR. The site's location is not in proximity to existing known faults. The latest available information on earthquakes and mapped faults was obtained from the U.S. Geological Survey (USGS) web-based databases (Earthquake Catalog and Quaternary Fault and Fold Database; accessed February 19, 2026). To further ensure the protection of USDWs, the Permit includes conditions for continuous monitoring of injection pressures and volumes, as well as seismic monitoring to detect any unusual subsurface activity.

III. Well Construction (40 C.F.R. § 146.22)

A. Casing and Cementing (40 C.F.R. § 146.22(b)(1); § 146.8)

Class II UIC regulations require that wells be cased and cemented to prevent the movement of fluids into or between USDWs. The construction of the Big Bend 1-5 SWD meets this requirement by utilizing multiple layers of casing and cementing to surface, which are designed to maintain well integrity and isolate the injection zone from USDWs. See Attachment I of the Permit for detailed well construction specifications.

EPA considered the following factors in determining these permit requirements: depth to the injection zone (IZ), depth to the bottom of all USDWs, estimated maximum and average injection pressures, the nature of formation fluids, lithology of the IZ and confining zones (CZ), external pressure, internal pressure, and axial loading, hole size, size and grade of all casing strings, and class of cement. These considerations ensure that the well construction is robust enough to withstand the operational pressures and environmental conditions, thereby preventing the movement of fluids into USDWs.

The current well construction review confirms the well is adequately cased and cemented to effectively isolate the injection zone and protect USDWs from contamination. No additional well construction is proposed at this time.

IV. Corrective Action (40 C.F.R. §§ 144.55; 146.7)

No corrective action is required at this time as EPA's evaluation did not identify migration pathways within the AoR. This conclusion is based on the absence of improperly sealed, completed, or plugged and abandoned wells within the AoR that could serve as conduits for fluid migration. EPA's assessment considered factors outlined in 40 C.F.R. § 146.7, including the geological characteristics of the area, the integrity of existing wells, and the potential for fluid movement.

V. Logs and Test/Authorization to Inject

A. Required logging and testing

In the context of this revoke and reissue permit proposal, only Part I Mechanical Integrity Testing (MIT) is required, as Part II MIT was demonstrated with the previously submitted and approved Cement Bond Log (CBL) when the permit was first issued. These demonstrations are critical for confirming the mechanical integrity of the injection well and ensuring the protection of USDWs. The most recent Part I MIT standard annulus pressure test was submitted to EPA on January 27, 2025. The test successfully demonstrated Part I mechanical integrity and therefore the next Part I MIT is due on or before January 27, 2030.

The reissued permit will remove the requirement to determine and report formation pore pressure. Pore pressure data is typically collected prior to authorization to inject to establish formation pressure before operations begin. Since additional pore pressure data during injection has limited value and has only been collected and not used to evaluate well operations, it will no longer be required.

VI. Well Operation (40 C.F.R. § 146.23)

A. Injection interval

The Permit requires that injection must only occur in the exempted Inyan Kara Formation, specifically within the designated depth interval of 4,870' to 5,274'. Movement of fluid outside of this approved injection zone is prohibited. This requirement is consistent with the UIC regulations at 40 C.F.R. §§ 144.12 and 146.22(a), which mandate that injection operations are confined to designated zones to prevent contamination of USDWs and ensure that fluids do not migrate into unintended geological formations. The specific interval is chosen based on geological assessments and well log data that confirm the presence of competent confining layers above and below the injection zone, ensuring safe containment of injected fluids.

B. Injection fluid limitation

Fluids injected into Class II wells must meet the definition at 40 C.F.R. § 144.6(b). These include: fluids (1) which are brought to the surface in connection with conventional oil or natural gas production that may be commingled with waste waters from gas plants which are an integral part of production operations unless those waters are classified as a hazardous waste at the time of injection, (2) used for enhanced recovery of oil or natural gas, and (3) used for storage of hydrocarbons which are liquid at standard temperature and pressure. Waste not exempted from RCRA Subtitle C hazardous waste such

as unused fracturing fluids or acids, gas plant cooling tower cleaning wastes, service wastes and vacuum truck wastes are not approved for injection. See Attachment II.

Conditions for Additional Sources for Commercial Wells: Before introducing a new source into the well (e.g., from a different production formation or well field), the Permittee must notify the Director. This notification must include a description of the fluid, the process that generated the fluid, and a representative sample for analysis.

C. Volume limitation

This permit sets an injection volume limitation of 71,500,000 barrels. See Attachment II. This limit was originally set on December 15, 2011, using the volume fill-up equation V = (nr2hn)/5.615.

V = (π2hϕ)/5.615 where

π = 3.1416

r = 1900 ft = radial distance

h = 177 ft = height of injection zone available for fill up (ft)

ϕ = 0.2 = porosity of injection zone (decimal percent)

5.615 = conversion factor (barrels and ft3)

Based on the above equation, V = barrels 71,500,914 =

The maximum cumulative volume rounded down the calculated volume to 71,500,000 bbl.

D. Injection Pressure limitation

Injection pressure at the wellhead must not exceed a maximum calculated pressure of 989 psi, to ensure that the pressure during injection does not initiate new fractures or propagate existing fractures in the confining zone adjacent to the USDWs. See 40 C.F.R. § 146.23(a)(1). The Permit also prohibits injection pressure that would cause the movement of injection or formation fluids into a USDW. To limit the injection pressure, the Permit requires that the Permittee calculate the MAIP using the formula provided in the Permit under Section B – Well Operation, 4. Injection Pressure Limitation. The MAIP calculation utilizes values specified in Attachment II - Operating Requirements, 3. Maximum Allowable Injection Pressure (MAIP).

To limit the injection pressure, the permit requires that the Permittee calculate the MAIP using the formula provided in the permit under Section B – Well Operation, 4. Injection Pressure Limitation. The initial MAIP calculation utilizes values specified in Attachment II.

The values the Permittee must use in the equation are determined by the following, as specified in Attachment II of the Permit:

Fracture Gradient: The FG value for each well must be determined by conducting a step rate test. The results of the test will be reviewed and approved by the Director.

Specific Gravity: The value for SG must be obtained from the fluid analysis of a representative sample of the injection fluid, as required in Attachment III.

Depth: The value for D is the depth of the top perforation of the as-built well.

Upon issuance, the Permit will contain an updated MAIP based on values submitted. However, because the Permit utilizes an equation to determine the MAIP, the MAIP will be recalculated when the values for the equation change. MAIP recalculations are triggered in the following circumstances:

1. A new step-rate test is conducted
2. A new analysis of the injection fluid indicates that the specific gravity sample results are greater than (SG + Specific Gravity Fluctuation Factor (SGFF)) previously reviewed and approved
3. Perforations are added to the well above the previous perforations
4. The Permittee requests a change to the MAIP

If any of the above circumstances occur, the Permittee must provide written notification to the Director and submit documentation that one or more of the circumstances has occurred. A new MAIP will only become effective after the Director has reviewed and approved the submittal and has provided written notification of a new effective MAIP. The Permit administrative record will be updated.

The Permit allows the Director to set a MAIP lower than the calculated MAIP in certain circumstances to protect USDWs. For example, if during testing, the Permittee did not or is unable to perform the test at the permitted MAIP, a new MAIP will be calculated utilizing the pressure at which the test was conducted. Previously, the MAIP was set at 1130 psi. Due to the higher specific gravity of the current fluids that are injected, using the same equation, the MAIP has been reduced to 989 psi. The revoked and reissued Permit uses a formula to recalculate the MAIP as the input parameters change, and is more protective as it reflects the current operating condition.

VII. Mechanical Integrity (MI) (40 C.F.R. § 146.8)

The Permit requires MI to be maintained at all times. This requirement is to ensure that the injection well does not provide a conduit for fluid movement into USDWs.

A Permittee is required to demonstrate both internal (Part I) and external (Part II) integrity of the well. Part I MI corresponds to 40 C.F.R. § 146.8(a)(1), and Part II MI to 40 C.F.R. § 146.8(a)(2).

For Part I MIT, internal tests are used to verify that the tubing-casing annulus is sealed and there are no significant leaks in the packer, casing, or tubing. This is done through pressure testing of the tubing-casing annulus, which is specified in Attachment V. The Permit requires a demonstration of internal MI at the following times: at least once every 5 years after the last successful test; following any workover operation that affects the tubing, packer, or casing; after a loss of MI; at conversion to another well class; or during plugging and abandonment. See Attachment V. Additional guidance for Internal (Part I)

MI can be found at https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy#guidance.

For Part II MIT, external tests are used to demonstrate that fluids are not migrating out of the authorized zone through cement channels behind the casing, by evaluating the CBL to show that adequate cement exists to prevent significant movement of fluid out of the approved injection zone through the casing annular cement (i.e., 80% cement bond index across the confining zone.)

The Permit specifies that the Director may request a Part II MI demonstration at any time. Guidance on the logging and interpretation of the CBL can be found at https://www.epa.gov/uic/underground-injection-control-epa-region-8-co-mt-nd-sd-ut-and-wy#guidance.

VIII. Monitoring, Recordkeeping and Reporting (40 C.F.R. § 146.23(b), (c))

The Permit requires monitoring of key parameters (such as tubing pressures, injection rate, and cumulative volumes) in accordance with 40 C.F.R. §146.23(b), with records maintained that include detailed measurement, calibration, and maintenance logs for at least three years. The specific parameters to be monitored and their frequencies are in a table in Attachment IV.

IX. Plugging and Abandonment (40 C.F.R. §§ 144.51(o); 146.10; 146.24(d))

Prior to abandonment, the well must be plugged in a manner that isolates the injection zone and prevents movement of fluid into or between USDWs. In accordance with 40 C.F.R. § 144.51(o), the operator submitted a plugging and abandonment plan that meets the requirements of 40 C.F.R. § 146.10 and has been incorporated into the Permit at Attachment VI.

X. Commercial Well Requirements

Site security and manifest controls for the commercial SWD facility include a fenced perimeter with locked gates, 24-hour camera surveillance, and a three-party custody/manifest system documenting generator, transporter, and disposal facility details for each load. The Permittee and transporter must certify that hazardous or non-oil/gas wastes are not injected; annual discrepancy reporting is required.

XI. Financial Responsibility (40 C.F.R. § 144.52(a)(7))

The Permittee must maintain financial responsibility and resources sufficient to close, plug, and abandon the underground injection operation in the manner prescribed by the Director. Pursuant to 40 C.F.R. § 146.24(a)(9), the Permittee currently maintains appropriate financial assurance in the amount of $75,000 through a surety bond.

XII. Compliance with Applicable Federal Laws (40 C.F.R. § 144.4)

E. National Historic Preservation Act (NHPA)

Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), 54 U.S.C. § 306108, requires federal agencies to consider the effects of their undertakings on historic properties and provide the Advisory Council on Historic Properties a reasonable opportunity to comment on the

undertaking. Federal undertakings include any project, activity, or program funded by or under the jurisdiction of a federal agency. EPA has determined that a decision to reissue a Class II injection well permit constitutes an undertaking subject to the NHPA and its implementing regulations at 36 CFR part 800.

When the permit was first issued the EPA made a no historic properties affected determination within the area of potential effects (APE) on October 28, 2011 (date of THPO letter). This current permit action is wholly an administrative activity to modify the permit conditions under which the well operations must conform. Further, the APE for this action is the same as the previous NHPA analysis. This action allows the continued operation of the well and does not authorize the construction of new surface structures or any physical modifications to the facility beyond what was previously authorized or includes any new requirements that would increase operational requirements. For these reasons and in accordance with 36 C.F.R. § 800.3(a)(1), EPA has made a no potential to cause effects determination for this action. .

F. Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S.C. § 1536 (a)(2), requires Federal agencies to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of federally listed endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. EPA has determined that the proposed UIC actions would constitute an action that is subject to the Endangered Species Act and its implementing regulations (50 CFR part 402). The proposed UIC action is solely an administrative update to the Permit and does not authorize any physical changes to the well or facility beyond what was previously authorized, nor do this action increase well operation activities. There are no new surface activities or disturbances from this UIC action that would affect any species. The well pad is part of existing infrastructure within an established oil and gas production field, and fluids will continue to be transported via the existing pipeline.

In the July 6, 2011, memo to file, EPA made a no effect determination for the listed species identified at that time in Mountrail County. On May 8, 2026, EPA utilized the U.S. Fish and Wildlife (USFWS) Information for Planning and Consultation (IPaC) tool to generate a species list for the project area. The report contained the following species and stated that there are no critical habitats within the project area.

Birds

- Piping Plover Charadrius melodus (Threatened)
- Rufa Red Knot Calidris canutus rufa (Threatened)
- Whooping Crane Grus americana (Endangered)

Insects

- Monarch Butterfly Danaus plexippus (Proposed Threatened)
- Suckley's Cuckoo Bumble Bee Bombus suckleyi (Proposed Endangered)

Compared to the 2011 species, the Rufa Red Knot and the 2 proposed species are new. The IPAC provides range information for each of the species. EPA compared the current range for the Piping Plover and the Rufa Red Knot and found the range for the Rufa Red Knot is wholly found in the range for the Piping Plover. These two bird species share similar habitat, specifically wetlands, inland and reservoir lakes, and portions of rivers[1,2]. Previously, EPA made a no effect finding for Piping Plover. Due to the similarity between the range and habitat for the Rufa Red Knot, a no effect finding is also supportable.

The IPAC report stated that there is proposed critical habitat for the Monarch Butterfly , but the action area or the location of the well pad does not overlap the critical habitat. For the Suckley's Cuckoo Bumble Bee, critical habitat for this species has not been designated. Therefore, activities associated with the Project are not likely to jeopardize the continued existence of the Monarch Butterfly or the Suckley's Cuckoo Bumble Bee.

EPA has made a no effect determination for the species identified in the May 2026 IPAC. This is based on EPA's previous 2011 no effect finding and because the EPA permit action does not physically alter the action area, beyond what was previously authorized. EPA also reviewed the new species list and concluded this action will have no effect for the Rufa Red Knot and will not likely jeopardize the continued existence of the Monarch Butterfly and Suckley's Cuckoo Bumble Bee.

[1] Piping Plover (Charadrius melodus) 5-Year Review 2025; https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/21330.pdf

[2] Species Status Assessment Report for the Rufa Red Knot (Calidris canutus rufa) Version 1.1; https://iris.fws.gov/APPS/ServCat/DownloadFile/187781