DOCKETED	
Docket Number:	21-AFC-02
Project Title:	Willow Rock Energy Storage Center
TN #:	259338
Document Title:	Willow Rock CURE Data Request Set 1 Response
Description:	N/A
Filer:	Kathryn Stevens
Organization:	WSP USA Inc.
Submitter Role:	Applicant Consultant
Submission Date:	9/27/2024 4:13:54 PM
Docketed Date:	9/27/2024

REPORT

Willow Rock Energy Storage Center (21-AFC-02)

California Unions for Reliable Energy (CURE) Data Request Response Set 1

Submitted by:

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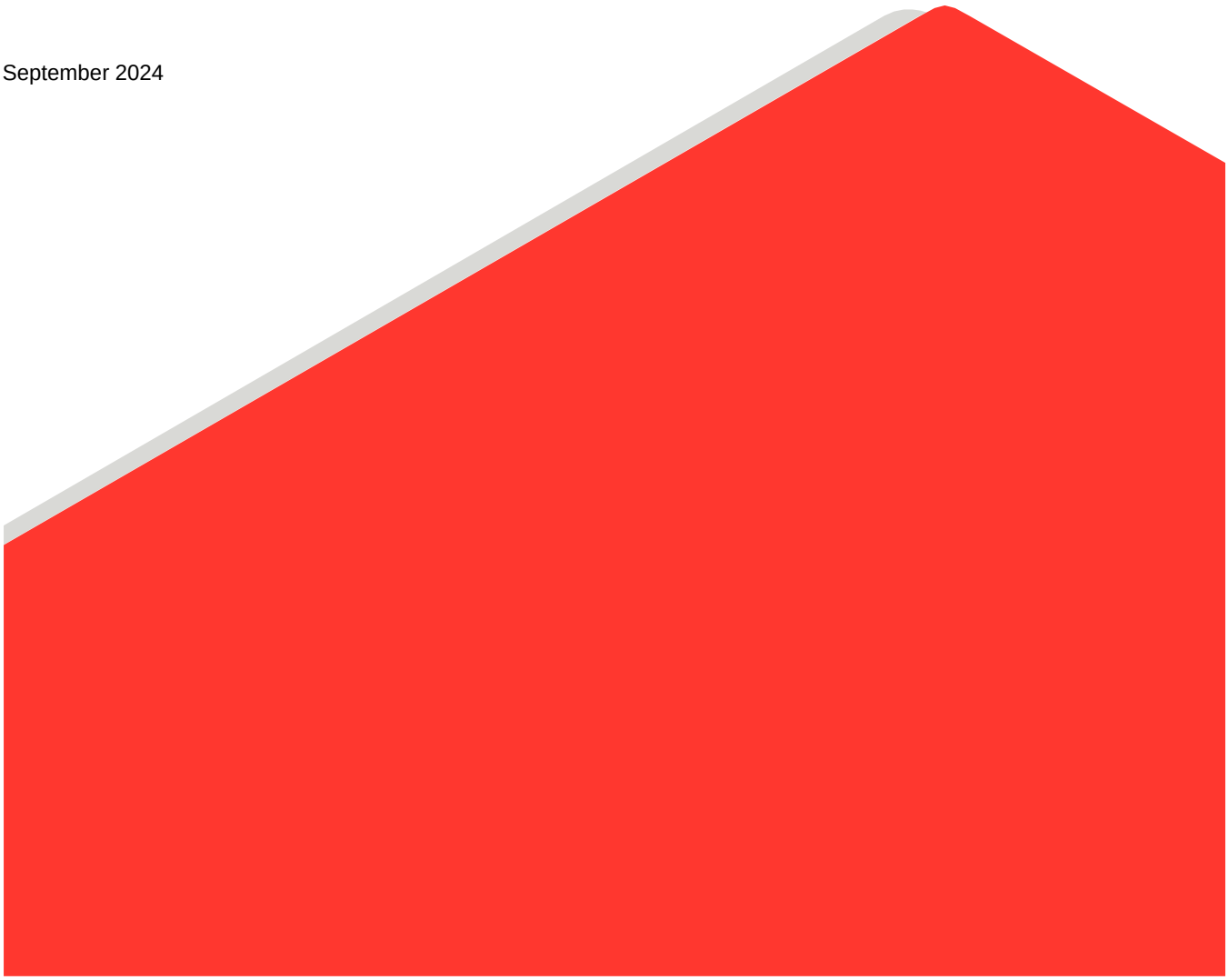
September 2024



Foreword

On March 1, 2024, GEM A-CAES, LLC (Applicant) docketed the Supplemental Application for Certification (SAFC) Volume 1 for the Willow Rock Energy Storage Center (WRESC; 21-AFC-02). On July 16, 2024, the Executive Director recommended that the Committee accept the Supplemental AFC as complete, and that the 12-month timeline to reach a decision on the AFC, as required by Public Resources Code section 25540.6, should begin.

Pursuant to Title 20, California Code of Regulations, section 1716(b), California Unions for Reliable Energy (CURE) docketed Data Requests Set 1 on August 22, 2024. Data Requests Set 1 presents a list of questions associated with the resource topic areas of Project Description; Biological Resources; Hazardous Materials and Hazards; Greenhouse Gas Emissions; and Geologic Hazards.

To address CURE's request, each Data Request within Set 1 has been responded to with supplemental information or guidance on where the information may be found. For CURE data requests that involve the project's location and extent, the Applicant has based their responses on the descriptions of the Project Area and Project Boundary presented in Section 5.0 of the SAFC and the information shown in Table 5.01 and Figure 5.01, therein. For questions and responses involving specific biological surveys, the study areas are defined in Section 5.02 of the SAFC on survey-by-survey basis.

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1.0 INTRODUCTION

GEM A-CAES LLC's (the "Applicant") is responding to the California Unions for Reliable Energy (CURE) Data Requests Set 1, numbers:

- **Project Description:** DR1 through DR7
- **Biological Resources:** DR8 through DR81
- **Hazardous Materials and Hazards:** DR82 through DR98
- **Greenhouse Gas Emissions:** DR99 through DR102
- **Geologic Hazards:** DR103 and DR104

This response document addresses CURE Data Request Set 1. The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as presented by CURE and are keyed to the Data Request (DR) numbers (DR#). New or revised graphics, tables, or attachments are provided as attachments and are numbered in reference to the Data Request number. For a hypothetical example, the first attachment used in response to Data Request DR1 would be numbered Attachment DR1-1. Each page in this response document is sequentially page-numbered consistently with the remainder of the document, although some attachments may also have their own internal page numbering system.

2.0 PROJECT DESCRIPTION

2.1 Project Ownership

2.1.1 Data Requests DR1 to DR7

The Supplemental Application for Certification ("SAFC") states that the Willow Rock Energy Storage Center Project ("Project" or "WRESC") "will be located on an approximately 88.6-acre portion of an approximately 112-acre parcel that is currently owned by Zevsar Concepts, LLC, a Nevada limited liability company. GEM has obtained site control of the entire 112-acre parcel by virtue of an optional purchase and sale agreement with the landowner." (TN 254806 at p. 1-12) Furthermore, GEM A-CAES LLC ("Applicant") "has entered into, or is in the process of completing, pending purchase and sale agreements with each of the parcel owners [for the Project's construction and laydown areas] that provides the project with full access and site control." (*Ibid.*) A complete list of properties associated with Project development is included in Tables 2-1 and 2-2 in the SAFC.

DR1: *Describe the status of the Applicant's access and site control over the Project's construction and laydown areas.*

Response: The Project's construction and laydown areas are depicted in the SAFC Section 5.0 Figure 5.0-1 as P1, P2N, P2S, and VH. The Applicant has access to 100% of these areas. The Applicant has obtained or is in the process of obtaining site control over the Project's construction and laydown areas. The Applicant has site control in excess of 90% of the temporary construction and laydown areas. The Applicant is in open and consistent communication with all landowners needed for the Project's development.

DR2: *Discuss the status of any pending purchase and sale agreements with each of the parcel owners.*

Response: The Applicant continues to finalize access and site control agreements. The Applicant is in open and consistent communication with all landowners needed for the Project's development.

DR3: *Discuss the Applicant's access to and site control over the Project Area, as defined on page 3-1 of the SAFC. (TN 254806)*

Response: The Project Area[1] encompasses the WRESC Site, the temporary construction and laydown areas as depicted in SAFC Section 5.0 Figure 5.0-1, and the right-of-way (ROW) associated with the gen-tie line. The Applicant has access[2] to 100% of the Project Area. The Applicant maintains site control[3] over 100% of the WRESC Site and in excess of 90% of the temporary construction laydown areas. The Applicant has acquired or is finalizing agreements for nearly 90% of the privately owned parcels needed for the gen-tie line's development. The Applicant is in discussions with Kern County regarding a Franchise Agreement for the remaining public ROW for the gen-tie line.

DR4: *Discuss the Applicant's access to and site control over the Project Boundary, as defined on page 3-1 of the SAFC. (TN 254806)*

Response: The Project Boundary encompasses the WRESC Site and the parcels of land for potential temporary construction and laydown areas as depicted in SAFC Section 5.0 Figure 5.0-1. The Applicant has access to 100% of these areas. The Applicant has site control over 100% of the WRESC Site. The Applicant has obtained site control in excess of 90% of the temporary construction laydown areas. The Applicant continues to finalize site control agreements.

DR5: *Identify any areas in the Project Area and Project Boundary where the Applicant still does not have access.*

Response: The Applicant has access to 100% of the Project Boundary. Portions of the Project Area where the Applicant does not have access are set forth in **Attachment DR8-1**. The Applicant anticipates finalizing access and site control agreements for the Project Area in the fourth quarter of 2024. The referenced map book has been submitted through Kiteworks under the reference Attachment DR8-1.

DR6: *Describe any areas that have not been surveyed for biological resources due to lack of access.*

Response: All areas within the Project Boundary have been surveyed for biological resources. Areas that have not been surveyed for biological resources due to lack of access are limited to areas with no right-of-entry within the survey buffer areas. **Attachment DR8-1** presents a map book that illustrates the parcels where right-of-access has not been granted to the Applicant. The referenced map book has been submitted through Kiteworks under the reference Attachment DR8-1.

DR7: *Describe any areas that will eventually be surveyed but have not yet been surveyed for geologic resources due to lack of access.*

Response: No areas require surveys for geologic resources.

[1] Section 5.0 of the SAFC (TN# 254806) and Table 5.01 and Figure 5.01 of the SAFC describe the spatial extent of the project area and project boundaries for the Project. All references to the project area and project boundary made in this response to CURE's Data Requests are made in alignment with the descriptions listed therein.

[2] Access means the Applicant has reached an agreement with the landowner to enter their parcel for the purpose of data collection in association with this Project.

[3] Site Control is defined as the Applicant having executed an agreement to either acquire or lease a parcel of land for long-term use

3.0 BIOLOGICAL RESOURCES

3.1 Survey Areas and Dates

3.1.1 Data Requests DR8 to DR17

There is inconsistent information regarding whether the entire Project study area was surveyed for biological resources, why certain areas were not surveyed, and the timing for the surveys. First, the SAFC defines the Project study area to include the Project area (TN 254806 at p. 5.2-1) and the surrounding buffer area (*Id.* at p. 5.2-2). Certain areas of the study area were not surveyed in 2023, and additional biological resource surveys were conducted in 2024. The results were provided in survey report addendums released on August 5, 2024. (TN 258308 to TN 258316)

Whether the entire Project study area has been surveyed is inconsistently addressed in the addendums filed to the docket on August 5, 2024. Some of the addendums suggest that some portions of the Project study area still have not been surveyed due to private property access issues. For example, page 4 of the Desert Tortoise Survey 2024 Addendum (TN 258309) states: "[a]reas that biologists could not safely survey or did not have permission to access, such as private property, were scanned from the perimeter using binoculars." Other addendums, however, suggest the entire Project study area was surveyed. For example, in describing the sensitive plant surveys, the 2024 Biological Resources Assessment Report Addendum ("BRAR Addendum") states: "[s]urveys were conducted by walking 33-foot- (10-meter-) wide parallel transects throughout the entire project area," which was defined as: (a) "additional project areas that were added for the additional 2024 BRAR addendum," and (b) "P2 North (47 acres) and P2 South (10 acres), as well as approximately 3.69 miles of additional gen-tie alignments." (TN 258316 at p. 1)

Additionally, the BRAR Addendum (pp. 12-13) states that desert tortoise, sensitive plants, and burrowing owl burrow data collection occurred during the same survey. Since the Desert Tortoise Survey 2024 Addendum (TN 258309) states that portions of the study area were not surveyed for desert tortoise, it is unclear why the biologists were able to survey the entire Project area for sensitive plants, but not for desert tortoises due to safety or private property restrictions.

Second, the SAFC states that some areas were not surveyed in 2023 because the biologists could not "safely survey" or gain permission to access areas due to private property restrictions, although the BRAR Addendum states these areas were not surveyed because: "[i]n September 2023, Hydrostor updated the WRESC project design to include additional project features following the completion of the 2023 biological survey season." (TN 254806 at p. 5.2-20; TN 258316 at p. 1)

Finally, the BRAR Addendum and survey report addendums provide inconsistent information on when surveys were conducted. The BRAR Addendum (Table 2) indicates the Crotch's bumble bee surveys were conducted on March 26-27, April 2-4, April 29-30, and May 1-3, 2024.

However, Table 1 in the Crotch's Bumble Bee Survey 2024 Addendum (TN 258314) indicates the surveys were conducted on March 26-27, April 8-9, May 7-8, and June 5-6, 2024. The BRAR Addendum (Table 6) indicates the sensitive plant surveys were conducted on April 2-4, April 8-9, and June 5-7, 2024. However, page 3 of the Sensitive Plant Survey 2024 Addendum (TN 258313) indicates the surveys were conducted on April 22, and June 3-5, 2024.

Moreover, based on the survey dates provided in the BRAR Addendum, many of the biologists conducted surveys for multiple different resources on a given date. For example, according to the BRAR Addendum (Tables 2

through 6), biologists MB and PC conducted surveys for desert tortoise, Crotch's bumble bee, burrowing owl, Swainson's hawk, and sensitive plants on April 2, 2024. Further information is needed to understand whether this would have been feasible. Except for the Burrowing Owl Survey 2024 Addendum, the Applicant has not identified the survey effort (e.g., hours) each biologist devoted to a particular survey on a given date.

DR8: *Identify and provide high resolution maps that clearly depict which portions of the Project study area (i.e., WRESC site, staging areas, Preferred Gen-tie Route, alternative gen-tie route options, and associated buffer areas) were not surveyed in either 2023 or 2024. If necessary, provide separate maps for each biological resource that was surveyed.*

Response: Attachment DR8-1 presents high resolution maps that show areas that were covered during the 2023 and 2024 surveys. Since filing of the SAFC and revised technical reports, the Applicant has obtained authorization to publish survey data publicly on all parcels within the facility's Project Boundary. The Biological Resources Reports will be supplemented accordingly. Due to file size, the map book has been submitted through Kiteworks under the reference Attachment DR8-1.

DR9: *For the areas identified in response to the data request above, estimate the acreage of each portion of the Project study area that was not surveyed in either 2023 or 2024.*

Response: All areas in the Project Site and Additional Work Areas (i.e., P2 South and P2 North), as identified in Figures 9-1 to 9-5 (TN# 258872[4]) of the August 2024 Biological Resources Assessment Report Addendum (TN# 258316), were accessible. The gen-tie ROW was accessible along Rosamond Boulevard, 65th Street, Felsite Avenue, Mojave Tropico Road, and Dawn Road. Portions of the buffer area (1,000-foot buffer for the Project Site and 500-foot buffer for the gen-tie alignment) surrounding the Project Site, Additional Work Areas (i.e., P2 South and P2 North), and gen-tie alignment options were not accessible in the field due to a lack of access to some private properties, although these areas were included in the desk-top analysis. As such, no field work was possible in these areas due to lack of property owner permission. Binoculars were used to scan inaccessible areas to verify habitat and existing conditions on those properties that did not have any structures or other evidence of human occupancy. In areas of the gen-tie corridor where no right-of-entry was granted, surveys were conducted from a distance in parcels with right-of-entry or on a public road. When combined with the boots-on-the-ground survey, the entirety of the gen-tie line corridor has been scanned.

Table DR9-1 summarizes the accessible and inaccessible areas in the individual project features as well as the percent of the total area the accessible and inaccessible areas represent. The table is organized by Project feature, which includes the associated buffer (1,000-foot buffer for the Project and Additional Workspace Areas and 500-foot buffer for the gen-tie routes). **Tables DR9-2a-e** show the acres surveyed and not surveyed for each biological survey.

[4] TN# 258872 was docketed under a repeated Application for Confidentiality on August 5, 2024.

Table DR9-1: Approximate Accessible and Inaccessible Areas Associated with Individual Project Features

Project Feature	Total Area (acres)	Approximate Percent Covered of the Total Area	Total Accessible Area (acres)	Total Inaccessible Area (acres) [(a)]	Approximate Percent Inaccessible Area
WRESC Site	132	100%	132	0%	0%
P1	111	100%	111	0%	0%
P2 North	70	100%	70	0%	0%
P2 South	15	100%	15	0%	0%
Gen-Tie corridor (125 feet wide) [(a)]	397	35%[(b)]	139	258	65%[(b)]
Villa Haines Site	118	100%	118	n/a	n/a
1000 ft buffer around P2	359	60%	215	144	40%

Notes:
a = The gen-tie corridor width is likely to be less than the 125-foot width referenced in the SAFC for much of the ROW. Final widths will be based on a franchise agreement between the Applicant and Kern County as well as specific agreements with landowners.
b = In areas of the gen-tie corridor where no right-of-entry was granted, surveys were conducted from a distance in parcels with right-of-entry or on a public road. When combined with the boots on the ground survey, the entirety of the gen-tie line corridor has been scanned.

Table DR9-2a: Area Surveyed and Area not Surveyed for Joshua Tree Survey Area

WJT Survey Results	Area (acres)
Acres Surveyed	6,118
Acres Not Surveyed[(a)]	0
Total Study Area[(b)] **Acreage**	6,118

a= Surveys were conducted from accessible parcels or roads from a distance.
b = Study area for the Joshua Tree Survey is defined in Section 5.02 of the SAFC

Table DR9-2b: Area Surveyed and Area not Surveyed for Swainson's Hawk Survey Area

Swainson's Hawk Survey Results	Area (acres)
Acres Surveyed	14,379
Acres Not Surveyed[(a)]	0
Total Study Area[(b)] **Acreage**	14,379

a= Surveys were conducted from accessible parcels or roads from a distance.
b = Study area for the Swainson's Hawk survey is defined in Section 5.02 of the SAFC

Table DR9-2c: Area Surveyed and Area not Surveyed for Burrowing Owl Survey Area

Burrowing Owl Survey Results	Area (acres)
Acres Surveyed	2,680
Acres Not Surveyed	2,475
Total Study Area[a] Acreage	5,155

a = Study area for the burrowing owl survey is defined in Section 5.02 of the SAFC

Table DR9-2d: Area Surveyed and Area not Surveyed for Jurisdictional Delineation Survey Area

Jurisdictional Survey Results	Jurisdictional Delineation in Field (acres)	Jurisdictional Delineation viewed from accessible areas (acres)
Acres Surveyed	2,680	2,475
Acres Not Surveyed	0	0
Total Study Area[a] Acreage	5,155	

a = Study area for the jurisdictional wetland survey is defined in Section 5.02 of the SAFC

Table DR9-2e: Area Surveyed and Area not Surveyed for Vegetation Survey Area

Vegetation Survey Results	Area (acres)
Acres Surveyed	3,606
Acres Not Surveyed[a]	0
Total Study Area[b] Acreage	3,606

a= Surveys were conducted from accessible parcels or roads from a distance.
b = Study area for the vegetation survey is defined in Section 5.02 of the SAFC

DR10: *Explain the safety issues that precluded biologists from surveying certain portions of the Project study area in 2024.*

Response: During the 2024 survey season, biologists encountered two types of safety issues. The first safety issue was the presence of squatters illegally parked in the P1 portion of the Project Area. For safety purposes, staff maintained a 25-foot buffer around the vehicles and therefore did not cover those areas occupied by vehicles by walking transects. Field staff made the following changes to the survey methodology to collect information from the affected area:

- A portion of two transects approximately 60 feet in length were avoided by staff biologists.
- Binoculars were used to scan the area around the vehicles to identify sensitive species or evidence of sensitive species, such as burrows, scat, tracks, and remains.
- Survey speed was slowed to less than 0.5 mph to facilitate observation of avoided areas using binoculars.

The second safety issue encountered by field biologists was the steep terrain associated with a butte and other landscape features within the 500-foot gen-tie line buffer. The following techniques were used to overcome the steep conditions within the buffer area:

- Binoculars were used to scan the area of steep terrain for sensitive species or evidence of sensitive species, such as burrows, scat, tracks, and remains.
- Survey pace was slowed to less than 0.5 mph to facilitate observations of avoided areas while walking transects adjacent to the avoided areas.

DR11: *Describe and provide a high-resolution map of the Project features that were added to the Project design after completion of the 2023 surveys.*

Response: There were four additional Project features that were surveyed in 2024 that were not included in the 2023 protocol-level surveys:

- P2 North additional workspace area[5]
- P2 South additional workspace area
- Northern alignment gen-tie route options
- Southern alignment gen-tie route options

The new features that were added to the Project in 2024 are shown in figures presented in **Attachment DR11-1**. The map book has been submitted through Kiteworks due to file size under the reference Attachment DR11-1. The P2 North additional workspace area is located along the northern edge of the P1 area and extends to the edge of Highway 14. This area was added to the Project as a contingency to provide additional workspace if the P1 is needed to construct an architectural berm to store excavated rock on-site.

The P2 South additional workspace was also added to support the above-described project scenario. The P2 South additional workspace is located south of Dawn Road southwest of the WRESC area and immediately south of the P1 area.

The two additional gen-tie alignments were separated into the northern alignment options and the southern alignment options. The northern gen-tie alignment options have two alignment options. The first alignment option continues from the main gen-tie line to the west along McConnel Street from 25th Street to Werner Avenue. The second alignment option turns north onto 25th Street from McConnel Street and then turns west along the northern edge of State Lands Commission property. It then turns south along 30th Street and connects back to the main alignment along Dawn Road.

The southern gen-tie option routes are associated with a portion of two road alignments. The first option occurs along a portion of Felsite Avenue between 60th Street and 65th Street. The second option occurs along Tropico Road between Felsite Avenue and Rosamond Boulevard (see Figure 8 of the Willow Rock Energy Storage Center Biological Resources Assessment, August 2024).

[5] Additional workspace is defined in the August 2024 Biological Resource Report Addendum (TN# 258316) as P2 South and P2 North.

DR12: *Discuss how the Applicant will collect information on sensitive biological resources in areas that cannot be safely surveyed.*

Response: WSP completed a scan of areas where safety concerns were encountered by staff. Areas where safety concerns existed were scanned with binoculars from no more than 30 feet away. As such, sensitive features are expected to have been visible from these secure observation points. Features, such as burrows, host plants, or suitable soils (sandy or alkaline soils) that could support plant or wildlife species, were not observed. When compared to the surrounding habitat, it is unlikely that sensitive biological resources would occur in these areas because the key constituent habitat elements were not present. Based on the aforementioned methodology, collecting additional field surveys in areas avoided for safety concerns is not necessary to determine presence/not detected status of sensitive species in the Project area. The safety concern areas that were viewed with binoculars comprise far less than 0.1 acre of the survey area. Additionally, pre-construction clearance surveys will be required as a condition of the Project's license from the CEC. Pre-construction clearance surveys are anticipated to include project disturbance areas prior to vegetation removal or soil disturbance.

DR13: *Explain why the biologists were able to survey the entire Project area for sensitive plants and Joshua trees in 2024, but not for Crotch's bumble bee, desert tortoise, burrowing owl, Swainson's hawk, jurisdictional waters, and vegetation communities.*

Response: The surveyable areas for the Project Site, Additional Work Areas (i.e., P2 South and P2 North), and gen-tie route options were the same for all sensitive species surveys. The buffer areas surveyed surrounding Project features differ from species to species based on the applicable species-specific standard protocols. Areas where the biologists did not have access, either because of private property or safety concerns, were not surveyed on foot for all protocol-level surveys and reconnaissance-level surveys. The affected area accounts for far less than 0.1 acres of the Project Area.

Unless otherwise required by a protocol, sensitive species protocols were limited to the Project footprint with no additional buffers. In some instances, such as desert tortoise, these surveys were conducted in concert with the initial burrowing owl survey, and therefore desert tortoise surveys were also conducted in the required 500-foot burrowing owl survey buffer area, where accessible.

DR14: *State the dates when surveys were conducted for Crotch's bumble bee.*

Response: The 2024 Crotch's bumble bee surveys were completed on the following dates:

- March 26, 2024
- March 27, 2024
- April 8, 2024
- April 9, 2024
- May 7, 2024
- May 8, 2024
- June 5, 2024
- June 6, 2024

DR15: *State the dates when surveys were conducted for sensitive plants.*

Response: The Applicant's consultant conducted the 2024 sensitive plant surveys on April 22, 2024, June 3, 2024, June 4, 2024, and June 5, 2024.

DR16: *Identify which biological resources were surveyed concurrently and the dates on which such surveys occurred.*

Response: Burrowing owl and desert tortoise surveys were completed concurrently on April 2, 2024, April 3, 2024, April 4, 2024, April 8, 2024, and April 9, 2024. Crotch's bumble bee surveys were conducted concurrently with the burrowing owl and desert tortoise surveys on April 8, 2024 and April 9, 2024, as those transects coincided with the location of potential nectar sources for Crotch's bumblebee.

DR17: *Provide the start and stop times for each biological resource survey, by date, and by biologist, for all surveys conducted in 2023 and 2024.*

Response: A separate Excel spreadsheet was prepared with all the survey dates and time for each species in 2023 and 2024 and is included as **Attachment DR17-1**.

3.2 Night Lighting

3.2.1 Data Request DR18 to DR20

The SAFC at page 5.13-18 states: "[c]onstruction-related lighting is anticipated to be limited to the period of the cavern excavation process, which is estimated to last for 41 months during which there will be intermittent localized 24-hour construction activities. This would result in a temporary increase in perceivable light sources and light levels at viewing locations adjacent to the Project." Additional information is necessary to assess the amount of ecological light pollution that would be generated during construction of the Project, and consequently, the potential for significant impacts on wildlife due to lighting.

DR18: *Identify the number of trucks that would be a source of light at the Project site during nighttime construction activities.*

Response: The information on truck hauling is presented in the Willow Rock Traffic Study Report (TN# 258518) docketed on August 15, 2024.

DR19: *Identify the heavy equipment that would be a source of light at the Project site during nighttime construction activities.*

Response: Nighttime construction is anticipated primarily for the underground cavern construction process and some intermittent localized 24-hour construction activities. Topside heavy equipment operating at night-time would likely only be associated with loading rock into the Project's haul trucks. Machinery used for underground cavern construction includes a jumbo face drill, load-haul-dump vehicles, and rock bolting machines but these pieces of heavy equipment would not be visible from the surface.

DR20: *Describe the types of night lighting that would be implemented during construction of the Project, including, but not limited to, information on the number of lights, the luminosity of the bulbs, and the height and angle of light fixtures.*

Response: The Applicant anticipates the preparation of a lighting plan before the commencement of construction will be required as a standard Condition of Certification, consistent with Kern County lighting LORS.

3.3 Access Roads for Gen-Tie Line

3.3.1 Data Requests DR21 to DR29

The SAFC at page 2-2 indicates the Project would require construction of up to 1.75 miles of unpaved service access road along the gen-tie line corridor. The SAFC at page 6-18 states: "[t]he Preferred Gen-Tie Route includes five named road segments and two segments that do not follow existing roads, which are located at the SR 14 crossing and the SCE Whirlwind Substation interconnection area." The SAFC does not provide a map that depicts the specific areas where new roads would be constructed to access the Preferred Gen-Tie Route. In addition, the AFC does not discuss whether construction of new access roads would be required for the gen-tie route alternatives.

The SAFC at page 5.2-41 states: "[c]onstruction of the gen-tie line alignment will occur in areas that contain a mix of previously developed/disturbed and undeveloped land and will follow already existing overhead powerlines." This statement is inconsistent with Google Earth imagery, which does not show existing overhead powerlines along substantial portions of the Preferred Gen-Tie Route and Route Options.

DR21: *Provide high resolution maps that identify the specific areas that would require construction of access roads (including spur roads) along the Preferred Gen-Tie Route and provide the dimensions of these new access roads.*

Response: The Applicant anticipates using existing ROW and easements to access pole locations for construction and maintenance, consistent with applicable LORS, including those of local and state agencies such as Kern County and California Department of Transportation. The Applicant may need to construct new access roads at the intersection of Dawn Road and Mojave Tropico Road and across SR-14 as needed to comply with LORS and has accounted for this possibility in the SAFC materials.

DR22: *Discuss whether any of the existing roads that would be used to access the Preferred Gen-Tie Route or alternative gen-tie route options would require widening, grading, or other improvements.*

Response: The Applicant anticipates using existing ROWs and easements to access pole locations. The Applicant has proposed no new access roads for the Project. The Applicant does not anticipate needing to widen, grade, or make other improvements to existing roads as part of the temporary activities associated with the gen-tie line. See also DR21 above.

DR23: *Discuss which alternative gen-tie route options would require construction of new access roads (including spur roads).*

Response: The Applicant anticipates using existing ROWs and easements to access pole locations for the construction of the gen-tie line. The Applicant has proposed no new access roads for the Project. See also DR21 and DR22.

DR24: *If construction of new access roads would be required for any of the alternative gen-tie route options, provide analysis of the impacts on biological resources associated with the construction of new access roads.*

Response: No new roads are expected to be required for the gen-tie route options. The Applicant does not anticipate needing to construct new access roads. See also DR21 through DR23 above.

DR25: *Provide high resolution maps that identify the specific areas that would require road construction along the alternative gen-tie route options.*

Response: See also DR21 through DR24 above. The Preferred Route and intersection of Dawn Road and Mojave Tropico Road and the area across SR-14 are illustrated in figures presented in **Attachment DR8-1**. The referenced map book has been submitted through Kiteworks under the reference Attachment DR8-1.

DR26: *Provide high resolution maps that identify the locations of existing overhead powerlines along the preferred gen-tie route and alternative route options.*

Response: Attachment DR26-1 presents high resolution maps that illustrate the location of existing utility poles along the preferred Gen-Tie route and alternative routes. Because this response may include information that is considered Critical Energy Infrastructure Information (CEII) or information that is otherwise sensitive, the Applicant will file **Attachment DR26-1** with a repeated Application for Confidentiality.

DR27: *Describe the environmental effects during construction of the gen-tie line in areas where there are existing powerlines as compared to areas where there are no existing powerlines, if any.*

Response: As depicted in the applicable Attachments, the majority of the gen-tie lines will follow previously disturbed county road ROWs. Moreover, in areas where existing transmission lines are present, potential environmental impacts would be similar or less than where no existing transmission lines exist due to the existing access points required for operation and maintenance of those existing transmission lines.

DR28: *Provide the analysis of impacts on biological resources in areas where there are no existing overhead powerlines along the preferred gen-tie route and/or alternative gen-tie route options.*

Response: Potentially impacted areas are added to the Geographic Information System (GIS) database and a desk-top assessment identifies if sensitive natural resources identified during field surveys are potentially impacted by pole locations. If a pole is identified as occurring within a potentially sensitive natural resource, it can and will be relocated within the surveyed areas to eliminate potential impacts to known sensitive natural resources. Potential project-related impacts will be limited to drilling holes and vegetation clearing around each hole location prior to drilling. Common grasses and other small forbs and herbs may be impacted, but not removed. Therefore, the root structures and seed backs will remain undisturbed during pole installation along areas with no existing overhead powerlines and access roads.

DR29: *Identify the setback distance that would be implemented between the Project's powerlines and existing overhead powerlines.*

Response: The Applicant understands the applicable LORS including those presented in California General Order 95 and will design the Project's powerlines accordingly.

3.4 Gen-Tie Line Fire Hazard Abatement

3.4.1 Data Requests DR30 to DR32

The SAFC at page 3-10 states: "[t]he gen-tie corridor and immediate area will be maintained in accordance with existing regulations and accepted industry practices that will include identification and abatement of fire hazards." Information on the specific maintenance activities for fire hazard abatement that will be conducted along the gen-tie corridor is needed to analyze the environmental impacts of those activities.

DR30: *Identify the width of the gen-tie corridor.*

Response: The width of the gen-tie corridor varies up to 125 feet to allow for pole placement and other activities to avoid potential impacts. The final horizontal dimensions of the corridor will be based on the applicable LORS.

DR31: *State the total acreage of the gen-tie corridor and "immediate area," as described on SAFC page 3-10, that will be maintained in accordance with existing regulations and accepted industry practices.*

Response: Table DR9-1 presents acreage associated with the gen-tie ROW. The final horizontal dimensions of the corridor will be based on the applicable LORS.

DR32: *Discuss the vegetation management activities that would or might be conducted in the gen-tie corridor and immediate area.*

Response: The vegetation management activities associated with the gen-tie corridor will include steps to reduce encroachment of vegetation along the edges of the ROW. The Applicant will manage vegetation in accordance with applicable laws and regulations for the State of California and Kern County. In the CAL FIRE State Responsibility Area (SRA), the requirement for clearances around poles and towers is contained in Public Resources Code (PRC) 4292. This section requires clearing of flammable fuels for a minimum 10-foot radius from the outer circumference of certain poles and towers and 4 feet from the lines. The distances for clearance requirements must be measured horizontally, not along the surface of the sloping ground. Despite occurring within a Local Responsibility Area (LRA), vegetation management for the Project site will occur in alignment with PRC 4292 as similar guidance for this specific LRA does not exist.

3.5 Impacts to Jurisdictional Aquatic Resources

3.5.1 Data Requests DR33 to DR42

The 2024 Jurisdictional Waters Delineation Report defines the jurisdictional delineation study area as the energy storage facility, gen-tie alignment, additional workspace, and additional areas beyond the limits of the Project site, both upstream and downstream. (TN 258308 at p. 2) The report states: "[f]ield surveys were completed by walking or driving the entire study area (with some exceptions due to private property access) …" (*Id.* at p. 4) However, the report does not identify, or quantify the size of, the areas that could not be surveyed due to private property access issues. In addition, although the maps provided in the report suggest there were "no right of entry areas" in the study area, the extremely small scale of the maps precludes the ability to discern where those "no right of entry areas" are located.

The 2024 Jurisdictional Waters Delineation Report states that 19 ephemeral drainages were documented in the study area. (TN 258308 at p. 9) The report further states that "jurisdictional waters within the study area are situated in the footprint of the additional workspace areas or transmission line alignments." (*Id.* at p. 15) The ephemeral drainages are mapped in Figure 8 of the report. However, the extremely small scale of the map precludes the ability to discern where drainages are located in relation to the workspace areas and other Project components. In addition, although the report (p. 9) states: "[s]ite photos of representative portions of the on-site drainages are included in Appendix B," the appendix omits photos for drainages C, P, Q, and S. (*Id.* at p. 9)

The SAFC does not incorporate data from the 2024 jurisdictional delineation. However, the SAFC determined one drainage feature would be potentially impacted by the Project within the P2 south Staging Area. (TN 254806 at p. 5.2-8) According to the SAFC, the Applicant has agreed to avoid this drainage feature. (*Ibid.*) In addition, the Applicant has also agreed to avoid drainage features potentially impacted by the gen-tie poles. (*Ibid.*) The single drainage feature referenced at page 5.2-8 of the SAFC diagonally bisects the P2 south Staging Area. The Applicant's site plans suggest this drainage feature would be directly impacted by a parking area (TN 254813,

Figure 2-1). Additional information is necessary to determine the significance of indirect impacts on the jurisdictional drainage feature. Specifically, it cannot be determined whether using the southwest half of the P2 south Staging Area would require vehicles and equipment to drive across (through) the drainage, whether the drainage feature could be indirectly impacted by the architectural berm (which would be constructed north and east of the drainage), and whether the drainage feature would be impacted by vegetation removal within the Staging Area. The SAFC states: "[c]onstruction of the WRESC will include complete vegetation removal within the WRESC Site as well as P1 and P2 Staging Areas." (*Id.* at p. 5.2-41) The SAFC does not include analysis of these and potentially other indirect impacts.

DR33: *Provide maps at a minimum scale of 1:6000 (1 inch = 500 feet) that depict the 19 drainages documented in the study area.*

Response: Attachment DR33-1 presents maps that depict the study area[6] and documented drainages at a scale of 1:6,000. **Attachment DR33-1** was submitted to the CEC under a repeated Application for Confidentiality.

DR34: *Provide maps at a minimum scale of 1:6000 (1 inch = 500 feet) that depict the portions of the study area that could not be field surveyed.*

Response: Portions of the study area that could not be field surveyed were mapped based on aerial interpretation and observations from areas where access was available. **Attachment DR33-1** presents the previously submitted confidential maps at a scale of 1:6,000 (1 inch = 500 feet). **Attachment DR33-1** was submitted to the CEC under a repeated Application for Confidentiality.

DR35: *Identify the acreage of the areas that were not field surveyed.*

Response: The total number of acres identified as a drainage feature and/or adjacent wetlands that were not field surveyed is approximately 10.24 acres. These areas were observed from a distance using binoculars to verify their presence.

DR36: *Provide a high-resolution map that shows the parking area depicted in the site plan (TN 254813, Figure 2-1) in relation to the drainage feature that bisects the P2 south Staging Area.*

Response: This area was previously mapped as a parking area prior to the completion of the August 2024 jurisdictional delineation report (TN# 258308). Since a drainage feature was identified within the P2 South Area, the Applicant has agreed to avoid this area. **Attachment DR33-1 Figure DR33-9** presents the above-referenced drainage feature and the P2 South Staging Area.

DR37: *Explain how impacts to the drainage feature in the P2 south Staging Area will be avoided during activities in that staging area.*

Response: As required during detailed design, the Applicant will be preparing a final Stormwater Pollution Prevention Plan for the Project's construction that will identify avoidance areas and BMPs. The drainage feature in the P2 South Staging Area will be avoided by installing a silt fence or similar barrier along the perimeter of the drainage. The barrier will be used to identify the drainage to keep construction crews from accidental entry. The fence will also be used to avoid Project debris, spoils, and construction equipment from entering the drainage.

[6] The study areas for survey's of biological resources are resource specific and defined in Section 5.02 of the SAFC.

DR38: *Provide the analysis of the Project's indirect impacts on the potentially jurisdictional aquatic resources.*

Response: As required during detailed design, the Applicant will be preparing a final Stormwater Pollution Prevention Plan for the Project's construction that will identify avoidance areas and BMPs. The drainage features associated with the additional workspace areas and the gen-tie lines are ephemeral except for two ponded areas along the northern side of Rosamond Boulevard. Run-off from the construction activities will be contained on-site and/or directed away from ephemeral drainage features and adjacent ponded areas. Run-off associated with the proposed Project will be directed to upland areas and allowed to sheet flow and natural percolate. Straw waddles, haybales, or similar energy dissipaters will be used to reduce erosion in upland areas.

DR39: *Describe the impacts on the drainage feature within the P2 south Staging Area from moving vehicles and equipment usage.*

Response: The P2 South Staging Area has been designed to avoid potential impacts to the drainage feature. The parking area associated with the P2 South Staging Area will either be designed to avoid the drainage feature with incorporation of a 25-foot buffer, or the P2 South Staging Area will be excluded from use if deemed unnecessary during the Project's detailed design.

DR40: *Describe the impacts on the drainage feature within the P2 south Staging Area from the construction of the architectural berm.*

Response: If the architectural berm is constructed in the P1 Staging Area, then a portion of the P2 South Staging Area may be required. If required, the parking area will be designed to include the northeastern portion of the P2 South Staging Area and avoid the existing drainage feature.

DR41: *Describe the impacts on the drainage feature within the P2 south Staging Area from vegetation removal within the Staging Area.*

Response: The drainage will be avoided; as such, no potential impacts to the drainage are predicted to result from vegetation removal. As required during detailed design, the Applicant will be preparing a final Stormwater Pollution Prevention Plan for the Project's construction that will identify avoidance areas and BMPs.

DR42: *Provide site photos for drainages C, P, Q, and S.*

Response: Attachment DR42-1 presents the photos for identified drainages C, P, Q, and S. Due to its file size, the photographs have been submitted through Kiteworks under the reference Attachment DR42-1.

3.6 Vegetation Classification and Mapping

3.6.1 Data Requests DR43 to DR52

It is unclear what methods were used to classify vegetation communities in the Project study area. The SAFC states: "[v]egetation maps were taken from the CDFW Vegetation Classification Reports (CDFW 2021b)." (TN 254806 at p. 5.2-10) However, the SAFC states:

"Vegetation mapping was conducted to determine the vegetation communities and habitat suitability for special-status and listed species within the Study Area. Mapping was completed following the National Vegetation Classification System per the Manual of California Vegetation (MCV), Second Edition (Sawyer et al. 2009). Biologists drove throughout the entire Study Area, where accessible, and accessed areas as needed on foot." (*Id.* at p. 5.2-18)

With regards to Joshua Tree specifically, there is conflicting information on the presence of Joshua Tree Woodland (*Yucca brevifolia* alliance) at the WRESC site and staging areas. According to the 2023 Mohave ground squirrel survey report, Joshua Tree Woodland occurs at the "Ansel Properties," which encompasses the WRESC site, and staging areas P1, P2N, and VH. (TN 254818) The 2024 Mohave ground squirrel survey report identified Joshua Tree Woodland in the two trapping grids, which were located in the P2N Staging Area and along a portion of Gen-Tie Route Option 2b. (TN 258310) According to the SAFC, Joshua Tree Woodland occurs in portions of Gen-Tie Route Option 2b corridor, but not at the WRESC site, or in the P1, P2N, and VH staging areas (TN 254806, Figure 5.2-5 series). The membership rules for the *Yucca brevifolia* alliance are: "*Yucca brevifolia* evenly distributed at ≥ 1% cover, *Juniperus* and/or *Pinus* spp. < 1% absolute cover in the tree canopy." (CNPS 2024) The SAFC does not provide cover values for *Yucca brevifolia* in areas where vegetation communities were classified; however, the Biological Resources Assessment Report at page 54 states the Project site has "moderate to high concentrations of this species."

DR43: *State the methods that were used to classify vegetation communities in the 2023 and 2024 Project study areas.*

Response: The methods used to classify vegetation communities during the 2023 and 2024 surveys were based on standards outlined in the California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan (Reyes et al. 2021). This methodology was presented in Section 3.2 of the August 2024 Willow Rock Energy Storage Project Biological Resources Assessment (TN# 258316). These are methods applied for the purposes of vegetation community identification for the Willow Rock Energy Storage Project. The initial step included a desktop review of recent aerial photographs (2022 and 2023) overlaid with the GIS layer of the California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan (Reyes et al. 2021). This Plan was prepared for the U.S. Bureau of Land Management by Aerial Information Systems, Inc. and maintained by the California Department of Fish and Wildlife. Data in the 2021 dataset applied to the Project was collected using protocols compliant with the Federal Geographic Data Committee (FCDC) and National Vegetation Classification Standards (NVCS).

The base map created from the desktop phase was used as the foundation for the vegetation mapping created for the project. Data from the Project area plus a 500-foot buffer around the gen-tie line alignment and a 1,000-foot buffer around the project site was uploaded into the Field Maps Application and was field verified by driving and walking accessible portions of the Project. Consistent with sound professional practice, areas within the project site that did not accurately depict the vegetation communities identified in the 2021 data, either due to overgeneralization, not field verified, or conversion since the 2021 mapping effort, were modified using GPS data collected in the Field Map Application.

DR44: *Provide the CDFW Vegetation Classification Reports referenced on page 5.2-10 of the SAFC since the reference provided (i.e., CDFW 2021b) does not identify the specific reports that were used.*

Response: The main report used for the base vegetation mapping is:

> *Reyes, E., A. Glass, J. Menke, J. Evens, K. Sikes, T. Keeler-Wolf, D. Johnson, S. Winitsky, and A. Hepburn. 2021. California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan, Contract L17PX00036. Final Report. Prepared for the U.S. Bureau of Land Management. Aerial Information Systems, Inc., Redlands, CA.*

DR45: *Discuss the specific methods that were used in areas where the Applicant's biologists independently classified vegetation communities (as opposed to using the CDFW Vegetation Classification Reports). This should include:*

a) the minimum mapping unit;

b) the sampling protocol (e.g., CDFW and CNPS 2024); and

c) the methods used to estimate cover of dominant plant species.

Response: Responses to a, b, and c are as follows:

a) The same minimum mapping units applied to Reyes et. al (2021) were used (10 acres, with the exception of wetlands and wash types, which were reduced to 2.5 acres).

b) Vegetation community polygons originally mapped in Reyes et. al (2021) were field verified to confirm accuracy based on current site conditions. If the vegetation polygon was visually verified as accurate, it was not changed. However, if there was a difference in the vegetation community structure, such as dominant species or disturbance level, it was updated in the field.

c) Cover of dominant species was visually estimated based on the previously prepared GIS vegetation community layer and existing vegetation cover.

DR46: *Identify and provide high resolution maps of the vegetation associations within the 2023 and 2024 study areas in accordance with the state and national classification standards.*

Response: Attachment DR46-1 presents high resolution maps of the vegetation associates within the 2023 and 2024 study areas. The referenced map book has been submitted through Kiteworks under the reference Attachment DR46-1.

DR47: *Provide high resolution maps that delineate the specific areas where vegetation communities were not surveyed in 2023.*

Response: Attachment DR47-1 presents high resolution maps that show areas with right-of-entry and areas that were surveyed from a distance in 2023 and 2024. There were no areas within the project study area[7] that were excluded from mapping. Areas with no right-of-entry were surveyed using binoculars from parcels with granted right-of-entry or from existing county roadways. The referenced map book has been submitted through Kiteworks under the reference Attachment DR47-1.

DR48: *Provide high resolution maps that delineate the specific areas that were not surveyed in 2024.*

Response: The high resolution vegetation maps do not include areas that were not evaluated. Areas, including inaccessible areas, were visible from adjacent properties where access was provided or from existing county roadways. There were no areas within the project study area that were excluded from mapping.

DR49: *Identify the portions of the 2023 and 2024 study areas where there is ≥ 1% cover of Joshua trees.*

[7] The project study area for the vegetation community mapping is described in Section 5.02 of the SAFC.

Response: Those areas mapped as Joshua Tree Woodland were the only areas in the Project footprint that meet the ≥ 1% cover of Joshua Tree consistent with the California Native Plant Society minimum criteria for this sensitive plant community. The areas mapped as Joshua Tree Woodland occur in the gen-tie alignment and potential impacts would be **minimized** by reducing the Project footprint, where possible, to avoid impacting Joshua trees. The vegetation community is identified in Figure 5-3 of the August 2024 Willow Rock Energy Storage Project Biological Resources Assessment (TN # 258316).

DR50: *Describe the methods utilized to estimate the cover of Joshua trees.*

Response: Joshua tree data was collected during the 2023 and 2024 CDFW Protocol Census surveys. Each Joshua tree was photographed, mapped using GPS, and documented using the required data set described in the CDFW Census Instructions. Total vegetation cover is not a required metric in the census data collection. In order to document the estimated cover of Joshua trees, each class of Joshua tree was provided a specific footprint based on a visual estimate of random tree samples for each size. Trees classified as Class 1 (< 1m) had an average of 1-foot diameter canopy cover with a dozen trees sampled. Trees classified as Class 2 (1m to 5 m) had a 4-foot-wide canopy cover with a dozen trees sampled. Class 3 trees (>3m) had a 12-foot diameter canopy cover with a dozen trees sampled.

Joshua tree coverage was estimated using a minimum 10-acre mapping unit. Based on this map unit, Joshua tree coverage would need to cover more than 4,356 square feet to meet the definition of a Joshua Tree Woodland (>1%), which is equivalent to a minimum of 38 trees based on a standard Class 3 tree covering 113 square feet. The densest portion of the WRESC project element has a density of Joshua trees estimated to be 0.6% cover or 2,634 square feet.

DR51: *Describe the methods utilized to estimate the cover of other dominant plant species.*

Response: The Applicant verified existing data from the State of California's databases on vegetation by visually assessing the study area and comparing observed vegetative species to the database results. Consistent with site access constraints and professional standards, no specific transects or other vegetation sampling was performed to confirm the database results.

DR52: *Explain the reason for the discrepancy between the SAFC and the Mohave ground squirrel survey reports with respect to presence of Joshua Tree Woodland at the WRESC site and staging areas.*

Response: There is no "discrepancy," as explained below. The Mohave Ground Squirrel Survey Report (TN# 258310) was prepared by a permitted Mohave Ground Squirrel Biologist who was not involved with the overall vegetation mapping of the Project site. As part of the first stage of a Mohave Ground Squirrel protocol survey, the Biologist documented potentially suitable habitat to identify trapping locations. The Mohave Ground Squirrel Biologist did not conduct census surveys for Joshua tree. The difference in the description of Joshua Tree Woodland is based on different survey requirements. Joshua tree density was not quantified for the Mohave Ground Squirrel protocol surveys.

3.7 Joshua Tree Census

3.7.1 Data Requests DR53 to DR55

According to the Joshua Tree Census Report, 3,196 Joshua trees were documented during the 2023 census, of which, 2,718 would be either removed or relocated. (TN 254820 at p. 4 and Appendix B) An additional 253 western Joshua trees were documented during the 2024 census. (TN 258311 at p. 4). Approximately 153 of these

trees would be directly impacted by the Project; the remaining 100 trees would be avoided because they are located east of the railroad and Sierra Highway. (TN 258311 at p. 5). The Biological Resources Report 2024 Addendum's description of the Joshua tree census states:

"[t]he entire project footprint was systematically searched using parallel survey transects spaced approximately 5 meters apart to achieve thorough coverage of the project area, including a 1,000-foot survey buffer." (TN 258316 at p. 18) The addendum does not explain why it was possible to survey Joshua trees throughout the entire Project area and 1,000-foot buffer, but not possible to survey the entire Project area for other biological resources due to private property restrictions.

The SAFC and associated survey reports do not address the Project's indirect impacts on western Joshua trees. In its comment letter on the original WRESC Project, CDFW indicated that Joshua trees within 290 feet of the Project site and linear features would be indirectly impacted. (TN 245782)

DR53: *Explain how Joshua tree surveys were performed throughout the entire Project area and 1,000-foot buffer without access or safety limitations.*

Response: The project will comply with all applicable requirements under the Western Joshua Tree Act. Joshua tree surveys were only completed in those areas that contain full access. Inaccessible areas containing Joshua trees were not mapped. Once full access is provided, the additional Joshua trees will be included in the census to document potential project-related impacts and determine the appropriate mitigation measures.

DR54: *Provide the analysis of the Project's indirect impacts on Joshua trees.*

Response: The project will comply with all applicable requirements under the Western Joshua Tree Act. Potential indirect impacts to Joshua trees were assessed in accordance with the Western Joshua Tree Act. This Act requires that trees that could be removed or damaged by the Project (e.g. root systems) be enumerated and characterized. Indirect impacts beyond what is characterized through the Western Joshua Tree Act methodologies are not expected.

DR55: *State the total number of Joshua trees within 290 feet of the Project site and linear features (including staging areas and gen-tie line routes).*

Response: The total number of Joshua trees recorded in the accessible areas of the project including workspace areas and within the gen-tie alignment is 4,062 trees. However, some of these Joshua trees, particularly along the gen-tie line and some additional workspace areas, will be avoided and may be outside of the 290-foot buffer. It should also be noted that the 290-foot avoidance area was identified by CDFW as an additional avoidance area prior to the issuance of the Western Joshua Tree Act. Under the Western Joshua Tree Act, the potential impact area was reduced to a 50-foot buffer to account for indirect effects associated with project-related impacts to the root system. Accordingly, the project will comply with all applicable requirements under the Western Joshua Tree Act.

3.8 Impacts to Sensitive Natural Communities

3.8.1 Data Requests DR56 and DR57

The SAFC states that one of the criteria that was assessed to determine the significance of the Project's impacts on biological resources is whether the Project would "[h]ave a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS." (TN 254806 at pp. 5.2-39-40) However, the SAFC does not provide an assessment of the Project's

impacts on sensitive natural communities. For example, the White Bursage Scrub alliance occurs at the WRESC site and within other portions of the study area. (TN 254806, Figures 5.2-5-1 through 5.2-5-16) All of the associations in the White Bursage Scrub Alliance are considered sensitive natural communities. (CDFW 2023)

DR56: *Provide the analysis of the Project's direct and indirect impacts on sensitive natural communities.*

Response: The only sensitive natural community identified within the project footprint is Joshua Tree Woodland as described in Section 4.2 of the August 2024 Willow Rock Energy Storage Project Biological Resources Assessment Report (TN# 258316). The project will comply with all applicable requirements under the Western Joshua Tree Act. Potential impacts to this community will be limited to the placement of gen-tie line poles, which will be strategically placed to avoid Joshua trees. White Bursage Scrub Alliance is listed under the 2023 CDFW California Natural Community List as a Class S5 community. Only natural communities with an S1 to S3 rating are considered sensitive. Therefore, White Bursage Scrub Alliance is considered a common vegetation community.

DR57: *Quantify the acreage of sensitive natural communities that will be impacted by the Project*

Response: Based on the vegetation map presented as Figure 5-3 in the August 2024 Biological Resources Assessment Report (TN# 258316), there are approximately 8 acres of Joshua Tree Woodland within one of the proposed gen-tie options. If one of these options is selected, the project's potential impacts will be calculated based on a temporary impact of 100 square feet for pole installation and a permanent impact of 16 square feet for vegetation management around each pole. Estimated length of ROW that is within the Joshua Tree Woodland area is 3,250 linear feet (750 feet for one alternative and 2,500 linear feet for the other alternative). Existing transmission line poles along Rosamond Boulevard are between 650 feet and 800 feet apart. Therefore, it is estimated that the total number of poles will range from 2 to 4 poles depending on the route selected. Based on the estimated disturbance area, the maximum disturbance to Joshua Tree Woodland is no more than 400 square feet. The project will comply with all applicable requirements under the Western Joshua Tree Act.

3.9 Swainson's Hawk Surveys

3.9.1 Data Requests DR58 to DR75

In 2023, biologists conducted surveys for Swainson's hawks within the Project site and 0.5-mile buffer. (TN 254816, Table 1) In 2024, biologists conducted surveys for Swainson's hawks within additional project areas that were added after the 2023 surveys. (TN 258312 at p. 1) Similar to the 2023 surveys, the 2024 surveys also included a 0.5-mile buffer.

The Swainson's Hawk Survey 2024 Addendum states:

"CDFW staff (Jeremy Pohlman) was contacted prior to conducting the surveys to confirm the survey limits would include a 0.5-mile buffer around the project site. This revised survey buffer is allowed under the protocol based on the known recorded Swainson's hawk nest within 7 miles of the project site. CDFW allowed the 0.5-mile buffer per the protocol, but in addition requested a general nest survey with a 5-mile buffer around the project site, which was completed (Figure 5, Swainson's Hawk Sightings and Nest Locations)." (TN 258312 at p. 3)

Guidance issued by the CEC and CDFW for renewable energy projects in the Antelope Valley, however, states:

"The Department considers a nest site to be active if it was used at least once during the past 5 years. Impacts to suitable habitat or individual birds within a five-mile radius of an active nest will be considered significant and to have the potential to "take" Swainson's haws as that term is defined in §86 of the Fish and Game Code." (CEC and CDFG 2010)

The BRAR Addendum states: “Swainson’s hawk are known to have an active nest 7 miles west of the project site. Since the project area is not within 5 miles of the nest, no mitigation measures are required for foraging habitat impacts.” (TN 258316 at p. 53) The BRAR Addendum provides the following discussion of the active nest: “[o]n June 5, 2024, a pair of Swainson’s hawks were documented near the nest reported by WSP during the desert tortoise survey (2024c), which is located off site (Figure 10).” (*Id.* at p. 47) However, according to the Desert Tortoise Survey 2024 Addendum (Table 1), no desert tortoise surveys were conducted on June 5, 2024 (they concluded on April 9, 2024) and the Addendum has no mention of the Swainson’s hawk nest. Also, the nest is located approximately 1.5 miles from the Project’s gen-tie line route, which means it is 1.5 miles from the Project area. (TN 254806 at p. 5.2- 33) Finally, Figure 10 is omitted from the BRAR Addendum.

The Swainson’s Hawk Survey 2024 Addendum provides no information on the “general nest survey with a 5-mile buffer around the project site.” According to the survey report: (1) during Survey Period I, biologists drove through the Project site and 0.5-mile buffer area to identify suitable nesting locations; (2) Survey Period II encompassed the same survey area covered in Survey Period I, but the report does not describe what survey methods were implemented; (3) during Survey Period III, the biologists monitored known/identified active nests identified during Survey Periods I and II; and (4) during Survey Period IV, additional nest monitoring was conducted and the biologists conducted another complete survey of the Project site and buffer area. (TN 258312 at pp. 3-4) Thus, the Swainson’s Hawk Survey 2024 Addendum suggests that surveys during all 4 survey periods were confined to the Project site and 0.5-mile buffer area. Additional information is needed regarding the 2024 survey effort.

The Swainson’s Hawk Survey 2024 Addendum states that focused surveys resulted in mapping a total of 119 nest sites within the 0.5-mile buffer surrounding the Project site. (TN 258312 at pp. 5-6) One nest was of suitable shape and size for Swainson’s hawk, 2 were occupied by red-tailed hawks, 83 were occupied by common ravens, and the occupants of the remaining 33 nests were unknown. (*Ibid.*) This suggests no nests were detected within the Project site, and that only 1 of the 119 nests could have been associated with a Swainson’s hawk. The addendum does not explain how the biologists were able to determine that Swainson’s hawks were not associated with the 33 nests having unknown occupants. In addition, the figures depicting the locations of the nests (TN 258312, Figure 4) and Swainson’s hawk observations (TN 258312, Figure 5) are at an extremely small scale, which precludes the ability to determine where these nests and birds were in relation to the WRESC site and staging areas.

DR58: *Provide reports, documents, and/or studies that support the determination that the protocol allows a 0.5-mile survey buffer if there are known recorded Swainson’s hawk nest sites within 7 miles of the Project site.*

Response: The Swainson’s Hawk Surveys were based on the methods identified in the Swainson’s Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California. State of California, California Energy Commission and Department of Fish and Game, June 2, 2010. On page 4 of the 2010 protocol, at the bottom of the second paragraph, it states: “If hawks or known nest sites are found within the five-mile radius, consult with the Department and the appropriate lead agency for follow-up to the surveys.”

Before conducting protocol-level surveys in the spring of 2021, Blackhawk Environmental Principal biologist Kris Alberts discussed the general survey approach with Jaime Marquez of CDFW. It was agreed that the survey approach would include the mapping of all Swainson’s hawk suitable nest trees within one-half mile of the Project, CDFW-protocol level Swainson’s hawk surveys catered specifically toward the Antelope Valley region, documentation of nest competitors (e.g. raven), and recording all Swainson’s hawk observations within the Survey Area.

When the project location was moved, Jaime Marquez was contacted (phone conversation March 2023) to discuss the survey strategy and the revised protocol was again approved prior to conducting protocol-level surveys in 2023. CDFW representative Jeremy Pohlman was contacted in March 2024, prior to conducting protocol surveys, for approval of the revised protocol based on the known location of the active nest within 5 miles of a portion of the gen-tie line, but 7 miles from the main Project footprint. In addition to the approved *revised survey protocol*,[8] Mr. Pohlman of CDFW in 2024 requested as part of the final protocol survey the biologists include an additional survey of Swainson's Hawks using a 5-mile buffer of the Project site.

DR59: *Provide documentation (e.g., notes, emails, memo) regarding the conversation with CDFW to allow the revised 0.5-mile buffer for Swainson's hawk surveys.*

Response: Conversations with CDFW were completed telephonically. DR58 describes the timing and individuals involved in the referenced conversations.

DR60: *Identify the data relied upon to determine whether there are any active Swainson's hawk nests within 5 miles of the Project site.*

Response: An active nest was identified during the 2021 and 2023 protocol-level surveys. This Swainson's hawk nest has been well documented and has remained active for many years.

DR61: *State the date on which a pair of Swainson's hawks were documented near the nest reported by WSP during the desert tortoise survey.*

Response: The text in the August 2024 Willow Rock Energy Storage Project Biological Resources Assessment Report (TN# 258316) on Page 47, second paragraph, first sentence is in error. Swainson's hawk were incidentally recorded on June 5, 2024 during the sensitive plant surveys, not during desert tortoise surveys. The incidental observation was made by a biologist visiting a known nest location to assess activity status, while the team was conducting the sensitive plant surveys. He was not surveying for sensitive plants in the area associated with the Swainson's hawk nest. Desert tortoise surveys were conducted in early April.

DR62: *Provide a copy of Figure 10, as referenced on page 47 of the BRAR Addendum (TN 258316).*

Response: Figures 9 and 10 were both inadvertently omitted from the August 2024 Willow Rock Energy Storage Project Biological Resources Assessment Report (TN# 258316). Figures 9 and 10 from the Biological Resources Assessment Report are provided as **Attachments DR62-1a and DR62-1b**.

DR63: *Explain why the pair of Swainson's hawks documented near the nest reported by WSP during the desert tortoise survey were not disclosed in the Desert Tortoise Survey 2024 Addendum.*

Response: The Swainson's hawk observations were not included in the Desert Tortoise Report, because they were not observed during the desert tortoise surveys. The Applicant's response to DR61 provides additional context on the findings and what is included in the respective reports.

DR64: *Explain what surveys were being conducted on June 5, 2024, when the pair of Swainson's hawks were documented near the nest reported by WSP.*

[8] The CDFW approved *revised survey protocol* for the Swainson's Hawk Survey required a 0.5-mile buffer of Project features.

Response: Sensitive plant surveys were conducted on June 5, 2024. The pair was observed during a nest check conducted to assess the activity status of a known nest. This nest check was not part of any survey effort conducted on the project site. Since no additional surveys were being conducted in the referenced area in 2024, one of the project biologists wanted to confirm that the nest was still active.

DR65: *Explain why a desert tortoise (or other) survey was being conducted in an area well beyond the boundaries of the survey areas described in Table 1 of the BRAR Addendum.*

Response: A desert tortoise survey was not conducted well beyond the boundaries of the survey area. Data collected were part of the 2023 and 2024 reports associated with the previous Willow Rock Project Site near the intersection of Sweetser Road and Tehachapi Willow Springs Road and associated gen-tie line options. Although the Project features are no longer associated with the Project, the Applicant's consultant concluded that it was necessary to include the additional data regarding the locations of sensitive species.

DR66: *Provide a high-resolution map of the roads that were driven during Survey Period I of the 2023 and 2024 Swainson's hawk surveys.*

Response: A map book showing the roads that were driven during the Survey Period I of the 2023 and 2024 Swainson's hawk survey is presented as **Attachment DR66-1**. The map book has been submitted through Kiteworks due to file size under the reference Attachment DR66-1.

DR67: *Describe the methods that were implemented in Survey Period II.*

Response: As stated in the Willow Rock Energy Storage Center Swainson's Hawk Focused Survey Report (TN# 258312), methods implemented in Survey Period II followed the CDFW Swainson's hawk protocol, specifically referencing Antelope Valley (CEC and CDFW 2010). Public roads and assessable private roads were driven to survey for Swainson's Hawk that have established or are in the process of establishing territories. Trees during this period typically have started to leaf-out but previous nests, staging birds, and other competing raptor species are detectable. The focus of this survey period is checking on previously established nests and surveying the trees and sky for courtship and territorial displays.

DR68: *Describe the methods that were implemented to conduct the "general nest survey with a 5-mile buffer around the project site," including the surveys dates and personnel.*

Response: The methods used to complete the general nest survey with a 5-mile buffer around the Project site were similar to the survey methods implemented in Survey Period II. Public and accessible private roads were driven during daylight hours to survey for suitable nest locations. These surveys were conducted on May 21, 2024 and June 12, 2024. The biologists that performed the surveys were from WSP and included Michael Wilcox, Nathan Moorhatch, Tim Chumley, Emily Urquidi, Melane Bukovac, Sarah Williams, and Melissa Bukovac.

DR69: *Provide the results of the "general nest survey."*

Response: No Swainson's hawk nests were identified during the general nest surveys.

DR70: *Provide high resolution maps depicting the areas that were surveyed for Swainson's hawks in 2023 and 2024.*

Response: Maps depicting the areas that were surveyed for Swainson's hawks in 2023 and 2024 are provided as **Attachment DR66-1**. Attachment DR66-1 shows all roads driven and all parcels with right-of-entry accessed

during 2023 and 2024 surveys. All areas were surveyed either inside a parcel with right-of-entry or using binoculars from a nearby parcel with right-of-entry or a public road.

DR71: *Provide high resolution maps depicting the areas that were not surveyed for Swainson's hawks in 2023 and 2024 due to safety or private property access issues.*

Response: The maps provided in response to DR66 (**Attachment DR66-1**) show areas that were accessible during the surveys. All areas were surveyed either inside a parcel with right-of-entry or using binoculars from a nearby parcel with right-of-entry or a public road.

DR72: *Explain how the biologists determined that 83 of the nests were occupied by common ravens. Specifically, discuss whether ravens were observed at all 83 of the nests or if biologists made their determination based on other variables.*

Response: Common ravens were visually observed by biologists at all 83 nests listed as having been occupied by ravens.

DR73: *Provide photographs of the 33 nests with unknown occupants, if available.*

Response: Photographs were only taken at active nests, as such, photographs of nests with unknown activity status are not available.

DR74: *Provide high resolution maps depicting the locations of the nests detected during the 2023 and 2024 surveys.*

Response: Attachment DR74-1 presents high resolution maps depicting the locations of the nests detected during the 2023 and 2024 surveys. These maps are submitted under a repeated Application for Confidentiality.

DR75: *Provide high resolution maps showing the locations of Swainson's hawks detected in 2023 and 2024.*

Response: Attachment DR75-1 presents high resolution maps depicting the locations of Swainson's hawks detected in the 2023 and 2024 surveys. These maps are submitted under a repeated Application for Confidentiality.

3.10 Burrowing Owl Surveys

3.10.1 Data Requests DR76 to DR81

The Burrowing Owl Focused Survey Report states: "WSP biologists (Table 1) walked a maximum of 30-meter-wide belt transects within the project site, including a 150-meter (500-foot) survey buffer, herein referred to as the burrowing owl 'study area', allowing for 100 percent visual coverage within the study area (Figure 4, Survey Transects)." (TN 254817 at p. 7) The survey report also states: "survey methods followed the guidelines per the Staff Report on Burrowing Owl Mitigation (CDFG 2012)," except with respect to the timing of the surveys, which was approved by CDFW. (*Id.* at p. 7) However, the 30-meter transect spacing implemented during the surveys is inconsistent with CDFW's Staff Report on Burrowing Owl Mitigation, which states: "[c]onduct surveys by walking straight-line transects spaced 7 m to 20 m apart, adjusting for vegetation height and density." The survey report does not discuss whether CDFW approved this modification to the survey methods.

The Burrowing Owl Focused Survey Report further states that: "[i]n deciding the size of a suitable burrow, the entrance must be larger than four (4) inches (11 cm), the burrow must have a sloping entrance (no vertical holes),

and the burrow should be more than 36 inches deep (91 cm) to provide cover." (*Ibid.*) The survey report does not provide a scientific citation to substantiate this information.

The survey report concludes that "[t]he surveys resulted in a total of 29 unoccupied suitable burrowing owl burrows, the majority of which were found in the energy storage facility area (Figure 5, Burrowing Owl Observation and Suitable Burrow Locations)." (*Id.* at p. 8) This statement is inconsistent with Figure 5 in the survey report, which only depicts one or two burrows at the WRESC site.

Figure 5 in the survey report shows 3 locations where burrowing owls were observed. The survey report states these 3 burrowing owls "were incidentally observed by WSP biologists during the 2023 survey efforts." (*Ibid.*) The 3 locations where burrowing owls were observed, and many of the potential burrowing owl burrows, are mapped well outside of the burrowing owl study area. This has implications on the burrowing owl survey effort and the accuracy of the information provided in the survey report and SAFC.

DR76: *State whether CDFW approved the 30-meter transect spacing implemented during the 2023 burrowing owl surveys.*

Response: The reference to 30-meter transect spacing in the Burrowing Owl Focused Survey Report (TN# 254817) for the 2023 burrowing owl survey is a typographical error. It should read either 30-foot transects, or 10-meter transects. The Burrowing Owl Focused Survey Report Addendum (TN# 258315) submitted in August 2024 correctly describes the transect width as 10-meter wide.

DR77: *Provide a scientific citation for the Burrowing Owl Focused Survey Report's statement that suitable burrowing owl burrows must have an entrance larger than 4 inches, the burrow must have a sloping entrance (no vertical holes), and the burrow should be more than 36 inches deep.*

Response: Typical burrowing owl burrow entrance size ranges from 4 – 6 inches (11 - 15 cm) and the burrow slants approximately 15° downward from the entrance, with an enlarged cavity at the end of the tunnel (Zarn 1974, Poulin et al. 2020). Burrows are often less than 3 feet (1 m) deep, often extending 6-9 feet (2–3 m) in length, with frequent turns to avoid roots and other obstructions (Poulin et al. 2020).

DR78: *Explain the discrepancy between the Burrowing Owl Focused Survey Report's statement that most of the 29 unoccupied burrows were found in the energy storage facility area, and the data depicted on Figure 5 of the survey report.*

Response: There is no discrepancy, as explained below. Regarding the January 2024 Burrowing Owl Survey Report (TN# 254817), the data depicted in Figure 5 includes additional survey areas that were proposed as part of the project alternatives but were rejected. The point data north of Rosamond Boulevard is associated with the original WRESC location at the intersection of Sweetser Road and Tehachapi Willow Springs Road. The point data along Sweetser Road is associated with a previously proposed, but rejected, gen-tie route option. The points southeast of the WRESC location as associated with a parcel of land that was an alternative WRESC site that was also rejected. Since this data was collected as part of the project analysis, we included it in our report, even though these areas are not part of the proposed project.

DR79: *Discuss whether the entire burrowing owl study area, as defined on page 7 of the Burrowing Owl Focused Survey Report, was surveyed for burrowing owls during each of the four survey passes identified in Table 1 of the survey report.*

Response: The burrowing owl study area was surveyed completely during the initial burrow survey, which was also designated as the first burrowing owl survey. Areas with suitable burrows documented during the initial burrow survey in the burrowing owl study area were revisited during the remaining three protocol-level surveys.

DR80: *If some of the survey passes were limited to surveys of previously identified burrows, identify the number and locations of burrows that were surveyed during each survey pass.*

Response: A total of 11 burrows were identified during the initial burrow survey/first burrowing owl survey and these burrows were consistently surveyed throughout the remaining three protocol-level surveys.

DR81: *Explain why the 2023 burrowing owl surveys included surveys of burrows outside of the study area, including burrows on the northwest side of Willow Springs Butte, a burrow north of the Rosamond Solar Project, and burrows southeast of the WRESC site along 10th Street W.*

Response: The additional survey areas were part of previously proposed project elements for the Sweetser Road site that are no longer part of the Project. Given data had been recorded in these areas, it was prudent that the data be presented for completeness.

4.0 HAZARDOUS MATERIALS AND HAZARDS

4.1 Chemical Inventory and Water Treatment

4.1.1 Data Requests DR82 to DR91

An estimated 1,400 acre-feet of water (incorporating approximate 20 percent contingency) over a 5-year period will be needed throughout the construction and startup period. (TN 254805 at p. 5.15-11) Most of the water will be used for cavern development and filling the hydrostatically compensating reservoir. (*Ibid.*) Other uses include surface works (hydrotesting and general purpose washdown) and fire system testing.

Water used for hydrotesting will be reused for hydrotesting other systems, including the spheres, pipe circuits, and initial fill. (*Id*. at p. 5.15-12) A temporary pumping sub-system with screening and filtering capabilities will be utilized to re-use this water. (*Ibid.*) After all testing, the volume of hydrotest water (losses at flange breaks, nozzle spray tests, etc.) will be screened and filtered to a suitable cleanliness level to supplement the initial fill volume of the cold thermal storage tanks and/or reservoir. (*Ibid.*)

The Antelope Valley East Kern Water Agency ("AVEK") supply water will be used for make-up to the plant water system, fire protection, and general needs such as equipment and surface washdown. (*Id*. at p. 5.15-14)

Project wastewater will be diverted to the zero-discharge evaporation pond. The oil-free evaporation pond will be maintained, and the remaining "sludge" will be hauled offsite by an approved waste disposal company to an approved disposal facility. (*Id.* at p. 5.15-13)

Water in the system will be treated with hazardous water treatment chemicals. (TN 254806 at p. 5.5-2) Those chemicals include eye and skin irritants, corrosives, and acutely toxic compounds when ingested or inhaled. At least two of the compounds used on site, ChemTreat BL1280 and ChemTreat BL1559, are federally or state regulated substances. (*Id.* at p. 5.5- 7)

Table 5.5-2 in the original AFC set forth the operational chemical inventory and description of hazardous materials to be stored on site during operations. (TN 240751-1 at p. 5.5-4) The table disclosed the types of compounds to be used and their regulatory constraints. (*Ibid.*) Several of the chemicals disclosed in the initial AFC were not included in the more limited chemical inventory identified in the SAFC. (TN 254806 at p. 5.5-5) Table 5.5-2 in the

SAFC also discloses information regarding Proposition 65 list of chemicals. (*Id.* at p. 5.5-4) ChemTreat BL 1280, for example, is labeled as “No” under Prop 65 yet the MSDS from ChemTreat shows that BL 1280 contains catechol (CAS Number 120-80-9) and benzophene (CAS Number 119-61-9), which are listed under Prop 65. (ChemTreat 2023)

DR82: *Explain why Table 5.5-2 in the SAFC identifies fewer chemicals to be stored onsite as compared to Table 5.5-2 in the initial AFC.*

Response: The former project site underwent an initial front-end engineering design process, in which there has been a refinement of the chemicals required for both construction and operation. The list is current, consistent with the Project’s design.

DR83: *Discuss which chemicals, if any, will be added to the surface reservoir to control potential growth of microbes in the reservoir.*

Response: Chemical dosing of the surface reservoir is not expected to be required for the Project’s operations. The following provides the rationale for this determination:

- The compensation water is not expected to have water quality deviations that negatively affect system performance.
- The compensation water functions exclusively as a displaced fluid ensuring near-constant hydrostatic head for the storage cavern.
- There are mitigation measures in place through oxygenation (ensuring aerobic digestion removing MIC and most aesthetic concerns) and the evaporative cover over the reservoir which limits the organics that will get into the reservoir, reduces algae growth by blocking the sun from reaching the water surface, and reduces the build-up of salts left behind by evaporation.

The operations phase of the Project will include monitoring of the reservoir for microbes.

DR84: *Describe how the water-filled subterranean cavern will be treated to prevent fouling of the system.*

Response: The compensation water in the cavern is common to the water in the reservoir as the water moves back and forth between the two. Chemical dosing is not expected to be required to prevent fouling of the system. The compensation water is not expected to have water quality deviations that negatively affect system performance. The water functions exclusively as a displaced fluid ensuring near-constant hydrostatic head for the storage cavern. There are mitigation measures in place through oxygenation (ensuring aerobic digestion removing MIC and most aesthetic concerns) and the evaporative cover over the reservoir which limits the organics that will get into the reservoir, reduces algae growth by blocking the sun from reaching the water surface, and reduces the build-up of salts left behind by evaporation. The operations phase of the Project will include monitoring of the reservoir for microbes.

DR85: *Explain how ChemTreat BL 1280 will be used and added to the thermal management system water treatment.*

Response: This helps reduce corrosion in the close-looped thermal fluid system as it is an oxygen scavenger. It is commonly used in boiler water. It is injected into the thermal fluid stream through dosing pumps on an as-needed basis only to maintain the thermal fluid water.

DR86: *Explain how ChemTreat BL 1559 will be used and added to the thermal management system water treatment.*

Response: These are amines used to reduce corrosion by neutralizing the pH in the thermal fluids. It is commonly used in boiler and steam water systems. It is injected into the closed-looped thermal fluid stream through dosing pumps on an as-needed basis only to maintain the thermal fluid water.

DR87: *Explain how ChemTreat CL 2900 will be used and added to the cooling water treatment.*

Response: This is sodium molybdate and is commonly used in steel-piped closed cooling systems as a corrosion inhibitor. It is injected through dosing pumps on an as-needed basis only to maintain the cooling water.

DR88: *Explain how ChemTreat CL 2150 will be used and added to slimicide.*

Response: ChemTreat CL2150 is a non-oxidizing biocide that will be required on an as-needed basis. The need for dosing the thermal management and closed cooling water systems with this chemical will be based upon field testing and will be by individual treatment.

DR89: *Explain how sodium hypochlorite will be used and added to the oxidant wash, chlorination, prechlorination.*

Response: It is used for initial tank cleaning and then general tank maintenance for the fire, service, and potable water storage tanks. It acts as a biocide.

DR90: *Provide the material safety data sheets ("MSDS") of each compound that will be used, stored, or transported to the facility.*

Response: The material safety data sheets of each compound that will be used, stored, or transported to the facility are provided in **Attachment DR90-1**.

DR91: *State whether the Prop 65 information in Table 5.5-2 is based on the chemical constituents in each trade name product.*

Response: The Prop 65 information in Table 5.5-2 is based on the chemical constituents in each trade name product.

4.2 Radon

4.2.1 Data Requests DR92 to DR96

Table 5.17-1 contains the construction hazard analysis for the Project. (TN 254805 at p. 5.17-2) The SAFC discloses that during shaft drilling, explosive gas mixtures may be encountered. (*Id.* at p. 5.17-4) In addition to the presence of explosive gases, underground excavations can release radon, a naturally occurring radioactive noble gas. Radon is a decay product of uranium found in varying concentrations in all soils and rocks in the earth crust. (Tukkaraja. et al., 2021) It is colorless, odorless, tasteless, and a leading cause of lung cancer death in the USA.

Radon exposure has been documented in the workplaces of miners and ancillary workers in structures built over or connected to underground caverns. Multiple studies of miners, including those involved in uranium mines (Hu et. al. 2012; Sahu et al., 2020) and non-uranium mines (Dehnert, 2020), reported high radon concentrations in the workplace. A study of underground miners (65,000 subjects) showed that 40% of lung cancer deaths may be due to radon progeny exposure. (Lubin, et. al., 1995) In underground mines, radon monitoring and exposure standards help in limiting miners' exposure to radioactivity. (Tukkaraja. et al., 2021)

In May 2014, the U.S. National Park Service (“NPS”) requested an evaluation of employee exposure to radon gas at a national park. NPS was concerned about the potential for elevated radon concentrations to affect workers and visitors at the park within the main cavern, the attached visitors center, a cave that had periodic guided tours (Spider Cave), and other administrative buildings within the park. NPS measured radon levels repeatedly (four times) to assess the seasonal variation of radon. The study concluded that radon gas was entering the visitors center primarily via the elevator shaft connecting the visitors center to the main cavern below it.

Tracer gas studies showed a slow and steady migration of air from the elevator lobby and elevator exit areas to the rest of the visitor’s center. A dose assessment of workers onsite site found that employees working in the cavern had the potential to exceed the OSHA whole body ionizing radiation dose limits, depending upon how much time they spend in the cave. As a result, several engineering controls were recommended, including modifications to the ventilation systems, and administrative controls were identified to ensure workers’ exposures to radon were limited.

DR92: *State whether the impacts from radon have been evaluated.*

Response: No

DR93: *Discuss the frequency and duration that workers would be underground during construction.*

Response: Workers are expected to be underground predominantly during the cavern construction phase, detailed in Section 2.1.20.2 of the SAFC. Workers are expected to be underground incrementally within a 12-hour shift, receiving breaks and meal periods in accordance with State regulations.

DR94: *Discuss the frequency and duration that workers would be underground during operations.*

Response: Workers will not be underground during facility operations. The cavern is designed to not be re-entered during the operational phase of the project. Section 2.1.21 of the SAFC outlines the workforce expected for facility operations.

DR95: *Explain how the Project will monitor worker exposure to radon that may be released during and operations.*

Response: Radon exposure is not expected during operations; therefore, no monitoring is proposed at this time.

DR96: *Describe how the Project will monitor for explosive gases during construction and operations.*

Response: The rock type associated with the Willow Rock project cavern is igneous granitic quartz monzonite. According to the cavern designer (Lane) there is no association of these rocks with naturally occurring methane or other explosive gases. As a result, the Applicant does not anticipate that the presence of methane or other explosive gases will be a concern. Nevertheless, the mine air space will be equipped with active ventilation. In addition, all spaces within the underground cavern will be monitored with personal gas monitors.

A worker health and safety plan will be prepared and worker safety training conducted prior to commencement of construction. These will detail the final monitoring procedures The cavern, once constructed is not considered a confined space. However, there may be limited areas where confined space entry procedures are appropriate. Portable gas monitors will likely be used during operation to confirm safe entry into any areas deemed confined spaces.

4.3 Odors

4.3.1 Data Requests DR97 and DR98

Waste streams from wastewater will be generated from sanitary waste, excavation water, stormwater, hydrotest water, equipment washdown water, and dewatering activities from general construction activities. (TN 254805 at p. 5.14-2) Approximately 1,350,000 gallons of used water will be generated from testing equipment and piping integrity. (*Ibid.*)

According to the SAFC, the WRESC is not expected to emit or cause to be emitted any substances that could cause nuisance odors. (*Id.* at p. 5.9-13) Most odorous substances can be classified as either inorganic gases or organic vapors. The principal odorous gases that can be emitted from industrial processes are sulfurous: hydrogen sulfide, carbonyl sulfide, carbon disulfide, and mercaptans. To a lesser extent, various organic vapors, ammonia, and formaldehyde can also be emitted in odor-inducing amounts (Yorke 2024) Some fungi can occasionally produce odors as well as corrosion in wastewater and water networks. Fungi are heterotrophic organisms that have no roots, stems, or leaves. Lacking chlorophyll, these organisms are unable to synthesize organic materials and thus are compelled to live on organic matter, such as dead animals and plants, or as parasites on or inside living cells. (Talaiekhozani, et al. 2016) These organisms use organic materials and produce considerable amounts of organic acids such as oxalic acid, acetic acid, and citric acid, which can lead to odor production and corrosion in wastewater installments. (Talaiekhozani, et al. 2016)

Evaporation and degassing are the two primary methods for the emission of odor-causing agents from wastewater collection and treatment systems. During the wastewater collection and treatment operations, odor-producing compounds are generated through the anaerobic decomposition of organic matter containing sulfur and nitrogen. (Nielsen, et. al., 1998; Zhang et. al., 2008; Hvitved-Jacobsen et al., 2002; Talaiekhozani, et al. 2016)

Health impacts associated with exposure to odorants include headaches, irritation in eyes, nose, and respiratory system, dizziness, nausea, vomiting, seizures, lack of coordination, damage to central nervous system, damage to liver, damage to kidneys, anemia, respiratory paralysis, and coma. (ATSDR, 2015)

Industrial sources that commonly cause odor impacts include wastewater treatment facilities. According to the SAFC, the septic waste from the administration/control building will be handled by one of these two methods: (1) sanitary waste from the administration/control building will be directed to a nearby underground septic storage tank, pumped out periodically by truck, and trucked offsite to an approved disposal facility, or (2) the sanitary sewer system will consist of a lateral septic system containing a lateral line from the structure to a septic tank. From there, the waste will flow to the lateral system of pipes that allows the waste from the septic system to discharge via perforations in the lateral pipes. (TN 254805 at p. 5.15-13)

DR97: *Describe the analytical techniques and/or odor panels to be used during operations to identify sources of odors onsite.*

Response: As outlined in Section 5.9.2.7 of the SAFC, odors are not expected to be emitted during operations. As such, no additional analytical techniques or odor panels are required.

DR98: *Explain how the Project will control sources of odorous emissions from the septic system.*

Response: The Project's septic system will be designed and operated in compliance with Kern County standards and regulations and will meet the performance requirements outlined in the Kern County Onsite Systems Manual (Kern County Public Health Department 2016).

5.0 GREENHOUSE GAS EMISSIONS

5.1 Indirect GHG Emissions

5.1.1 Data Requests DR99 to DR102

As outlined in SAFC section 2.1.19, the Project site would be connected to the Southern California Edison ("SCE") electrical grid via a predominately overhead 230 kV single-circuit gen-tie line, which will extend approximately 19 miles from the SCE Whirlwind Substation to the WRESC site. (TN 254806 at p. 2-29) The 230 kV line will terminate at a dead-end tower before the main power transformers, which will step down the voltage to 13.8 V and 5 kV, suitable for distribution within the WRESC. (*Ibid.*) This grid connection is designed to facilitate power import and export, with a capacity to accommodate all operating scenarios. (*Ibid.*) The SAFC states that the electric power necessary for system charging will be drawn from the electrical grid, along with additional power for the auxiliaries. (*Id.* at p. 2-19) According to the SAFC, "[t]he facility will typically cycle between Charging Mode (compression/energy storage) lasting approximately 14 hours and Discharging Mode (decompression/power production) lasting 8 hours at nameplate capacity. (*Id.* at p. 1-11) "The facility will be designed to achieve an average round trip efficiency of 55 to 60 percent. This means that the facility will return 55 to 60 percent of the electric energy used to complete the storage cycle as useful power output during the discharge cycle…." (*Id.* at p. 2-13)

Additional information is needed regarding the energy used to charge the Project across various scenarios, including periods of high and low demand. This information is directly related to the Project's indirect greenhouse gas ("GHG") emissions as well as the Project's overall electricity requirements.

DR99: *Provide the data and calculations for CO2 emissions from charging the system.*

Response: Please see *Applicant's Notice Pursuant to 20 CCR § 1716(f) Regarding CURE Data Requests Set 1_TN #: 259126.*

DR100: *Discuss how frequently the system will charge.*

Response: Please see *Applicant's Notice Pursuant to 20 CCR § 1716(f) Regarding CURE Data Requests Set 1_TN #: 259126.*

DR101: *Provide the percentage of fossil fuel energy that will be used from the grid to charge the system during "Charging Mode."*

Response: Please see *Applicant's Notice Pursuant to 20 CCR § 1716(f) Regarding CURE Data Requests Set 1_TN #: 259126.*

DR102: *Provide the percentage of renewable energy that will be used from the grid to charge the system during "Charging Mode."*

Response: Please see *Applicant's Notice Pursuant to 20 CCR § 1716(f) Regarding CURE Data Requests Set 1_TN #: 259126.*

6.0 GEOLOGIC HAZARDS

6.1 Geologic Data

6.1.1 Data Requests DR103 and DR104

In February 2024, three deep test borings were drilled to the estimated target depth for cavern construction (between 2,000 and 2,500 ft below ground surface) to provide geotechnical design parameters. The drilling core samples indicated decreasing rock quality as depth increases through the cavern target horizon. Since the cavern will be subjected to daily cycles of water infiltration and hot compressed air, the degree and extent of rock fractures could impact the volume of water lost to surrounding rock formations. Geophysical and water injection testing was performed during the February geotechnical study, but key data is missing from the report.

DR103: *Provide the following data on the packer testing for the Project:*

a) Packer testing elevation intervals for each borehole.

b) Water injection volume and water level monitoring data for each test.

c) Optical televiewer results for each tested packer interval.

Response: Packer testing was performed by the project geologist to estimate the hydraulic conductivity of the rock mass at a depth suitable for A-CAES operation.

a) Packers were set along the core hole length to isolate consecutive 21.8-foot intervals for testing.

b) For each test, a small amount of water was added to the test interval after which the interval was pressurized to 80 psi above the hydrostatic pressure. Changes in the water level are then measured, first at 1-minute intervals for 5 minutes and 5-minute intervals thereafter, until the flow rate into the rock stabilized. Packer testing began at the bottom of the core holes and worked higher in elevation until a final depth of 1,800 and 1,900 feet below the ground surface. Water injection volume and water level monitoring data are provided in **Attachment DR103-1**. Due to its file size, the data has been submitted through Kiteworks under the reference Attachment DR103-1.

c) Acoustic (not Optical, which didn't prove effective due to mud presence) Televiewer data is provided as **Attachment DR103-2**. Due to its file size, the data has been submitted through Kiteworks under the reference Attachment DR103-2.

DR104: *Discuss the schedule and work plan for performing the hydrogeological study to assess the cavern's water and gas containment properties as described in the report by Lane Power and Energy Systems dated February 2024 entitled, Bases of Design: Compensated Hard Rock Caverns For Compressed Air Energy Storage.*

Response: The following presents the framework of the leakage analysis.

1. **Objective**

    - Model how air and water will flow into and out of the rock mass during compression/generation cycle to estimate potential leakage rates into and from the rock mass.

- The following three (3) scenarios are modeled:
    1) Normal daily charging and discharging cycle consisting of:
        - 13.5 hours of charging
        - 1.75 hours of standby
        - 8 hours of discharging
        - 1.75 hours of standby
    2) Fully charged cavern for a duration of 7 days
    3) A daily charging and discharging cycle operating between 60 and 100% consisting of:
        - 5.4 hours of charging
        - 7.7 hours of standby
        - 3.2 hours of discharging
        - 7.7 hours of standby

2. **Assumptions**

- Steady state flow conditions.
- The threshold of acceptability of leakage is <2% per day.
- Constant hydraulic conductivity with depth.
- Utilize peak air conductivity values.
- Consider a construction phase and an operational phase.
- A 3m thick excavation dilation zone, or the maximum anticipated brittle failure zone (whichever is greater), where conductivity is 100 times greater than overall rock mass.
- Utilize packer testing results, porosity tests results, and fracture logs to develop an intact rock hydraulic conductivity and a fracture hydraulic conductivity.

3. **Methodology**

- Estimate one dimensional steady state leakage using the Brown approach.
- Model dynamic pressure induced leakage using Finite Element Method (FEM) programs SEEP/W and AIR/W concurrently.
- Evaluate leakage rates for an untreated cavern at the range of hydraulic conductivities calculated.
- The leakage analysis will consider the jointed rock mass.
- Present the results of the four modeling scenarios noted above.

7.0 REFERENCES

7.1 Section 3.6 - Vegetation Classification and Mapping

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7.2 Section 3.8 – Impacts to Sensitive Natural Communities

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7.3 Section 3.9 – Swainson's Hawk Surveys

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7.4 Section 3.10 – Burrowing Owl Surveys

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7.5 Section 4.1 - Chemical Inventory and Water Treatment

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7.6 Section 4.2 - Radon

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7.7 Section 4.3 - Odors

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ATTACHMENT DR8-1

2023 and 2024 Survey Areas Map Book (submitted via Kiteworks)

ATTACHMENT DR11-1

2024 Additional Project Features (submitted via Kiteworks)

ATTACHMENT DR17-1

2023 and 2024 Survey Dates and Times

ATTACHMENT DR17-1 - 2023 AND 2024 SURVEY DATES AND TIMES

Year **2024**

Species	**Crotch's Bumbel Bee**		
Date	**Survey Number**	**Time**	**Staff**
26-Mar-24	Habitat Assessment/Queen Survey	0730-1200	Nathan Moorhatch, Melanie Bukovac, Sarah Williams, Emily Urquidi, Tim Chumley
27-Mar-24	Habitat Assessment/Queen Survey	0730-1500	Nathan Moorhatch, Melanie Bukovac, Sarah Williams, Emily Urquidi, Tim Chumley
8-Apr-24	Survey 1	0730-1500	Mike Wilcox, Tim Chumley, Melanie Bukovac, Melissa Bukavoc, Phil Clevinger
9-Apr-24	Survey 1	0730-1500	Melissa Bukavoc, Ciara Shirey, Phil Clevinger
7-May-24	Survey 2	0730-1500	Mike Wilcox, Emily Urquidi, Melanie Bukovac, Melissa, Bukovac.
		0910-1500	Nathan Moorhatch
8-May-24	Survey 2	0730-1500	Nathan Moorhatch, Mike Wilcox, Emily Urquidi, Melanie Bukovac, Melissa, Bukovac.
5-Jun-24	Survey 3	0730-1500	Melanie Bukovac, Tim Chumley, Emily Urquidi, Melissa Bukovac, Phil Clevinger
		0930-1500	Nathan Moorhatch
6-Jun-24	Survey 3	0730-1500	Melanie Bukovac, Tim Chumley, Emily Urquidi, Melissa Bukovac, Phil Clevinger
		0930-1500	Nathan Moorhatch

Species	**Desert Tortoise**		
Date	**Survey Number**	**Time**	**Staff**
2-Apr-24	Survey 1	0600-1600	Nathan Moorhatch, Marshall Paymard, Emily Urquidi, Melissa, Bukovac, and Phil Clevinger
3-Apr-24	Survey 1	0600-1600	Nathan Moorhatch, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa, Bukovac, Phil Clevinger
4-Apr-24	Survey 1	0600-1600	Nathan Moorhatch, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, and Phil Clevinger
8-Apr-24	Survey 1	0600-1600	Michael Wilcox, Tim Chumley, Melanie Bukovac, Melissa Bukovac, and Phil Clevinger
9-Apr-24	Survey 1	0600-1600	Michael Wilcox, Scott Crawford, Marshall Paymard, Tim Chumley, Melanie Bukovac, Melissa Bukovac, Ciera Shirey, Phil Clevinger

ATTACHMENT DR17-1 - 2023 AND 2024 SURVEY DATES AND TIMES

Year **2024**

Species	**Burrowing Owl**		
Date	**Survey Number**	**Time**	**Staff**
2-Apr-24	Survey 1/Burrrow Survey	0700-1000	Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, and Phil Clevinger
3-Apr-24	Survey 1/Burrrow Survey	0700-1000	Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, and Phil Clevinger
4-Apr-24	Survey 1/Burrrow Survey	0700-1000	Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, and Phil Clevinger
8-Apr-24	Survey 1/Burrrow Survey	0700-1000	Michael Wilcox, Scott Crawford, Marshall Paymard, Tim Chumley, Melanie Bukovac, Melissa Bukovac, Ciera Shirey, Phil Clevinger, Emily Urquidi
9-Apr-24	Survey 1/Burrrow Survey	0700-1000	Melissa Bukovac, Ciera Shirey, Phil Clevinger, Emily Urquidi
5-May-24	Survey 2	0500-0910	Nathan Moorhatch
6-May-24	Survey 2	0500-0910	Nathan Moorhatch
7-May-24	Survey 2	0500-0910	Nathan Moorhatch
5-Jun-24	Survey 3	0500-0930	Nathan Moorhatch
6-Jun-24	Survey 3	0500-0930	Nathan Moorhatch
18-Jun-24	Survey 4	0530-0945	Nathan Moorhatch
19-Jun-24	Survey 4	0530-0945	Nathan Moorhatch
20-Jun-24	Survey 4	0530-0945	Nathan Moorhatch

ATTACHMENT DR17-1 - 2023 AND 2024 SURVEY DATES AND TIMES

Year **2024**

Species	**Swainson's Hawk**		
Date	**Survey Number**	**Time**	**Staff**
18-Mar-24	Survey Period I	0600-1600	Nathan Moorhatch, Michael Wilcox, Tim Chumley, Emily Urquidi, Melanie Bukovac
19-Mar-24	Survey Period I	0600-1600	Nathan Moorhatch, Michael Wilcox, Tim Chumley, Emily Urquidi, Melanie Bukovac
25-Mar-24	Survey Period I	0600-1600	Nathan Moorhatch, Sarah Williams, Tim Chumley, Emily Urquidi, Melanie Bukovac
26-Mar-24	Survey Period I	1200-1600	Nathan Moorhatch, Sarah Williams, Tim Chumley, Emily Urquidi, Melanie Bukovac
1-Apr-24	Survey Period II	0600-1000	Nathan Moorhatch, Phil Clevinger, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac
2-Apr-24	Survey Period II	1200-1600	Nathan Moorhatch, Phil Clevinger, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac
3-Apr-24	Survey Period II	1200-1600	Nathan Moorhatch, Phil Clevinger, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac
4-Apr-24	Survey Period II	1200-1600	Nathan Moorhatch, Phil Clevinger, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac
12-Apr-24	Survey Period II	0600-1600	Michael Wilcox, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, Tim Chumley, Ciara Shirey
23-Apr-24	Survey Period II	1200-1600	Nathan Moorhatch, Michael Wilcox, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, Tim Chumley, Ciara Shirey
24-Apr-24	Survey Period II	1200-1600	Nathan Moorhatch, Michael Wilcox, Marshall Paymard, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, Tim Chumley, Ciara Shirey
7-May-24	Survey Period III	0600-1200	Nathan Moorhatch, Melanie Bukovac, Melissa Bukovac, Michael Wilcox, Emily Urquidi
8-May-24	Survey Period III	0600-1200	Nathan Moorhatch, Melanie Bukovac, Melissa Bukovac, Michael Wilcox, Emily Urquidi
15-May-24	Survey Period III	0600-1200	Tim Chumley, Sarah Williams
16-May-24	Survey Period III	0600-1200	Tim Chumley, Sarah Williams
17-May-24	Survey Period III	0600-1200	Tim Chumley, Sarah Williams
21-May-24	Survey Period III	0600-1200	Michael Wilcox, Tim Chumley, Sarah Williams, Melanie Bukovac
5-Jun-24	Survey Period IV	1600-1800	Tim Chumley, Sarah Williams
12-Jun-24	Survey Period IV	0600-0800	Nathan Moorhatch, Tim Chumley, Emily Urquidi, Melanie Bukovac, Melissa Bukovac, Sarah Williams
19-Jun-24	Survey Period IV	0600-1200	Tim Chumley, Sarah Williams

ATTACHMENT DR17-1 - 2023 AND 2024 SURVEY DATES AND TIMES

Year **2024**

Species	**Mohave Ground Squirrel**		
Date	**Survey Number**	**Time**	**Staff**
27-Apr-24	Grid 1 _Survey 1	0600-1830	Dalton Stanfield
28-Apr-24	Grid 1 _Survey 1	0600-1830	Dalton Stanfield
29-Apr-24	Grid 1 _Survey 1	0600-1830	Dalton Stanfield
30-Apr-24	Grid 1 _Survey 1	0600-1830	Dalton Stanfield
1-May-24	Grid 1 _Survey 1	0600-1810	Dalton Stanfield
27-May-24	Grid 1 _Survey 2	0600-1800	Dalton Stanfield
28-May-24	Grid 1 _Survey 2	0600-1815	Dalton Stanfield
29-May-24	Grid 1 _Survey 2	0600-1800	Dalton Stanfield
30-May-24	Grid 1 _Survey 2	0600-1145	Dalton Stanfield
31-May-24	Grid 1 _Survey 2	0600-1130	Dalton Stanfield
21-Jun-23	Grid 1 _Survey 3	0600-0930	Dalton Stanfield
22-Jun-23	Grid 1 _Survey 3	0600-0915	Dalton Stanfield
23-Jun-23	Grid 1 _Survey 3	0600-0915	Dalton Stanfield
24-Jun-23	Grid 1 _Survey 3	0600-0910	Dalton Stanfield
25-Jun-23	Grid 1 _Survey 3	0600-0910	Dalton Stanfield

Species	**Sensitive Plants**		
Date	**Survey Number**	**Time**	**Staff**
22-Apr-24	Earling Blooming Season	0600-1600	Nathan Moorhatch, Michael Wilcox, Marshall Paymard, Tim Chumley, Emily Urquidi, Melanie Bukovac, Sarah Williams, Melissa Bukovac, Phil Clevinger
3-Jun-24	Late Blooming Season	0600-1200	Nathan Moorhatch, Tim Chumley, Emily Urquidi, Melanie Bukovac, Sarah Williams, Melissa Bukovac
4-Jun-24	Late Blooming Season	0600-1200	Nathan Moorhatch, Tim Chumley, Emily Urquidi, Melanie Bukovac, Sarah Williams, Melissa Bukovac
5-Jun-24	Late Blooming Season	0600-1200	Nathan Moorhatch, Tim Chumley, Emily Urquidi, Melanie Bukovac, Sarah Williams, Melissa Bukovac

ATTACHMENT DR17-1 - 2023 AND 2024 SURVEY DATES AND TIMES

Year **2024**

Species	**Joshua Tree Census**		
Date	**Survey Number**	**Time**	**Staff**
10-Apr-24	Census	0600-1600	Scott Crawford, Michael Wilcox, Marshall Paymard, Tim Chumley, Melanie Bukovac, Melissa Bukovac, Ciara Shirey
11-Apr-24	Census	0600-1600	Nathan Moorhatch, Mike Wilcox, Marshall Paymard, Tim Chumley, Melanie Bukovac, Melissa Bukovac, Ciara Shirey
12-Apr-24	Census	0600-1600	Nathan Moorhatch, Mike Wilcox, Marshall Paymard, Tim Chumley, Melanie Bukovac, Emily Urquidi, Sarah Williams, Melissa Bukovac, Ciara Shirey
22-Apr-24	Census	0600-1600	Nathan Moorhatch, Melanie Bukovac, Emily Urquidi, Sarah Williams, Melissa Bukovac, Phil Clevinger
23-Apr-24	Census	0600-1200	Nathan Moorhatch, Mike Wilcox, Marshall Paymard, Tim Chumley, Melanie Bukovac, Emily Urquidi, Sarah Williams, Melissa Bukovac, Phil Clevinger
24-Apr-24	Census	0600-1200	Nathan Moorhatch, Mike Wilcox, Marshall Paymard, Tim Chumley, Melanie Bukovac, Sarah Williams, Melissa Bukovac, Phil Clevinger

Species	**Juridictional Delineation**		
Date	**Survey Number**	**Time**	**Staff**
3-Oct-23	JD Field Work	0600-1600	Scott Crawford, Marshall Paymard
4-Oct-23	JD Field Work	0600-1600	Scott Crawford, Marshall Paymard
21-Jun-24	JD Field Work	0600-1600	Scott Crawford, Dale Hameister
18-Sep-24	Follow-up Photo	0600-0800	Melanie Bukovac, Melissa Bukovac

ATTACHMENT DR26-1

Utility Pole Locations Map Book (submitted under repeated Application for Confidentiality)

ATTACHMENT DR33-1

Survey Area and Drainages Map Book (submitted under repeated Application for Confidentiality)

ATTACHMENT DR42-1

Drainages C, P, Q, and S Photographs (submitted via Kiteworks)

ATTACHMENT DR46-1

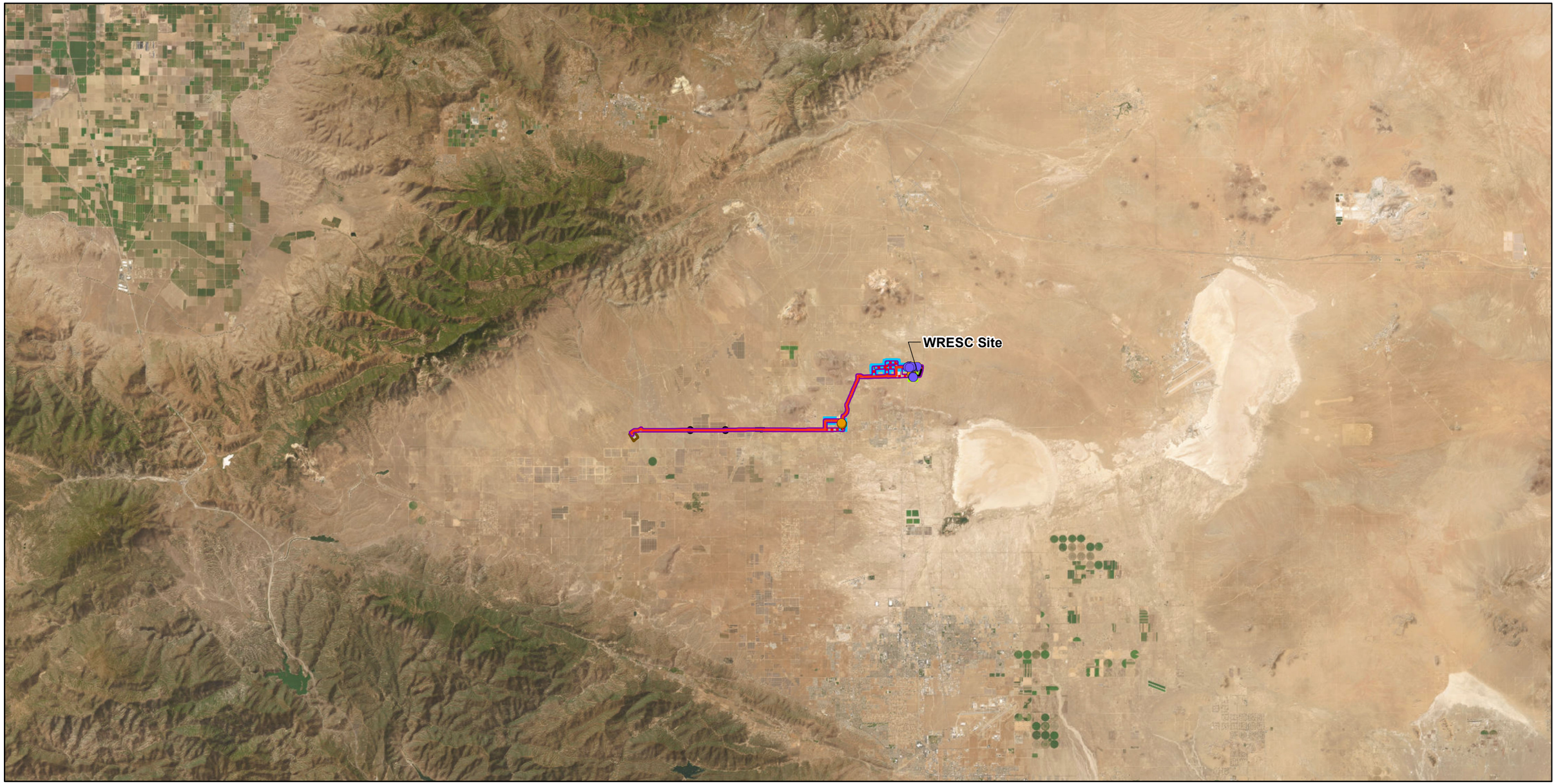
2023 and 2024 Study Area Vegetation Map Book (submitted via Kiteworks)

ATTACHMENT DR47-1

2023 and 2024 Right-of-entry and Areas Surveyed at a Distance Map Book
(submitted via Kiteworks)

ATTACHMENT DR62-1A

Figure 9 from BRAR Addendum



LEGEND

- Mojave monardella (2024)
- Sagebrush loeflingia (2024)

Proposed Transmission Line

- Preferred Route, Aboveground
- Preferred Route, Underground
- Route Options 1-6, Aboveground
- Route Options 1-6, Underground

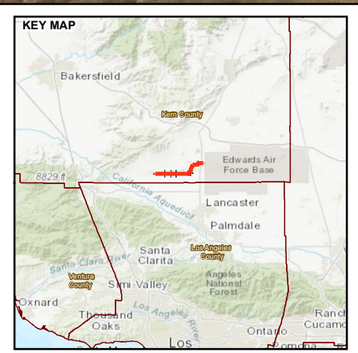
Project Components

- WRESC Site
- Other Project Parcels
- No Right of Entry Areas
- Project Boundary
- SCE Whirlwind Substation
- 500 ft Buffer Around Project Parcels and Transmission Line

2024 Project Areas

- Gen-Tie Transmission Line Variances
- P2 North
- P2 South

KEY MAP



0 5 10

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REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET
2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
GEM A-CAES LLC

PROJECT
WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT

CONSULTANT
wsp

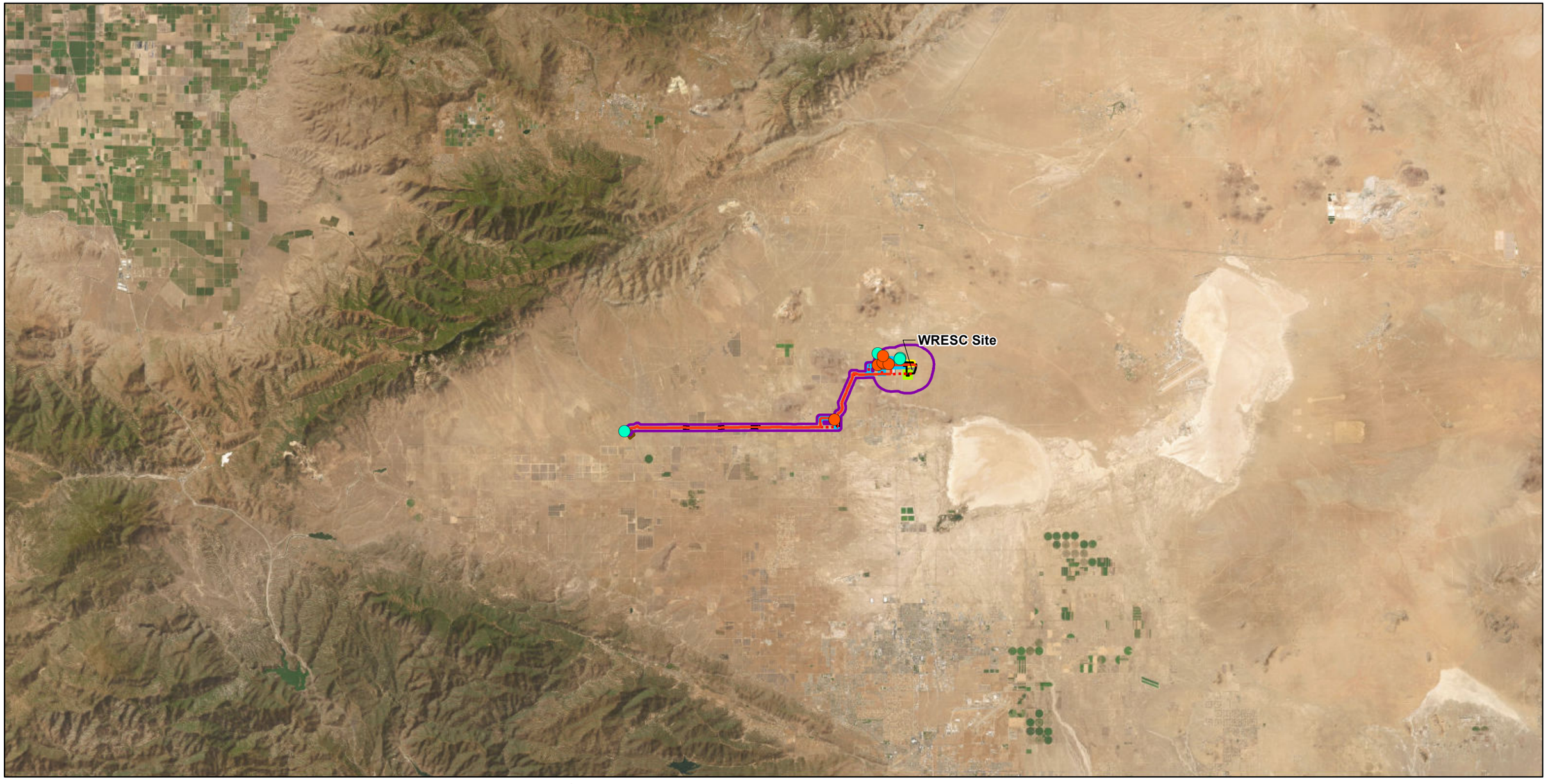
YYYY-MM-DD	2024-07-30
DESIGNED	MK
PREPARED	MK
REVIEWED	SC
APPROVED	VG/LL

TITLE
SPECIAL STATUS PLANTS

PROJECT NO.	PHASE	REV.	FIGURE
31406639.000	01.LBR	1	9

ATTACHMENT DR62-1B

Figure 10 from BRAR Addendum



LEGEND

- Loggerhead Shrike Observation (2024)
- Swainson's Hawk Observation (2024)

Proposed Transmission Line

- Preferred Route, Aboveground
- Preferred Route, Underground
- Route Options 1-6, Aboveground
- Route Options 1-6, Underground

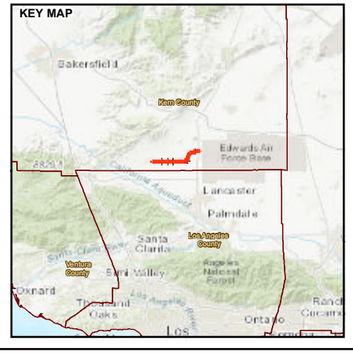
Project Components

- WRESC Site
- Other Project Parcels
- No Access Permitted
- Project Boundary
- SCE Whirlwind Substation
- 1000 ft Around Transmission Lines and 1 Mile Around Project Parcels

2024 Project Areas

- Gen-Tie Transmission Line Variances
- P2 North
- P2 South

KEY MAP



0 5 10

1:350,000 MILES

REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V FIPS 0405 FEET
2. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
GEM A-CAES LLC

PROJECT
WILLOW ROCK ENERGY STORAGE CENTER
BIOLOGICAL RESOURCES ASSESSMENT

CONSULTANT

YYYY-MM-DD	2024-08-05
DESIGNED	MK
PREPARED	MK
REVIEWED	SC
APPROVED	VG/LL

TITLE
SPECIAL STATUS WILDLIFE

PROJECT NO.	PHASE	REV.	FIGURE
31406639.000	01.LBR	1	10

PATH: G:\Hydrostor\Ansel\99_PROJECTS\31406639.000_Hydrostor\Ansel\BioSurvey\01.LBR_Ph1_BioSurvey\02_PRODUCTION\MXD\FIGURES\Biological_Resource_Assessment\Rev1\31406639-000_01_10_FX-X-10_Rev1_SpecialStatusWildlife.mxd PRINTED ON: 2024-08-05 AT: 1:54:44 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 1in

ATTACHMENT DR66-1

Roads Driven 2023 and 2024 Swainson's Hawk Survey Map Book (submitted via Kiteworks)

ATTACHMENT DR74-1

2023 and 2024 Swainson's Hawk Survey - Nest Locations Map Book (submitted under repeated Application for Confidentiality)

ATTACHMENT DR75-1

2023 and 2024 Swainson's Hawk Survey - Hawk Locations Map Book (submitted under repeated Application for Confidentiality)

ATTACHMENT DR90-1

Material Safety Data Sheets

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Diesel Fuel

Product Use: Blendstock, Chemical Feedstock, Fuel Oil, Fuel
Synonyms: #2 ULSD; Dyed Diesel Fuel; Fuel Oil; #1 ULSD; CARB Diesel; CARB Diesel; Diesel; Diesel fuel – all grades; Diesel Fuels; Fuel Oil #1; Fuel Oil #2; Heating oil; HO; HSHO; Kero; Kerosene; LSHO; No. 1 ULSD; No. 2 ULSD; Off Road Diesel Fuel, B2 – B20 Diesel; R2 – R20 Diesel Fuel; SDS 900; ULS No. 1 Diesel; ULS No. 2 Diesel; ULSD; ULSK; Ultra Low Sulfur Diesel; Winter diesel
Company Identification
REG Marketing & Logistics Group, LLC
416 South Bell Avenue
Ames, IA 50010
United States of America

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency & Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
Product Information: Phone: 1 888.734.8686 / Email: REG-SDSDistribution@chevron.com

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION:
- Flammable liquid: Category 3.
- Acute inhalation toxicant: Category 4.
- Aspiration toxicant: Category 1.
- Carcinogen: Category 2.
- Skin irritation: Category 2.
- Target organ toxicant (central nervous system): Category 3.
- Target organ toxicant (repeated exposure): Category 2.
- Target organ toxicant (respiratory irritant): Category 3.
- Acute aquatic toxicant: Category 2.
- Chronic aquatic toxicant: Category 2.

Signal Word: Danger
Physical Hazards:
- Flammable liquid and vapour.

Health Hazards:

- May be fatal if swallowed and enters airways.
- Causes skin irritation.
- Harmful if inhaled.
- May cause respiratory irritation.
- May cause drowsiness or dizziness.
- Suspected of causing cancer.
- May cause damage to organs (Blood/Blood Forming Organs, Liver, Thymus) through prolonged or repeated exposure.

Environmental Hazards:
- Toxic to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS:
Prevention:
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep container tightly closed.
- Keep cool.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting/equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Do not breathe dust/fume/gas/mist/vapours/spray.
- Wash thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Avoid release to the environment.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.

Response:
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- IF ON SKIN: Wash with plenty of soap and water.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- IF exposed or concerned: Get medical advice/attention.
- Specific treatment (see Notes to Physician on this label).
- Do NOT induce vomiting.
- If skin irritation occurs: Get medical advice/attention.
- Take off contaminated clothing and wash it before reuse.
- In case of fire: Use media specified in the SDS to extinguish.
- Collect spillage.

Storage:
- Store in a well-ventilated place. Keep container tightly closed.
- Store locked up.

Disposal:
- Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT

Fuel Oil, No. 2	68476-30-2	0 - 100 %weight
Kerosene	8008-20-6	0 - 100 %weight
Fatty acids, C14-18 and C16-18-unsatd., Methyl esters	67762-26-9	0 - 95 %weight
Fuels, diesel, C9-18 alkane branched and linear	1159170-26-9	0 - 95 %weight
Naphthalene	91-20-3	< 3 %weight

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue or if any other symptoms develop.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes may cause irritation. Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin causes irritation. Skin contact may cause drying or defatting of the skin. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response.
Ingestion: Highly toxic; may be fatal if swallowed. Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death. May be irritating to mouth, throat, and stomach. Symptoms may include pain, nausea, vomiting, and diarrhea.
Inhalation: The vapor or fumes from this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing. Excessive or prolonged breathing of this material may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death. If this material is heated, fumes may be unpleasant and produce nausea and irritation of the eye and upper respiratory tract.

DELAYED OR OTHER HEALTH EFFECTS:
Cancer: Prolonged or repeated exposure to this material may cause cancer. Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Target Organs: Contains material that may cause damage to the following organ(s) following repeated inhalation at concentrations above the recommended exposure limit: Liver Blood/Blood Forming Organs Thymus
Medical Conditions Aggravated by Exposure: Exposure to naphthalene may aggravate existing blood disorders. Individuals with congenital erythrocyte glucose-6-phosphate dehydrogenase deficiency may be particularly susceptible to the hemolytic effects of naphthalene.

See Section 11 for additional information. Risk depends on duration and level of exposure.

Indication of any immediate medical attention and special treatment needed
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames. Do not use water spray or a direct stream of water.
Unusual Fire Hazards: See Section 7 for proper handling and storage.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion. Combustion may form oxides of: Hydrocarbons, Nitrogen, Sulfur.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Precautionary Measures: Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive force. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches.
Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

General Storage Information: DO NOT USE OR STORE near heat, sparks, flames, or hot surfaces . USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, refer to PPE information below.

Factors that affect PPE include, but are not limited to: properties of the chemical, other chemicals which may contact the same PPE, physical requirements (fit & sizing, cut/puncture protection, dexterity, thermal protection, etc.), and potential allergic reactions to the PPE material. It is the responsibility of the user to read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances. Refer to appropriate CEN standards.

ENGINEERING CONTROLS:
Use general ventilation, local exhaust ventilation, or a combination of both.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work operations conducted.
Skin Protection: Wear chemical personal protective equipment (PPE) to prevent skin contact. Selection of chemical protective clothing should be performed by an Occupational Hygienist or Safety Professional and be based upon applicable standards (ASTM F739 or EN 374). Using chemical PPE depends upon operations conducted and may include chemical gloves, boots, chemical apron, chemical suit, and complete facial protection. **Refer to PPE manufacturers to obtain breakthrough time information to determine how long PPE can be used before it needs to be replaced.** Unless specific glove manufacturer data indicates otherwise, the below table is based upon available industry data to assist in the glove selection process and is intended to be used as reference only.

Chemical Glove Material	Thickness (mm)	Typical Breakthrough Time (minutes)
Nitrile	0.5	5
Viton Butyl	0.3	60

Butyl	**Not recommended for use**
Neoprene	**Not recommended for use**
Polyvinyl Chloride (PVC)	**Not recommended for use**

Respiratory Protection: Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: Air-Purifying

Respirator for Organic Vapors.

Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	Form	TWA	STEL	Ceiling	Notation
Fuel Oil, No. 2	ACGIH	Inhalable fraction and vapor	100 mg/m3	--	--	Skin total hydrocarbon
Kerosene	ACGIH	Vapor	200 mg/m3	--	--	Skin
Fuel Oil, No. 2	ACGIH	Vapor and aerosol	100 mg/m3	--	--	Skin total hydrocarbon
Kerosene	CVX	Vapor	200 mg/m3	--	--	Skin
Fuel Oil, No. 2	CVX	Vapor and aerosol	100 mg/m3	--	--	--
Naphthalene	ACGIH	--	10 ppm	--	--	Skin
Naphthalene	ACGIH	Vapor	10 ppm	15 ppm	--	A4 Skin
Naphthalene	OSHA Z-1	--	50 mg/m3	--	--	--

Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Varies depending on specification
Physical State: Liquid
Odor: Petroleum naphtha odor
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: <13 psia
Relative Vapor Density: No data available
Initial Boiling Point: >130°C (266°F)
Solubility: Negligible
Freezing Point: No data available
Melting Point: No data available
Specific Gravity: 67 @ 15.6°C (60°F)
Particle Characteristics: Not applicable
Density: No data available
Kinematic Viscosity: 1.3 mm2/s - 4.1 mm2/s @ 40°C (104°F)
Coefficient of Therm. Expansion / °F: No data available
Evaporation Rate: Not Applicable
Decomposition temperature: No data available
Partition coefficient n-octanol/water (logarithmic value): No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): No Data Available

Flashpoint: > 38 °C (> 100 °F)
Autoignition: > 210 °C (> 410 °F)
Flammability (Explosive) Limits (% by volume in air): Lower: 0.4 Upper: 8

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Conditions to Avoid: Do not store near sources of ignition. Do not heat above flash point. Avoid contact with mineral acid/alkali.
Incompatibility With Other Materials: Not applicable
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The material is not considered an eye irritant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Skin Corrosion/Irritation: This material causes skin irritation. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Skin Sensitization: The material is not considered a skin sensitizer. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Acute Dermal Toxicity: LD50: >2000 mg/kg (rabbit).

Acute Oral Toxicity: LD50: >5000 mg/kg (rat).

Acute Inhalation Toxicity: LC50: 1 - 5 mg/l (rat).
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The material is not considered a mutagen. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Carcinogenicity: This material is suspected of causing cancer. The product has not been tested. The statement is based on evaluation of data for similar materials or product components. Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Reproductive Toxicity: The material is not considered a reproductive toxicant. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Single Exposure: This material may cause drowsiness or dizziness. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.
This material may cause respiratory irritation. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Specific Target Organ Toxicity - Repeated Exposure: This material may cause damage to organs through prolonged or repeated exposure. The product has not been tested. The statement is based on evaluation of data for similar materials or product components.

Aspiration Hazard: This material is considered an aspiration hazard based on the kinematic viscosity of the material.

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains naphthalene.

GENERAL TOXICITY: Exposure to naphthalene has been reported to cause methemoglobinemia and/or hemolytic anemia, especially in humans deficient in the enzyme glucose-6-phosphate dehydrogenase. Laboratory animals given repeated oral doses of naphthalene have developed cataracts.

REPRODUCTIVE TOXICITY AND BIRTH DEFECTS: Naphthalene did not cause birth defects when administered orally to rabbits, rats, and mice during pregnancy, but slightly reduced litter size in mice at dose levels that were lethal to the pregnant females. Naphthalene has been reported to cross the human placenta. GENETIC TOXICITY: Naphthalene caused chromosome aberrations and sister chromatid exchanges in Chinese hamster ovary cells, but was not a mutagen in several other in-vitro tests.CARCINOGENICITY: In a study conducted by the National Toxicology Program (NTP), mice exposed to 10 or 30 ppm of naphthalene by inhalation daily for two years had chronic inflammation of the nose and lungs and increased incidences of metaplasia in those tissues. The incidence of benign lung tumors (alveolar/bronchiolar adenomas) was significantly increased in the high-dose female group but not in the male groups. In another two-year inhalation study conducted by NTP, exposure of rats to 10, 30, and 60 ppm naphthalene caused increases in the incidences of a variety of nonneoplastic lesions in the nose. Increases in nasal tumors were seen in both sexes, including olfactory neuroblastomas in females at 60 ppm and adenomas of the respiratory epithelium in males at all exposure levels. The relevance of these effects to humans has not been established. No carcinogenic effect was reported in a 2-year feeding study in rats receiving naphthalene at 41 mg/kg/day.

This product contains kerosene. CONCAWE (product dossier 94/106) has summarized current health, safety and environmental data available for a number of kerosenes (typically straight-run kerosene, CAS 8008-20-6, or hydrodesulfurized kerosene, CAS 64742-81-0). ACUTE/SUBCHRONIC: Following acute exposure to kerosene, signs observed in rats and rabbits were of a low order of toxicity: central nervous system depression occurred following oral exposure, skin irritation (ranging from slight to severe irritation) occurred with dermal exposure, and respiratory tract irritation occurred with inhalation exposure. None of the kerosenes tested produced more than slight eye irritation and none were skin sensitizers. However, intratracheal administration or artificial aspiration of small volumes (0.1 to 0.2 ml) of kerosene into the lungs of rats, chickens and primates resulted in lung damage and/or death. In a study in which rats, mice, rabbits and cats were exposed to kerosene aerosol concentrations in the range 0.05 to 120 mg/l for up to four weeks, reductions in respiratory rate, pulmonary hyperaemia, leucocytosis, monocytosis and decreased erythrocyte sedimentation rate were observed, and histological examination revealed inflammatory changes in the respiratory tract (tracheitis, bronchitis and pneumonia).

CANCER: Chronic (3 to 24 months) mouse dermal toxicity studies of kerosenes and jet fuels produced mild to moderate skin irritation, while long-term (2+ years) studies showed moderate to severe skin damage as well as an increased incidence of tumors after long latency periods (probably due to a secondary mechanism related to skin irritancy). DEVELOPMENTAL/REPRODUCTION: Hydrodesulfurized kerosene was tested by the Petroleum Product Stewardship Council in a OECD Guideline 421 Reproductive/Developmental Toxicity Study. The kerosene sample was diluted to 494 (60%), 330 (40%),and 165 (20%) mg/kg/day in food grade mineral oil and applied daily during pre-mating and mating to day 19 of gestation. There was no apparent maternal, reproductive, or developmental toxicity at any dose. Males treated for eight weeks had increased relative kidney weights in the high dose group but no microscopic changes in testes or epididymides. No gross anomalies were observed in the pups.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

The product has not been tested. The statement has been derived from the properties of the individual

components.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is expected to be readily biodegradable. The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Partition coefficient n-octanol/water (logarithmic value): No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by international, country, or local laws and regulations.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Description: UN1202, DIESEL FUEL, 3, III

IMO/IMDG Shipping Description: UN1202, DIESEL FUEL, 3, III, (FLASH POINT SEE SECTION 9), MARINE
POLLUTANT (DIESEL FUEL)

ICAO/IATA Shipping Description: UN1202, DIESEL FUEL, 3, III

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:
Acute toxicity (any route of exposure)
Aspiration Hazard
Carcinogenicity
Flammable (gases, aerosols, liquids, or solids)
Skin Corrosion or Irritation
Specific target organ toxicity (single or repeated exposure)

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	05=MA RTK
01-2A=IARC Group 2A	06=NJ RTK
01-2B=IARC Group 2B	07=PA RTK
02=NTP Carcinogen	08-1=TSCA 5(e)
03=EPCRA 313	08-2=TSCA 12(b)

04=CA Proposition 65

The following components of this material are found on the regulatory lists indicated.

Fuel Oil, No. 2	06, 07
Kerosene	05, 06, 07
Naphthalene	01-1, 01-2B, 02, 03, 04, 05, 06, 07

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: DSL (Canada), TSCA (United States).

One or more components does not comply with the following chemical inventory requirements: AIIC (Australia), EINECS (European Union), ENCS (Japan), IECSC (China), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan).

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 2 Flammability: 2 Reactivity: 0

HMIS RATINGS: Health: 2* Flammability: 2 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: This is a new Safety Data Sheet.
No revision information

Revision Date: December 01, 2023

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	PNOS - Particles Not Otherwise Specified

Prepared according to the 29 CFR 1910.1200 (2012) by Chevron Technical Center, 6001 Bollinger Canyon Road, San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility

for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SAFETY DATA SHEET

1. Identification

Product identifier BL1280

Other means of identification None.

Recommended use Boiler Water Treatment

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name ChemTreat, Inc.

Address 5640 Cox Road
Glen Allen, VA 23060
United States

Telephone 800-648-4579

Website chemtreat.com

E-mail productcompliance@chemtreat.com

Emergency phone number 800-424-9300

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Sensitization, skin	Category 1
Germ cell mutagenicity	Category 2
Carcinogenicity	Category 2

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement May cause an allergic skin reaction. Suspected of causing genetic defects. Suspected of causing cancer. Toxic to aquatic life.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing mist/vapors. Contaminated work clothing must not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response If on skin: Wash with plenty of water. If exposed or concerned: Get medical advice/attention. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Diethylhydroxylamine		3710-84-7	10 - < 20

Chemical name	Common name and synonyms	CAS number	%
Hydroquinone		123-31-9	5 - < 10
Other components below reportable levels			70 - < 80

4. First-aid measures

Inhalation
Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact
Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions.

Eye contact
Rinse with water. Get medical attention if irritation develops and persists.

Ingestion
Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed
May cause an allergic skin reaction. Dermatitis. Rash.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information
IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media
Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical
During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions
Move containers from fire area if you can do so without risk.

Specific methods
Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards
No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up
Prevent product from entering drains.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions
Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling
Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing mist/vapors. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store locked up. Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Permissible Exposure Limits (PEL) for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Hydroquinone (CAS 123-31-9)	PEL	2 mg/m3

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value
Diethylhydroxylamine (CAS 3710-84-7)	TWA	2 ppm
Hydroquinone (CAS 123-31-9)	TWA	1 mg/m3

NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended

Components	Type	Value
Hydroquinone (CAS 123-31-9)	IDLH	50 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards Recommended Exposure Limits (REL)

Components	Type	Value
Hydroquinone (CAS 123-31-9)	Ceiling	2 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Not available.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Color Straw

Odor Strong

Odor threshold Not available.

pH 7.3 - 9.5 @ 20C (100% Dilution)

Melting point/freezing point 28.40 °F (-2.00 °C)

Initial boiling point and boiling range Not available.

Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	8.47
Specific gravity	1.01 - 1.02 @ 20C
VOC	1.5 %w/w

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	May cause an allergic skin reaction.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	May cause an allergic skin reaction. Dermatitis. Rash.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Diethylhydroxylamine (CAS 3710-84-7)		
Acute		
Dermal		
LD50	Rabbit	1300 mg/kg
Oral		
LD50	Rat	2190 mg/kg

Components	Species	Test Results
Hydroquinone (CAS 123-31-9)		
Acute		
Dermal		
LD50	Rat	> 900 mg/kg
Oral		
LD50	Rat	320 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

ACGIH sensitization

Hydroquinone (CAS 123-31-9) Dermal sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization May cause an allergic skin reaction.

Germ cell mutagenicity Suspected of causing genetic defects.

Carcinogenicity Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Hydroquinone (CAS 123-31-9) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Toxic to aquatic life.

Product		Species	Test Results
BL1280			
Aquatic			
Crustacea	LC50	Ceriodaphnia dubia	6.4 mg/l, 48 hours
		Daphnia magna	1.26 mg/l, 48 hours
		Daphnia pulex	4.2 mg/l, 48 hours
		Opossum shrimp order (Mysida)	4.1 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	0.732 mg/l, 96 hours
			0.64 mg/l, 48 hours
		Inland silverside (Menidia beryllina)	1.3 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Hydroquinone 0.59

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods in non-bulk packaging

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to of MARPOL 73/78 and the IBC Code Not established. **Annex II**

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Hydroquinone (CAS 123-31-9) Listed.

SARA 304 Emergency release notification

Hydroquinone (CAS 123-31-9) 100 LBS

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Hydroquinone	123-31-9	100		500	10000

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Respiratory or skin sensitization
Germ cell mutagenicity
Carcinogenicity

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Hydroquinone	123-31-9	5 - < 10

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Hydroquinone (CAS 123-31-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

California Proposition 65

WARNING: This product can expose you to chemicals including Catechol (120-80-9) and Benzophenone (CAS 119-61-9) which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

Compliance Information: Halal

Compliance Information: Kosher

This product is certified by the Orthodox Unionas Kosher pareve

Ashland, VA
Eldridge, IA
Nederland, TX

16. Other information, including date of preparation or last revision

Issue date 06-05-2023

Revision date 06-05-2023

Version # 02

HMIS® ratings Health: 2*
Flammability: 0
Physical hazard: 0

Disclaimer

ChemTreat, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available. Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.

Revision information

Hazard(s) identification: Hazard statement
Hazard(s) identification: Prevention
Hazard(s) identification: Response
First-aid measures: Eye contact
First-aid measures: Most important symptoms/effects, acute and delayed
Exposure controls/personal protection: Appropriate engineering controls
Exposure controls/personal protection: Hand protection
Exposure controls/personal protection: PPE Symbols
Toxicological information: Eye contact
Toxicological information: Eye contact
Toxicological information: Symptoms related to the physical, chemical and toxicological characteristics
GHS: Classification

Other information

Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

SAFETY DATA SHEET

1. Identification

Product identifier **BL1559**

Other means of identification

Product code BL1559

Recommended use Steam Line Treatment

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name ChemTreat, Inc.

Address 5640 Cox Road
Glen Allen, VA 23060
United States

Telephone 800-648-4579

Website chemtreat.com

E-mail productcompliance@chemtreat.com

Emergency phone number 800-424-9300

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Sensitization, skin	Category 1
	Reproductive toxicity	Category 2
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 3
	Hazardous to the aquatic environment, long-term hazard	Category 3

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Flammable liquid and vapor. Harmful if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage. Causes serious eye damage. Toxic if inhaled. Suspected of damaging fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe mist/vapors. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response	Rinse mouth. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Take off immediately all contaminated clothing and wash it before reuse. In case of fire: Use appropriate media to extinguish.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	25% of the mixture consists of component(s) of unknown acute inhalation toxicity. 25% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Cyclohexylamine		108-91-8	20 - < 30
Methoxypropylamine (MOPA)		5332-73-0	20 - < 30
Other components below reportable levels			50 - < 60

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a poison center or doctor/physician.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Dizziness. Nausea, vomiting. Diarrhea. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Coughing. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off immediately all contaminated clothing. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Flammable liquid and vapor.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. Prevent product from entering drains.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist/vapors. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid prolonged exposure. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. ACGIH Threshold Limit Values

Components	Type	Value
Cyclohexylamine (CAS 108-91-8)	TWA	10 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Cyclohexylamine (CAS 108-91-8)	TWA	40 mg/m3
		10 ppm

US. Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value
Methoxypropylamine (MOPA) (CAS 5332-73-0)	STEL	15 ppm
	TWA	5 ppm

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

US - California OELs: Skin designation

Cyclohexylamine (CAS 108-91-8)	Can be absorbed through the skin.

Appropriate engineering controls Explosion-proof general and local exhaust ventilation. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical respirator with organic vapor cartridge and full facepiece.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. When using do not smoke. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Clear
Physical state	Liquid.
Form	Liquid. Liquid
Color	Colorless.
Odor	Strong
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	< -9.40 °F (< -23.00 °C) <
Initial boiling point and boiling range	211.95 °F (99.97 °C) estimated
Flash point	132.0 °F (55.6 °C)
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	9.2 hPa estimated
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	559.4 °F (293 °C) estimated
Decomposition temperature	Not available.
Viscosity	0 - 200 cps

Other information

Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	8.04
Specific gravity	0.96 @ 20C
VOC	50 %w/w

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Acids. Strong oxidizing agents. Aluminum.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Toxic if inhaled.
Skin contact	Toxic in contact with skin. Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns. Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Dizziness. Nausea, vomiting. Diarrhea. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Coughing.

Information on toxicological effects

Acute toxicity	Toxic if inhaled. Toxic in contact with skin. Harmful if swallowed.
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	Suspected of damaging fertility or the unborn child.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful. Causes damage to organs through prolonged or repeated exposure.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Product		Species	Test Results
BL1559			
Aquatic			
Crustacea	LC50	Ceriodaphnia dubia	519.63 mg/l, 48 hours
		Daphnia pulex	277 mg/l, 48 hours
		Opossum shrimp order (Mysida)	406 mg/l, 24 hours
			330 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	1025 mg/l, 48 hours
			659.75 mg/l, 96 hours
		Inland silverside (Menidia beryllina)	637 mg/l, 24 hours
			470 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Cyclohexylamine	1.49

Mobility in soil No data available.

Other adverse effects The product contains volatile organic compounds which have a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D001: Waste Flammable material with a flash point <140 F
D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN2734
UN proper shipping name Amines, Liquid, corrosive, flammable, n.o.s. (Cyclohexylamine and Methoxypropylamine (MOPA))
Transport hazard class(es)
Class 8
Subsidiary risk 3
Label(s) 8, 3
Packing group II
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions B2, IB2, T11, TP2, TP27
Packaging exceptions 132
Packaging non bulk 202
Packaging bulk 243

IATA

UN number UN2734
UN proper shipping name Amines, Liquid, corrosive, flammable, n.o.s. (Cyclohexylamine and Methoxypropylamine (MOPA))

Transport hazard class(es)

Class	8
Subsidiary risk	3
Label(s)	8, 3

Packing group II

Environmental hazards No.

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN2734

UN proper shipping name Amines, Liquid, corrosive, flammable, n.o.s. (Cyclohexylamine and Methoxypropylamine (MOPA))

Transport hazard class(es)

Class	8
Subsidiary risk	3
Label(s)	8, 3

Packing group II

Environmental hazards

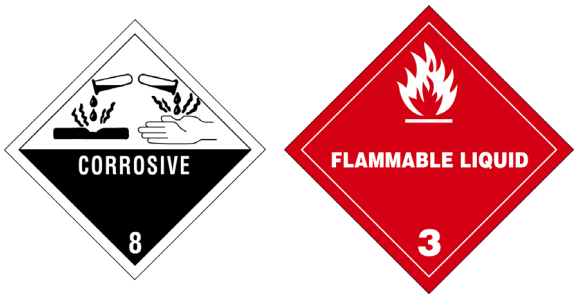
Marine pollutant No.

EmS Not available.

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

DOT



IATA; IMDG

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Cyclohexylamine (CAS 108-91-8)	Listed.
Methoxypropylamine (MOPA) (CAS 5332-73-0)	Listed.

SARA 304 Emergency release notification

Cyclohexylamine (CAS 108-91-8)	10000 LBS

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Cyclohexylamine	108-91-8	10000	10000		

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Flammable (gases, aerosols, liquids, or solids)
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Reproductive toxicity

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Cyclohexylamine (CAS 108-91-8)

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 06-16-2021

Revision date 02-28-2023

Version # 02

HMIS® ratings
Health: 2
Flammability: 2
Physical hazard: 0
Personal protection: X

Disclaimer	ChemTreat, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available. Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.
Revision information	Transport Information: Material Transportation Information
Other information	Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

SAFETY DATA SHEET

1. Identification

Product identifier **CL2150**

Other means of identification

Product code CL2150

Recommended use Cooling Water Microbiocide and Paper Slimicide

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name ChemTreat

Address 5640 Cox Road
Glen Allen, VA 23060
United States

Telephone 800-648-4579

E-mail Not available.

Emergency phone number 800-424-9300

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Sensitization, skin	Category 1A

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 3
Hazardous to the aquatic environment, long-term hazard	Category 3

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Causes skin irritation. May cause an allergic skin reaction. Causes serious eye irritation. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention Avoid breathing mist/vapors. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Avoid release to the environment. Wear eye protection/face protection. Wear protective gloves.

Response If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation or rash occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
5-chlor-2-methyl-4-isothiazolin-3-on e		26172-55-4	< 1
2-methyl-4- Isothiazolin-3-one		2682-20-4	< 0.2
Other components below reportable levels			90 - 100

4. First-aid measures

Inhalation
Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact
Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Wash contaminated clothing before reuse.

Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion
Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed
Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media
Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical
During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions
Move containers from fire area if you can do so without risk.

Specific methods
Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards
No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up
Prevent product from entering drains.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions
Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Avoid breathing mist/vapors. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles). Face shield is recommended.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance	Clear
Physical state	Liquid.
Form	Liquid.
Color	Green
Odor	Mild
Odor threshold	Not available.
pH	3.6 @ 100%
Melting point/freezing point	44.60 °F (7.00 °C)
Initial boiling point and boiling range	211.95 °F (99.97 °C) estimated
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	0.00001 hPa estimated
Vapor density	Not available.
Relative density	Not available.

Solubility(ies)

Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	0 - 200 cps

Other information

Density	8.55 lbs/gal
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	8.55
Specific gravity	1.02 - 1.03 @ 20C
VOC	0.1 %w/w

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation. May cause an allergic skin reaction.
Eye contact	Causes serious eye irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash.

Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	May cause an allergic skin reaction.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Product		Species	Test Results
CL2150			
Aquatic			
Crustacea	LC50	Ceriodaphnia dubia	18.1 mg/l, 48 hours
		Daphnia magna	10.7 mg/l, 48 hours
		Daphnia pulex	17 mg/l, 48 hours
		Opossum shrimp order (Mysida)	46.1 mg/l, 48 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	18.6 mg/l, 96 hours
		Fathead minnow (Pimephales promelas)	8.7 mg/l, 48 hours
		Rainbow Trout	12.6 mg/l, 96 hours
		Sheepshead minnow (Cyprinodon variegatus)	70.7 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1760

UN proper shipping name CORROSIVE LIQUIDS, N.O.S. (5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one)

Transport hazard class(es)

Class 8

Subsidiary risk -

Packing group II

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Special provisions B2, IB1, T11, TP2, TP27

Packaging exceptions 154

Packaging non bulk 202

Packaging bulk	242

IATA

UN number	UN1760
UN proper shipping name	CORROSIVE LIQUIDS, N.O.S. (5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1760
UN proper shipping name	CORROSIVE LIQUIDS, N.O.S. (5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

DOT

IATA; IMDG

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

2-methyl-4- Isothiazolin-3-one (CAS 2682-20-4)	1.0 % One-Time Export Notification only.
5-chlor-2-methyl-4-isothiazolin-3-one (CAS 26172-55-4)	1.0 % One-Time Export Notification only.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
Classified hazard categories	Skin corrosion or irritation Serious eye damage or eye irritation Respiratory or skin sensitization

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

Compliance Information: Halal

Compliance Information: Kosher

This product is certified by the Orthodox Unionas Kosher pareve

Eldridge IA
Ashland VA
Nederland TX
Fontana CA

Compliance Information: Biocide Regulation

Registered pesticide under 40 CFR 152.10, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), EPA Registration Number: 15300-24.

16. Other information, including date of preparation or last revision

Issue date	09-29-2022
Version #	01
HMIS® ratings	Health: 3 Flammability: 0 Physical hazard: 0 Personal protection: X
Disclaimer	ChemTreat cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available. Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.
Other information	Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

SAFETY DATA SHEET

1. Identification

Product identifier CL2900

Other means of identification None.

Recommended use Cooling Water Treatment

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name ChemTreat, Inc.

Address 5640 Cox Road
Glen Allen, VA 23060
United States

Telephone 800-648-4579

Website chemtreat.com

E-mail productcompliance@chemtreat.com

Emergency phone number 800-424-9300

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Acute toxicity, inhalation Category 4

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Harmful if inhaled.

Precautionary statement

Prevention Avoid breathing vapors. Use only outdoors or in a well-ventilated area.

Response If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. Take off contaminated clothing and wash it before reuse.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information 12.25% of the mixture consists of component(s) of unknown acute dermal toxicity.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Disodium Molybdate		7631-95-0	30 - < 40
Other components below reportable levels			60 - < 70

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a poison center or doctor/physician if you feel unwell.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors and spray mists. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid inhalation of vapors and spray mists. Avoid prolonged exposure. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Chemical respirator with organic vapor cartridge and full facepiece.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear suitable protective clothing.
Respiratory protection	Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Liquid. Liquid
Color	Not available.
Odor	Mild
Odor threshold	Not available.
pH	≥ 8 - ≤ 10 100
Melting point/freezing point	46.40 °F (8.00 °C) =
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	11.6
Specific gravity	≥ 1.38 - ≤ 1.41 @ 20C
VOC	0 %w/w

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful if inhaled.
Skin contact	No adverse effects due to skin contact are expected.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Harmful if inhaled.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product		Species	Test Results
CL2900			
Aquatic			
Crustacea	LC50	Daphnia magna	3220 mg/l, 48 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	6790 mg/l, 96 hours
		Fathead minnow (Pimephales promelas)	7630 mg/l, 96 hours
		Rainbow Trout	7340 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D002: Waste Corrosive material [pH ≤2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA)

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Acute toxicity (any route of exposure)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

Compliance Information: Halal

Compliance Information: Kosher

This product is certified by the Orthodox Unionas Kosher pareve

Ashland, VA
Eldridge, IA
Nederland, TX

16. Other information, including date of preparation or last revision

Issue date 07-25-2022

Revision date 07-27-2023

Version # 02

HMIS® ratings
Health: 1
Flammability: 0
Physical hazard: 0
Personal protection: X

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Revision information
Product and Company Identification: Product and Company Identification
Composition / Information on Ingredients: Ingredients
Regulatory information: Compliance Information:Kosher Location

Other information
Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

ChemicalBook

Chemical Safety Data Sheet MSDS / SDS

Sodium hypochlorite

Revision Date:2024-05-11 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name	: Sodium hypochlorite
CBnumber	: CB1705333
CAS	: 7681-52-9
EINECS Number	: 231-668-3
Synonyms	: sodium hypochlorite,NaOCl

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	: For R&D use only. Not for medicinal, household or other use.
Uses advised against	: none

Company Identification

Company	: Chemicalbook
Address	: Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone	: 400-158-6606

SECTION 2: Hazards identification

Classification of the substance or mixture

Skin corrosion, Sub-category 1B

Serious eye damage, Category 1

Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

Label elements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H314 Causes severe skin burns and eye damage

H315 Causes skin irritation

H318 Causes serious eye damage

H400 Very toxic to aquatic life

H401 Toxic to aquatic life

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Precautionary statement(s)

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P310 Immediately call a POISON CENTER or doctor/physician.

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continuerinsing.

P405 Store locked up.

Prevention

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P264 Wash ... thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P273 Avoid release to the environment.

Response

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P363 Wash contaminated clothing before reuse.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P316 Get emergency medical help immediately.

P321 Specific treatment (see ... on this label).

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P317 Get medical help.

P391 Collect spillage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name	: Sodium hypochlorite
Synonyms	: sodium hypochlorite,NaOCl
CAS	: 7681-52-9
EC number	: 231-668-3

MF	: ClNaO
MW	: 74.44

SECTION 4: First aid measures

Description of first aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Administration of oxygen may be needed. Refer immediately for medical attention.

Following skin contact

First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer immediately for medical attention.

Following eye contact

Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer immediately for medical attention.

Most important symptoms and effects, both acute and delayed

no data available

Indication of any immediate medical attention and special treatment needed

no data available

SECTION 5: Firefighting measures

Extinguishing media

Use dry chemical, carbon dioxide or alcohol-resistant foam.

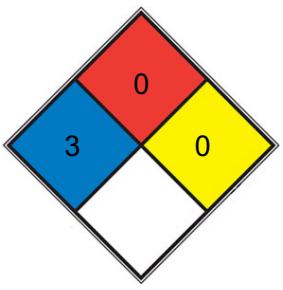
Specific Hazards Arising from the Chemical

Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.

Advice for firefighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

NFPA 704



HEALTH 3 Short exposure could cause serious temporary or moderate residual injury (e.g. liquid hydrogen, sulfuric acid, calcium

			hypochlorite, hexafluorosilicic acid)
■	FIRE	0	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 820 °C (1,500 °F) for a period of 5 minutes.(e.g. Carbon tetrachloride)
■	REACT	0	Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,N2)
□	SPEC. HAZ.		

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Then wash away with plenty of water. Do NOT absorb in saw-dust or other combustible absorbents.

Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

SECTION 7: Handling and storage

Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Separated from combustible substances, reducing agents, acids and food and feedstuffs. See Chemical Dangers. Cool. Keep in the dark. Well closed. Store only in original container.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

Physical state	Solution
Colour	Light yellow
Odour	no data available
Melting point/freezing point	-28.9 °C. Atm. press.:1 013 hPa.
Boiling point or initial boiling point and boiling range	111°C
Flammability	no data available
Lower and upper explosion limit/flammability limit	no data available
Flash point	> 111 °C. Atm. press.:101.3 kPa.
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	12.5.;10.3.
Kinematic viscosity	dynamic viscosity (in mPa s) = >= 1.4 - <= 1.6. Temperature:20°C. Remarks:Rotation of 200 rpm.;dynamic viscosity (in mPa s) = >= 1.1 - <= 1.4. Temperature:40°C. Remarks:Rotation of 200 rpm.
Solubility	Miscible with water
Partition coefficient n-octanol/water	log Pow = -3.42. Temperature:20 °C.
Vapour pressure	17.5 mmHg (20 °C)
Density and/or relative density	1.209
Relative vapour density	1.209
Particle characteristics	no data available

SECTION 10: Stability and reactivity

Reactivity

no data available

Chemical stability

no data available

Possibility of hazardous reactions

Decomposes on heating and on contact with acids. Decomposes under the influence of light. This produces toxic and corrosive gases including chlorine (see ICSC 0126). The substance is a strong oxidant. It reacts violently with combustible and reducing materials. This generates fire and explosion hazard. The solution in water is a strong base. It reacts violently with acid and is corrosive. Attacks copper and its compounds and light metals.

Conditions to avoid

no data available

Incompatible materials

no data available

Hazardous decomposition products

no data available

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: LC50 - rat (male) - > 10.5 mg/L air.
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

The substance is corrosive to the eyes, skin, respiratory tract and digestive tract. Inhalation may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest. The effects may be delayed. Medical observation is indicated. See Notes.

STOT-repeated exposure

Repeated or prolonged contact with skin may cause dermatitis.

Aspiration hazard

No indication can be given about the rate at which a harmful concentration of this substance in the air is reached on evaporation at 20°C.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50 - different fish species - 0.39 - 0.455 mg TRC/L - 96 h.

Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna - 141 µg/L - 48 h.

Toxicity to algae: EC50 - Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum) - 0.036 mg/L - 72 h.

Toxicity to microorganisms: EC50 - activated sludge of a predominantly domestic sewage - 563 mg/L - 3 h. Remarks:Respiration rate.

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible

for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN1791 (For reference only, please check.)

IMDG: UN1791 (For reference only, please check.)

IATA: UN1791 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: HYPOCHLORITE SOLUTION (For reference only, please check.)

IMDG: HYPOCHLORITE SOLUTION (For reference only, please check.)

IATA: HYPOCHLORITE SOLUTION (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 8 (For reference only, please check.)

IMDG: 8 (For reference only, please check.)

IATA: 8 (For reference only, please check.)

Packing group, if applicable

ADR/RID: II (For reference only, please check.)

IMDG: II (For reference only, please check.)

IATA: II (For reference only, please check.)

Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

PICCS

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

Household bleaches usually contain about 5% sodium hypochlorite (about pH11, irritant), and more concentrated bleaches contain 10-15% sodium hypochlorite (about pH13, corrosive).The symptoms of lung oedema often do not become manifest until a few hours have passed and

they are aggravated by physical effort. Rest and medical observation are therefore essential.Rinse contaminated clothing with plenty of water because of fire hazard.Also consult ICSC #0482 (Sodium hypochlorite, active chlorine <10%).

ATTACHMENT DR103-1

Water Injection Volume and Water Level Monitoring Data (submitted via Kiteworks)

ATTACHMENT DR103-2

Acoustic Televiewer Data (submitted via Kiteworks)

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