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Project Title:	Abengoa Mojave Compliance
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Document Title:	Segment 005 of COMPLIANCE7-08-00 Mojave Solar Project 2024 Annual Compliance Report (09-AFC-5C)
Description:	N/A
Filer:	Mahnaz Ghamati
Organization:	Abengoa Solar
Submitter Role:	Applicant
Submission Date:	2/11/2025 8:55:41 AM
Docketed Date:	2/11/2025

Mojave

Mojave Solar LLC

Atlantica
Sustainable Infrastructure

Spill Prevention, Control, And Countermeasures (SPCC) Plan, Rev 06

PP-O&M-MJV-006

Revision	Date	Reason for Revision
00	09/16/2013	Initial Release
01	10/07/2013	Agency Comments
02	02/27/2014	To address San Bernardino Fire Department concerns
03	06/17/2021	Updated Formatting, Font Header and ASI Logo
04	05/19/2022	Updated certification page signed by current Plant Manager
05	01/20/2023	Updated the signatures and appendixes.
06	01/17/2024	Chemical inventory updated

Produced by:	Department	Date
Nicholas Diercks	Environmental Technician	Electronic Signature
Fred Hrenchir	Safety Services Lead	Electronic Signature
Steven Pochmara	Q&E Compliance Manager	Electronic Signature

Reviewed by:	Department	Date
Mahnaz Ghamati	Q&E Compliance Manager	01/17/2024

Approved by:	Department	Date
David Rosas	Plant Manager	01/17/2024

Contents

CERTIFICATION PAGE

Facility Information

Name of Facility: Mojave Solar Project

Type of Facility: Solar Power Plant

Location of Facility: 42134 Harper Lake Road; Hinkley, California

Owner/Operator: Mojave Solar LLC

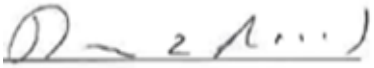
Designated Person Accountable for Spill Prevention at this Facility: Mahnaz Ghamati

Date of Initial Oil Storage: December 1, 2013

This Facility has not had a reportable oil spill event that has resulted in the Submission of this plan to the EPA (refer to Section 1.5 for Submission requirements).

Management Approval

- The spill prevention, control, and countermeasures for the referenced facilities will be implemented and maintained as described in this SPCC Plan.
- Management agrees to provide the manpower, equipment, and materials required to expeditiously control and remove any quantity of unauthorized discharge.

Signature:  Date: 01/20/2023

Title of Manager: David Rosas Galindo, Plant Manager

Certification

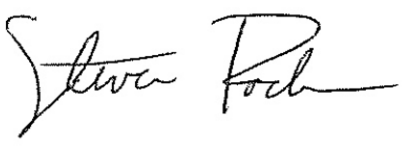
Pursuant to 40 CFR § 112.3(d), I hereby certify and attest that:

1. I am familiar with the provisions of 40 CFR Part 112;
2. I, or my agent, have visited and examined the facility;
3. This SPCC Plan has been prepared in accordance with good engineering practices, with consideration of applicable industry standards and the requirements of Part 112;
4. Procedures for required inspections and testing have been established; and
5. This plan is adequate for the facility.

This certification shall in no way relieve the owner/operator of the duty to prepare and fully implement this Plan in accordan with the provisions of 40 CFR Part 112.

Date: 2/27/14

Bradford A. DeWitt
State of California Registration No: P1804

MOJAVE SOLAR PROJECT **EPA APPLICABILITY OF SUBSTANTIAL HARM CRITERIA** **40 CFR Part 112 SUBPART D** **112.20 (a)(2) and 112.20 (f)(1)**	
Does the Facility transfer oil over-water to or from vessels and does the Facility have a total storage capacity greater or equal to 42,000 gallons? Yes [ ] No [X]	
Does the Facility have a total oil storage capacity greater than or equal to 1 million gallons and within any aboveground storage tank area, does the Facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tanks plus sufficient freeboard to allow for precipitation? Yes [ ] No [X]	
Does the Facility have a total oil storage capacity greater than or equal to 1 million gallons and is the Facility located at a distance such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? Yes [ ] No [X]	
Does the Facility have a total oil storage capacity greater than or equal to 1 million gallons and is the Facility located at a distance such that a discharge from the facility would shut down a public drinking water intake? Yes [ ] No [X]	
Does the Facility have a total oil storage capacity greater than or equal to 1 million gallons and has the Facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years? Yes [ ] No [X]	
CERTIFICATION	
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.	
Signature	
Printed Name	Steven Pochmara
Title	Permit Manager
Date	02/27/2014

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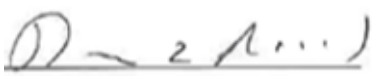
Signature	
Printed Name	David Rosas Galindo
Title	Plant Manager
Date	01/20/2023

DISTRIBUTION LIST

Note: The Distribution of this Plan is tracked by the Copy Number located on the Title Page. Plan Distribution and Plan Review and Update Procedures are provided in Sections 1.4 & 1.5.

COPY NUMBER	• PLAN HOLDER	LOCATION
1	Mojave Solar Project 42134 Harper Lake Road; Hinkley, California 92347	Main Office (ALPHA site)
1	Mojave Solar Project 42134 Harper Lake Road; Hinkley, California 92347	Main Office (BETA site)
2	EnviroTech Consultants, Inc. 5400 Rosedale Highway Bakersfield, CA 93308	Main Office
1	Processes Unlimited International Inc. 5500 Ming Ave. Bakersfield, Ca. 93309	Main Office

REVISION RECORD

Note: It is the responsibility of the holder of this plan to ensure that all changes and updates are made. The holder should:

- Remove and discard obsolete pages.
- Replace obsolete pages with the updated pages.
- Record each change on this form.

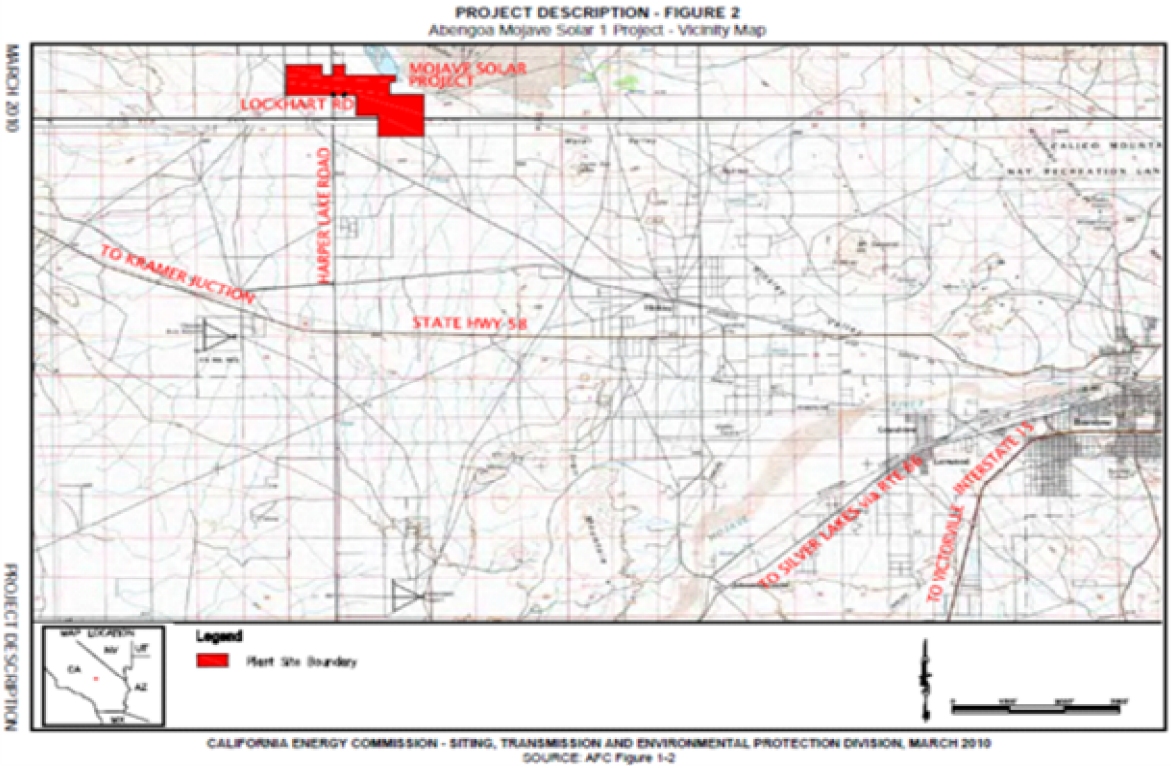
Change Date	Affected Page Number(s)	Description of Change(s)	Name
EXAMPLE			
01/01/01	1-1 thru 1-4; 5-2	HES Staff Update	M. Doyle

1 INTRODUCTION

1.1 Facility Description

The Mojave Solar Project facility ("Facility") consists of 1,765 acres and is located in unincorporated San Bernardino County approximately nine miles northwest of the community of Hinkley, California along the Highway 58 corridor (See Figure 1-1). The Facility is accessed via Harper Lake Road, approximately six miles north of the intersection of Harper Lake Road and Highway 58. The existing Solar Electric Generating Stations (SEGS) VIII and IX facilities owned by Next Era Energy Resources are immediately northwest of the Facility. The topography is flat (about 2,070 feet above sea level) consisting of open desert and agricultural land adjacent to the Harper Dry Lake Depression. Elevated land surrounds the Facility site from all directions and can be found 1-3 miles from the Facility. The Facility is owned and operated by Mojave Solar LLC. The California Energy Commission (CEC) has exclusive jurisdiction to license this Facility.

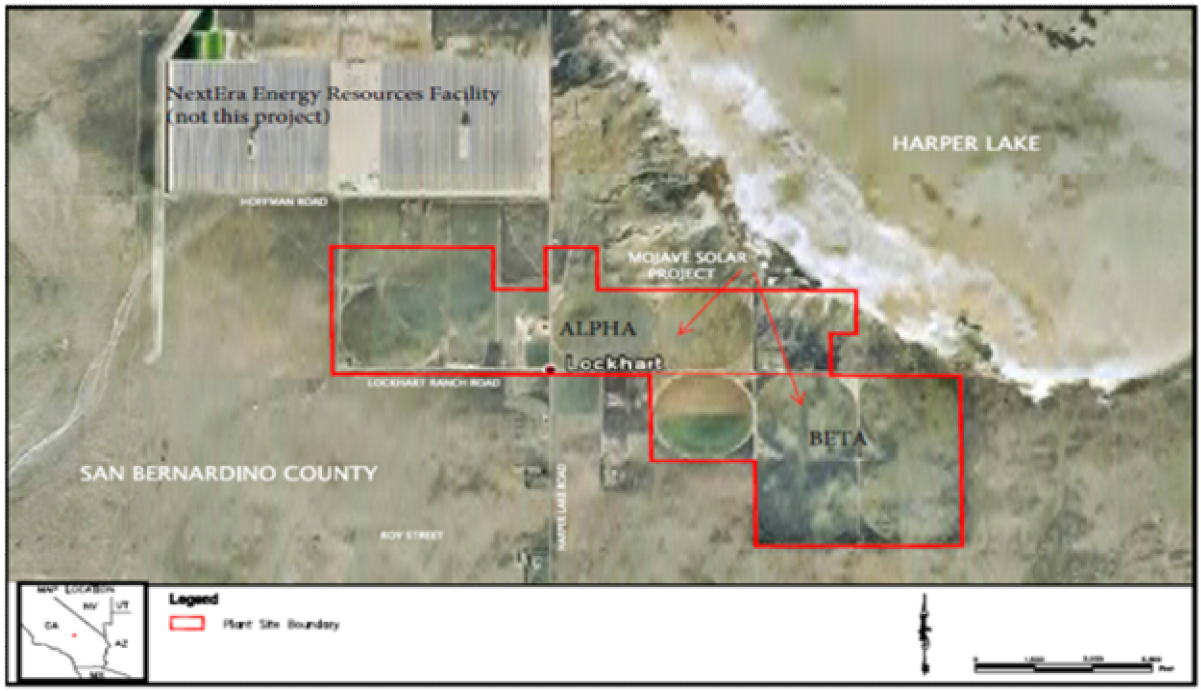
Figure 1-1 Facility Vicinity Map



The Facility consists of two sites, Alpha and Beta, which have a combined nominal electric output of 250 MW from twin, independently operable solar fields. The Alpha site,

situated in the northwest portion of the Facility area, occupies 884 acres and is bisected by Harper Lake Road. The Beta site is located east of Harper Lake Road in the southeast portion of the Facility site and occupies 800 acres (See Figure 1-2). The Alpha and Beta sites share the remaining 81 acres of the Facility for activities that include receiving and discharging offsite drainage improvements. Each field (Alpha and Beta) will feed a 125 MW Power Island.

Figure 1-2 Facility Site Map



SOURCE:CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010 SOURCE: AFC Figure 1-3

The Facility uses parabolic trough, solar thermal technology to produce electrical power using a steam turbine generator fed from a solar steam generator. The solar steam generator receives heated heat transfer fluid (HTF) from solar thermal equipment comprised of arrays of parabolic mirrors that collect energy from the sun. The "Mirror Fields" are comprised of single-axis-tracking parabolic trough solar collectors arranged to form many parallel rows aligned on a north-south axis. Each solar collector has a linear, parabolic-shaped reflector that focuses the sun's radiation on a specially designed linear receiver known as a heat collection element (HCE). The collectors track the sun from east to west to ensure that the maximum amount of the sun's radiation is continuously focused on the HCE. The Heat Transfer Fluid, Therminol™ VP-1, is heated to approximately 740° F as it circulates through the HCE and returns to a series of heat exchangers where the fluid is used to generate steam in the solar steam generator

system at the Power Island, thereby providing steam to the steam turbine generator to produce electricity. The Facility's electrical transmission lines will interconnect with the Southern California Edison (SCE) 230-kV Kramer-Coolwater #1 transmission, which is located adjacent to the southern border of the Facility.

The Facility uses a wet cooling tower for power plant cooling. The electric re-heaters will supply HTF to HTF heat exchangers as needed during offline hours to keep the HTF in a liquid state when ambient temperatures fall below its freezing point of 54° F. Each Power Island will also have a diesel engine-driven firewater pump for fire protection and a diesel engine-driven backup generator for power plant essentials.

Water for plant cooling and other purposes is supplied via on-site wells, and both the Alpha and Beta sites have newly constructed wells that draw groundwater based on adjudicated water rights from Harper Valley Ground Basin.

A single treatment Facility has been installed for each pair of wells to treat the groundwater to meet potable standards for employee use. A septic system disposes of sanitary wastewater.

1.2 Plan Purpose/Objectives

The purpose of this Spill Prevention, Control, and Countermeasure (SPCC) Plan is to describe measures to be implemented by the Facility to prevent oil discharges from occurring, and to prepare to respond in a safe, effective, and timely manner to mitigate the impacts in the event of a discharge. This Plan is required by the California Energy Commission (CEC). This Plan follows the format specific in 40 CFR Section 112. In addition, this Plan will be used as a reference for oil storage information and testing records, as a tool to communicate practices on preventing and responding to discharges with employees, as a guide to Facility inspections, and as a resource during emergency response.

The specific objectives of this Plan are to define the spill prevention, control, and countermeasures for the Facility and to assist Facility personnel in establishing and maintaining an efficient and effective program. This is accomplished in the Plan by addressing:

- Personnel Training and Spill Prevention Procedures.
- Inspections and Records; Facility Drainage.
- Bulk Storage Tanks.
- Transfer Operations, Pumping, and In-Plant Process, Security

The Hazardous Materials Division of the San Bernardino County Fire Department is the Administering Agency and the Certified Unified Program Agency (CUPA) for San Bernardino County with responsibility for regulating hazardous materials handlers, hazardous waste generators, underground storage tank facilities, above ground storage tanks, and stationary sources handling regulated substances. Contact information for this Administering Agency is provided in the Emergency Contact List.

1.3 Plan Distribution Procedures

The person accountable for spill prevention at this Facility shall have the responsibility for administering the Plan. The Distribution Number listed on the Title Page designates plan copies. Distribution will be handled in the following manner:

- Distribution of the Plan is tracked by the number on the Title Page. A Distribution List is included (page 6) to facilitate control and to identify the current holders of the Plan.

2 SPCC PLAN REGULATION OVERVIEW

2.1 APPLICABILITY (§112.1)

This requirement applies to owners or operators of non-transportation-related onshore and offshore facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing or consuming oil and oil products, and that meet the following criteria:

- Due to the location, could reasonably be expected to discharge oil in harmful quantities into or upon the navigable waters of the United States or adjoining shorelines; and

- Has an aggregate aboveground storage capacity, in containers of 55 gallons or greater capacity, in excess of 1,320 gallons; **or**
- Has a completely buried storage capacity, excepting tanks subject to 40 CFR Part 280 or 281, in excess of 42,000 gallons.

Additionally, in California, if a facility has an aggregate aboveground oil storage capacity in excess of 1,320 gallons, regardless of proximity to navigable waters, then the facility is subject to the California Aboveground Petroleum Storage Act and is required to prepare an SPCC plan in accordance with the Federal Regulations.

This facility has an aggregate aboveground oil storage capacity greater than 1,320 gallons; therefore, is subject to the requirements of the SPCC regulation.

2.2 DEFINITIONS (§112.2)

Facility: "Any mobile or fixed, onshore or offshore building, property, parcel, lease, structure, installation, equipment, pipe, or pipeline (other than a vessel or a public vessel) used in oil well drilling operations, oil production, oil refining, oil storage, oil gathering, oil processing, oil transfer, oil distribution, and oil waste treatment, or in which oil is used, as described in appendix A to this part. The boundaries of a facility depend on several site-specific factors, including but not limited to, the ownership or operation of buildings, structures, and equipment on the same site and types of activity at the site. Contiguous or non-contiguous buildings, properties, parcels, leases, structures, installations, pipes, or pipelines under the ownership or operation of the same person may be considered separate facilities."

Production Facility: "All structures (including but not limited to wells, platforms, or storage facilities), piping (including but not limited to flowlines or intra-facility gathering lines), or equipment (including but not limited to workover equipment, separation equipment, or auxiliary non-transportation-related equipment) used in the production, extraction, recovery, lifting, stabilization, separation or treating of oil (including condensate), or associated storage or measurement, and is located in an oil or gas field, at a facility."

Bulk storage container: "Any container used to store oil. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container."

Tank: All tanks are containers. Regulations further define specific types of tanks, such as "underground" (USTs regulated by Federal UST regulations under 40 CFR 280 and 281), "bunkered", "completely buried" or "partially buried". USTs regulated by UST regulations are not subject to SPCC Regulations. "Breakout" tanks regulated by DOT are also not subject to SPCC Regulations. Bunkered, Completely Buried (such as vaulted tanks other than USTs) and Partially Buried Tanks are considered aboveground storage containers and are subject to SPCC Regulations.

Loading/Unloading Rack: "A fixed structure (such as a platform, gangway) necessary for loading or unloading a tank truck or tank car, which is located at a facility subject to the requirements of this part. A loading/unloading rack includes a loading or unloading arm and may include any combination of the following: piping assemblages, valves, pumps, shut-off devices, overfill sensors, or personnel safety devices."

Oil-filled operational equipment: "Equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container and does not include oil-filled manufacturing equipment (flow-through process). Examples of oil-filled operational equipment include, but are not limited to, hydraulic systems, lubricating systems (e.g. , those for pumps, compressors and other rotating equipment, including pump jack lubrication systems), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device."

2.3 REQUIREMENT TO PREPARE AND IMPLEMENT (§112.3)

The owner or operator or an onshore or offshore facility subject to this regulation must prepare in writing and implement a Spill Prevention Control and Countermeasure Plan in accordance with §112.7.

A licensed Professional Engineer must review and certify a Plan for it to be effective to satisfy the requirements of this part.

By means of this certification the Professional Engineer attests:

- That he is familiar with the requirements of this regulation
- That he or his agent has visited and examined the facility
- That the Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and with the requirements of this part
- That procedures for required inspections and testing have been established
- That the Plan is adequate for the facility
- That, if applicable, for a produced water container subject to §112.9(c)(6), any procedure to minimize the amount of free-phase oil is designed to reduce the accumulation of free-phase oil and the procedures and frequency for required inspections, maintenance and testing have been established and are described in the Plan.

The owner or operator of a facility for which a Plan is required must:

- Maintain a complete copy of the Plan at the facility if the facility is normally attended at least four hours per day, or at the nearest field office if the facility is not so attended, and
- Have the Plan available to the Regional Administrator for on-site review during normal working hours.

2.4 AMENDMENT OF SPCC BY REGIONAL ADMINISTRATOR (§112.4)

Submission of Plan (§112.4(a))

The facility shall submit this Plan to the EPA Regional Administrator within sixty (60) days whenever the Facility has a discharge event(s) from potential spill sources that meets one of the following conditions:

- Discharge more than 1,000 gallons of oil into or upon the navigable waters of the United States or adjoining shorelines in a single spill event; or
- Discharges oil in harmful quantities into or upon the navigable waters of the United States or adjoining shoreline in two spill events greater than 42 gallons within any twelve-month period.

Documentation to be included with this Plan submission includes the following:

- Name and location of the facility
- Name(s) of the owner or operator of the facility
- Date and year of initial facility operation
- Maximum storage or handling capacity of the facility and normal daily throughput
- Description of the facility, including plot plants, flow diagrams and topographical maps
- The cause(s) of such discharge, including a failure analysis of system or sub-system in which the failure occurred
- The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements
- Additional preventive measures taken or contemplated to minimize the possibility of recurrence

If, after submission of the Plan to the Regional Administrator, revisions to the Plan are required, the Plan will be amended in accordance with 40 CFR 112.4 (d)(e)(f).

2.5 AMENDMENT OF SPCC BY OWNERS AND OPERATORS (§112.5)

The "Designated Person Accountable for Oil Spill Prevention" (identified on the Certification Page) will coordinate the following plan review and update procedures.

Facility Changes Requiring Plan Revision

This Plan will be revised when there are changes in the Facility's design, construction, operation, or maintenance that materially affects the Facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shorelines. Such amendments shall be incorporated into the Plan within six months of the change and fully implemented as soon as possible but no later than six months following the preparation of the amendment.

Changes that may require revision include, but are not limited to:

- Commission or decommission of containers.
- Replacement, reconstruction, or movement of containers.
- Reconstruction, replacement, or installation of piping systems.
- Construction or demolition that might alter secondary containment structures and/or drainage systems.

Five-Year Review

At least once every five years the Facility will complete a review and evaluation of this Plan and make amendments within six (6) months of the review in accordance with 40 CFR Section 112.5. This evaluation will include, at a minimum, the following:

- Applicability of new prevention and control technology which may significantly reduce the likelihood of a spill event from the facility if such technology has been field-proven at the time of the review.
- Accuracy of the SPCC Plan as compared to the current facility operation and SPCC Regulations.
- Capacity and structural integrity of secondary containment structures.
- SPCC inspections and records files to ensure continuity for a minimum period of five (5) years.

Certification of Revisions by a Professional Engineer

- Technical amendments to the Plan require certification by a Registered Professional Engineer.
- Administrative changes such as updates to contact information or other changes that do not increase the likelihood of a spill or discharge will not require certification by a Registered Professional Engineer.
- Plan amendments or submittals to the EPA Regional Administrator due to the occurrence of reportable spills or other Plan Amendments by the Regional Administrator will not require

recertification by a Registered Professional Engineer unless a technical amendment is required.

These procedures are in accordance with 40 CFR Sections 112.5.

Inclusion of Amendments into the Plan

- The facility will coordinate the word processing, publication, and distribution efforts of completing the revisions and maintaining the Plan.
- The plan holder, immediately upon receipt of any revisions, shall review and insert the revised pages into the Plan and discard the obsolete pages. This action should then be recorded on the "Revision Record" page in the Foreword.

2.6 QUALIFIED FACILITY PLAN REQUIREMENTS (§112.6)

The facilities included in this SPCC plan do not meet the criteria of a "Qualified Facility" as defined below:

- A Tier I qualified facility meets the qualification criteria of a Tier II qualified facility and has no individual aboveground oil storage container with a capacity greater than 5,000 U.S. gallons.
- A Tier II qualified facility is one that has had no single discharge exceeding 1,000 U.S. gallons or no two discharges each exceeding 42 U.S. gallons within any twelve-month period in the three years prior to the SPCC Plan self-certification date, or since becoming subject to this part if the facility has been in operation for less than three years and has an aggregate aboveground oil storage capacity of 10,000 U.S. gallons or less.

3 §112.7 GENERAL REQUIREMENTS FOR SPCC PLANS

3.1 GENERAL REQUIREMENTS (§112.7(a))

Facility Conformance with Part 112 Requirements (§112.7(a)(1))

The facility is in conformance with the following regulatory requirements:

- Federal Oil Spill Prevention regulations – US EPA Final Rule for Oil Pollution Prevention; Non-Transportation Related Onshore and Offshore Facilities (40 CFR Part 112).

Facility Description and Diagrams (§112.7(a)(3)(i)

The Mojave Solar Project will produce solar electricity by means of an integrated process using solar energy to heat a synthetic petroleum-based fluid in a closed-loop system that, in turn, heats water to create steam to drive a conventional steam turbine. The Facility is comprised of two separate but similar sections- the Alpha and Beta solar fields and Power Islands. An overall facility diagram showing the entire site is located in Appendix A-1. Appendix A-2-Central Plant Layout provides details of the Power Islands (Alpha Power Island is represented; however, the Beta Power Island is identical with the exception of gasoline storage), and Appendix A-3 shows the detailed locations of the pertinent HTF, HF and lube oil storage facilities noted.

Oil Storage and Oil-Filled Equipment

Oils stored at the facility required to have secondary containment include hydraulic fluid and lube oil. Oils used in operational equipment include Heat Transfer Fluid (HTF), mineral oil, and hydraulic fluid.

CFR 40, Part 112 Oil Pollution Prevention; Spill Prevention, Control, and Plan Requirements-Amendments (Section 112.2) excludes oil-filled operational equipment from the definition of bulk storage provided the oil storage container in which the oil is present solely supports the apparatus or the device. Examples of oil-filled operational equipment include hydraulic and lubricating systems and heat transfer systems. The regulations provide for the option of SPCC compliance by providing for secondary containment for each piece of operational equipment in accordance with 112.7(c); or by preparing a contingency plan which includes active containment measures (countermeasures or spill response capability) which prevent discharge into navigable waters.

Specific locations of oil storage areas and oil-filled operational equipment are indicated on the diagrams in Appendix A-3. A table listing oils stored and their secondary containment and oil-filled operational equipment is included in Appendix B.

Heat Transfer Fluid (HTF)

Therminol VP1 is the heat transfer fluid (HTF) that will be used in the solar panels to collect solar heat and transfer it in order to generate steam to run the steam turbines. Therminol is a mixture of 73.5% diphenyl ether and 26.5% biphenyl and is a solid at temperatures below ~54 °F. Therminol can therefore be expected to remain liquid if a spill occurs. While the risk of off-site migration is minimal, Therminol is highly flammable, and fires have occurred at other solar generating stations that use it. Approximately 2,292,000 gallons of HTF will be contained in the pipes and heat exchanger. Isolation valves are placed throughout the HTF piping system designed to automatically block off sections of the piping in which a loss of pressure is detected.

To accommodate the volumetric change that occurs when heating the HTF to the operating temperature, expansion vessels and overflow tanks are required. Nitrogen will be used to provide a blanket on the headspace of the expansion vessels and tanks to prevent oxidation and contamination of the HTF by reducing its exposure to atmospheric air in the expansion vessels.

- Expansion Vessels: For each Power Island, there are four (4) HTF expansion vessels. Each HTF expansion vessel is designed to operate at 32% level with a total of 81728.74 lbs. of HTF. Based on the specific gravity of the HTF, each vessel will operate at approximately 9,245 gallons of HTF.
- HTF Overflow Tanks: For each Power Island, there are two (2) HFT overflow tanks, each having a capacity of 57,000 gallons.

The "close-loop" heat transfer process circulates HTF through the facility's pumps, expansion tanks, piping, and other associated components and does not require the transfer of oil. The HTF expansion and overflow tanks are present solely to support the HTF heat transfer/circulation process, and therefore meet the definition of "oil filled operational equipment".

Although the HTF is not defined as bulk storage, The Facility has constructed secondary containment for HTF expansion vessels and overflow tanks and has a prepared an emergency response plan including countermeasures and spill response procedures. Secondary containment drawings are included in Appendix C and the facility's emergency response plan is included in the Facility HMBP.

Hydraulic Fluid

Hydraulic Fluid (HF) is brought to the Facility by flatbed truck in 330-gallon totes and used in the hydraulic pumps to rotate the mirrors in the Mirror Fields. The hydraulic pumps and related distribution equipment are considered "oil filled operational equipment" and are not considered bulk storage containers. Hydraulic fluid is stored within the chemical products storage area (No. 38 on Central Plant Layout Map) of each Power Island. The chemical products storage areas have been constructed with secondary containment to meet the requirements of 110% of volume of the largest container.
Lube Oil

Storage areas for lube oil (exceeding 55 gallons) are located within the Lube Oil Skid (No. 28 on Central Plant Layout Map) of each Power Island. The lube oil skids have been constructed with secondary containment to meet the requirements of 110% of volume of the largest container.

Mineral Oil

Mineral oil is used in the facility's power transformers. The power transformers are defined as "oil filled operational equipment" (per §112.2) and are not considered bulk storage.

Transportation and Distribution of Oils

Heat Transfer Fluid (HTF)

Various containerized and bulk hazardous materials will be transported to the Facility via truck. Approximately 2.3 million gallons of HTF will be transported to the Facility prior to start-up of operations resulting in an estimated 374 deliveries total or 10 trucks per week. Each truck will deliver approximately

6,130 gallons of HTF. The risk of an accidental release during HTF transport in the Facility area has been assessed based on criteria such as previous accident data, established accident modeling, and existing regulatory requirements regarding transport of hazardous materials (e.g., standards for vehicle safety and driver qualifications/competence). The evidence shows that, with applicable regulatory conformance, the risk of exposure to significant concentrations of HTF during transportation to the Mojave Solar, LLC facility is extremely low.

The HTF tank truck unloading area will be surrounded with a rollover berm that provides secondary containment in the event of a discharge during transfer operations. The rollover berm is designed to address the more stringent containment requirements of 40 CFR 112.7(h), which requires that the berm be sufficient to contain the capacity of the largest compartment, plus freeboard for precipitation. The curbed area has been designed accordingly.

HTF is transported through the Mirror Fields using a supply-and-return header system, which assists in balancing flow through the pipe system. Pumps include seal cooling and high temperature materials to preserve component function under extreme conditions. The Mirror Fields are divided into sections with automatic or semiautomatic isolation valves. The isolation valves will be located to minimize the volume of HTF leakage during a pipe failure and may either be triggered automatically or by the operator inside the facility control room. Piping expansion loops are located throughout the Facility as required to maintain the composite pipe stress within the allowable limits.

Hydraulic Fluid (HF)

Hydraulic Fluid (HF) is brought in by flatbed truck in 330-gallon totes. The totes are unloaded at the containment areas. Secondary containment for unloading areas is provided with oil booms and pads to contain any spills or leaks. HF remains in the totes until it is downloaded into smaller containers for use in filling the hydraulic pumps that operate the mirrors. Small containers consist of less than 50-gallon steel or plastic containers. Minor amounts of HF pass through short length, small diameter hoses or pipes that transfer HF fluid from containers to motors.

Lube Oil/Mineral Oil

Lube Oil is brought in by truck in containers. Mineral oil is preloaded into the transformers prior to arriving on site.

Discharge Prevention Measures (§112.7(a)(3)(ii))

Off-Site Drainage

The Facility is located on relatively level terrain. The area originally drained towards the Harper Lake Wash, which is located northeast of the Facility. The off-site storm water runoff from the mountains east, west and the north of the Facility is managed by an interceptor and conveyance channels as well as detention basins to ensure that pre-development flows are not exceeded, and historic flow patterns are maintained. Off-site flows are eventually released into the Harper Lake Wash Area north of the Facility. (See Figure 1-2 Facility Site Map).

The Facility's storm water will be retained on-site in drainage basins. Runoff in the Mirror Fields will be collected in a series of shallow basins between the mirror rows. These basins will be designed to provide natural percolation/infiltration of the rainfall. The shallow retention areas are designed with a five percent slope to minimize the effects of erosion and soil carry-over and deposition into the retention basins. The drainage from the Power Islands will be contained within the Power Islands.

Discharge or Drainage Controls (§112.7(a)(3)(iii))

The Facility has developed measures for operating personnel that cover the activities to be conducted during the routine handling, loading, unloading, and transfer of products. Such measures include routine startup and shutdown, emergency shutdown, routine operating practices, and emergency response procedures. (See the Facility HMBP)

All oil storage containers (greater than 55 gallons) are provided with sufficient secondary containment to contain the volume of the largest container within

the containment area plus freeboard (110%). Facilities or equipment without secondary containment are addressed in Section 2.4.

The steel HTF overflow tanks are equipped with direct-reading level gauges and with high level alarms set at 90 percent of the rated capacity. Liquid level sensing devices will be tested on a monthly basis during the monthly inspection of the facility, following manufacturer recommendations. Venting capacity will be suitable for the fill and withdrawal rates. Overfill prevention systems for the HF and lube oil will be developed based on the operation of those systems. Totes will be not refilled, and therefore overfill prevention systems do not apply. Facility personnel will be present throughout the filling operations to monitor the product level in the tanks.

On-Site Drainage/Discharge

Drainage from the curbed and diked/containment areas including storm water, overflow from the adjacent tanks, and spillage will be contained and must be manually pumped out. The contents of the secondary containment areas will be inspected by facility personnel prior to pumping. Any water containing oil will be taken to the oil/water separator for treatment.

- Discharges occurring during truck loading/unloading operations will be restrained by the rollover berm. Operation and maintenance trucks may transport HTF or HF within the facility. When they are parked at the facility for an extended period of time (such as parking overnight with a load of product), they will be positioned in an area which will either provide secondary containment capacity (i.e., sufficient for the capacity of the delivery truck and additional freeboard for 4 inches of precipitation) or will be positioned such that any leakage will be able to be contained by booms or pads prior to entering a drainage basin.

- Discharge from above-ground storage tanks, totes or pipelines without direct containment will be identified and efforts made to contain the discharge by booms, pads or other material prior to reaching drainage basins.

- Totes and portable containers will have secondary containment. Any discharged material will be quickly contained and cleaned up using sorbent pads and appropriate cleaning products.

Countermeasures for Discharge Discovery, Response, and Cleanup (§112.7(a)(3)(iv))

The Facility uses in-house personnel to respond to small releases and contracts with a spill response contractor to provide immediate response to larger. All employees are trained in spill response and the SPCC plan is reviewed annually. The training provides specific response information including notification guidelines and available resources.

Leak detection will be accomplished in a combination of ways. A Facility employee performs a complete walk-through of the facility each day. This daily visual inspection involves: (1) looking for storage /piping damage or leakage, stained or discolored soils, or excessive accumulation of water in diked and bermed areas. Small leaks, which could occur at ball joints or other connections, will be detected based on these daily inspections. Small leaks could then be corrected via repacking of joints or valves or by minor repairs if needed. The ability to isolate loops and sections of the field will allow for quick repairs. In the event of larger sudden leaks, these are handled through a combination of remote pressure sensing equipment and remote operating valves that will allow for isolation of large areas of the field, or possibly the entire field.

Methods of Disposal of Recovered Materials (§112.7(a)(3)(v))

Visible discharges from any container or appurtenance – including seams, gaskets, piping, pumps, valves, rivets, and bolts – will be quickly corrected upon discovery. Oil will be promptly removed from the containment areas and disposed of according to the waste disposal method.

Spilled materials will be recovered via pump and vacuum lines. The material will be treated as waste and will be removed by a contracted third-party in accordance with the Hazardous Materials-Contingency Plan included in the Facility Emergency Response program.

Contact List and Phone Numbers for Response (§112.7(a)(3)(vi))

A current contact list that includes the facility response coordinator, National Response Center, response contractors, and appropriate Federal, State and Local agencies can be found in the Facility's Emergency Response program. Copies are kept in the main office.

Spill Notification Requirements (§112.7(a)(4))

Spill notification requirements are summarized in the Spill Notification Guidelines located in the Facility's Emergency Response program.

Response Plan (§112.7(a)(5))

The facility has developed an Emergency Contact List that will be used in the event of an oil spill. The list includes contact information for facility personnel, spill contractors, emergency numbers, and government agencies that must be notified in case of a spill. The list can be located in the Facility's Emergency Response program.
The responsibilities of the response personnel include identifying the size, position, and content of the spill, and also the direction and speed and the chances of entering a vulnerable area.

No member of the response party shall do anything that would put himself or herself or anyone else at any sort of risk. Knowing this, it is also important that the flow of oil be blocked off as soon as possible as to prevent the general public from being affected.

The facility's Hazardous Materials Contingency Plan is located in Facility Emergency Response program.

3.2 Rate, Quantity and Direction of RELEASE (§112.7(b))

The predicted rate and quantity of a release from the bulk storage containers are noted in Appendix B. Any changes to this information will be amended in accordance with Section 2.5 of this Plan and 40 CFR Part 112 Subpart A Section

112.5. Direction of flow is shown directly on the overall Facility Plan in Appendix A-1. Other facilities are addressed below:

There is potential for oil spills to occur as a result of equipment failure.				
Spill Source	**Type of Failure**	**Estimated Volume** (max. rate of flow)	**Direction of Flow**	**Secondary Containment**
TRANSFER LINES	Leak	Will vary depending on flow rate, pipe diameter, location, and spill duration	Varies	None (1)
MANIFOLDS	Leak	Will vary depending on flow rate and spill duration	Varies	None (1)
STORAGE TANKS	Leak or Rupture	5,000 Gallons	Varies	Concrete walls and curbing
OIL-FILLED EQUIPMENT	Leak	Will vary depending on flow rate and spill duration	Varies	None (1)
TRUCK LOADING	Leak while loading	Will vary depending on flow rate and spill duration	Varies	See note (2)
(1) Permanent containment structures are not practical for these types of equipment, as potential spill volumes cannot be adequately predicted. Regular inspections, diligent monitoring and an Oil Spill Contingency Plan will be utilized to prevent and control spills at these sites. (2) Loading racks are not present at these facilities. Truck loading is accomplished through flex lines and pumps. When such operations are performed, they are continuously monitored.				

3.3 Secondary Containment / Diversionary Structures (§112.7(c))

Secondary containment is provided for each tank storage area as shown in Appendix B. Containment structures are of sufficient size and impermeability to retain any release until cleanup occurs.

3.4 Contingency Planning (§112.7(d))

Exceptions from Secondary Containment

In section 3.2, the facility identified equipment for which it is not practical to install secondary containment or containment structures, as described in section 112.7(c).

It is not practical to construct containment outside the proximity of the listed major facilities for equipment, such as transfer lines, pumps, manifolds, truck loading areas, and oil-filled equipment.

Buried ferrous piping at this facility will be either cathodically protected against corrosion or will be provided with a protective wrapping and coating. When a section of buried line will be exposed, it will be carefully examined for deterioration. If corrosion damage will be found, additional examination and corrective action will be taken as deemed appropriate considering the magnitude of the damage. Additionally, integrity and leak testing of buried piping will be conducted at the time of installation, modification, construction, relocation, or replacement. Records of all tests will be kept at the facility for at least three years. Lines that will not be in service or are on standby for an extended period of time will be capped or blank-flanged and marked as to their origin. All pipe supports will be designed to minimize abrasion and corrosion and to allow for expansion and contraction. Pipe supports will be visually inspected during the monthly inspection of the facility. All aboveground piping and valves will be examined monthly to assess their condition. Inspection includes aboveground valves, piping, appurtenances, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces. Observations will be noted on the SPCC Inspection Checklist provided in this Plan (Appendix D-1). Warning signs will be posted at appropriate locations throughout the facility to prevent vehicles from damaging aboveground piping and appurtenances. Most of the aboveground piping will be located within process areas that will not be accessible to vehicular traffic. Brightly painted bollards will be placed where needed to prevent vehicular collisions with equipment.

Oil Spill Contingency Plan (§112.7(d)(1))

An Emergency Contingency Plan is included in the Hazardous Materials Business Plan (HMBP) prepared in accordance with state regulations. An Emergency Contact List is included in the Facility's Emergency program which addresses oil spills for equipment listed as having no secondary containment in section 3.2.

Written Commitment (§112.7(d)(2))

For the equipment listed as having no secondary containment in section 3.2, the facility has provided a written commitment of manpower, equipment, and materials necessary to remove any quantity of oil discharged that may be harmful. Refer to the "Certification Page".

3.5 Inspections, Testing, and Records (§112.7(e))

Facility personnel perform SPCC Inspections quarterly. A copy of the "SPCC Inspection Checklist" is located in Appendix D-1 and a copy of the "Mojave Solar Project Inspection Checklist" is located in Appendix D-2. In addition to the quarterly inspection, surveillance is a routine function of the facility personnel.

Operators inspect their facilities daily for signs of leaks. If a spill is detected, its source would be shut-in and supervisory personnel notified and appropriate actions taken to:

1. Contain and clean up spill
2. Repair the equipment that was the source of the leak
3. Make any required notifications

The facility also conducts periodic audits and facility reviews, that include spill prevention, containment, and control procedures.

Records of the quarterly inspections, signed by the appropriate supervisor or inspector, are maintained with the SPCC Plan for a minimum period of three (3) years.

3.6 Personnel, Training, and Discharge Prevention (§112.7(f))

Training (§112.7(f)(1))

Employees are given annual training on the SPCC plan, as applicable. The major emphasis of the training is in spill prevention and response, good housekeeping, and material management practices and an understanding of the SPCC Plan including applicable pollution control laws and discharge procedure protocols

Person Accountable for Discharge Prevention (§112.7(f)(2))

The Plant Manager is responsible for discharge prevention.

Discharge Prevention Briefings (§112.7(f)(3))

Discharge prevention briefings are conducted annually for oil handing personnel. The briefings highlight and describe known discharges or failures, malfunctioning components, and any recently developed precautionary measures. All training will be documented and maintained with this plan.

3.7 Security (§112.7(g))

The facility has implemented the following security practices at the facility:

- Each facility is surrounded by an 8 – foot tall chain link fence.
- Entrance to each site is controlled by a manned gate. Personnel entering the facility must provide identification to gain access to the facility. A visitor log is maintained at the facility to record access granted to non-employee personnel.
- Contracted security officers actively monitor the property to detect suspicious persons or activities.
- Security lighting is used to deter trespassing and ensure safety for those monitoring the premise. This lighting is also sufficient to assist with the detection of oil discharges.

3.8 TANK CAR AND TANK TRUCK LOADING/UNLOADING RACK (§112.7(h))

This facility does not utilize tank car and tank truck loading and unloading racks as defined in 40 CFR Part 112 Section 112.2.

3.9 Brittle Fracture Evaluation (§112.7(i))

The facility will inspect any aboveground storage containers that undergo repair, alteration or change in service. The inspection evaluates the potential for discharge due to brittle fracture or other catastrophe that might have been affected by the repair, alteration or change in service.

The facility will also investigate equipment failures. The inspection considers the condition of the equipment, including the potential for brittle fracture, and recommends changes to prevent a recurrence of the failure.

3.10 Conformance with Other Applicable Regulations (§112.7(j))

In 1989, California adopted the Aboveground Petroleum Storage Act under California Health and Safety Code, Chapter 6.67. This regulation requires all facilities with aboveground oil storage tank aggregate capacity of 1,320 gallons or more, regardless of surface water proximity, to develop SPCC Plans in accordance with the guidelines set forth in the SPCC Regulations under 40 CFR Part 112.7, and be under the jurisdiction of the State through the Regional Water Quality Control Board and the Certified Unified Program Administrator (CUPA). This facility is subject to the regulation.

This facility does store hazardous materials and as such falls under Hazardous Materials Business Plan regulations under California jurisdiction (see Appendix E-Hazardous Materials Contingency Plan).

3.11 Qualified Oil-filled Operational Equipment (§112.7(k))

All oil-filled operational equipment at this facility meets the criteria as "Qualified".

A Consolidated Contingency Plan is included in the Hazardous Materials Business Plan (HMBP) prepared in accordance with state regulations. An Emergency Contact List is included in the Facility's Emergency Response program which addresses oil spills for all oil-filled operational equipment.

For all oil-filled operational equipment, the facility has provided a written commitment of manpower, equipment, and materials necessary to remove any quantity of oil discharged that may be harmful. Refer to the "Certification Page".

4 §112.8 SPCC Plan Requirements for Onshore Facilities

4.1 General Requirements (§112.8(a))

This Plan satisfies the requirements of Section 112.7 in addition to the specific discharge prevention and containment procedures that follow.

4.2 Facility Drainage (§112.8(b))

Drainage from Secondary Containment Berms (§112.8(b)(1))

The Facility does not drain any containment areas to any pond, watercourse, storm water drains, etc. Pumps and vacuum lines will be used to remove accumulated materials as necessary.

4.3 Bulk Storage Containers (§112.8(c))

Materials of Construction (§112.8(c)(1))

The Facility's bulk storage containers have the following design characteristics, materials of construction, and fail-safe engineering features:

- Storage tanks are constructed of either welded or bolted steel. This material is determined to be compatible with the products stored and the conditions of storage (including pressure and temperature).

- Chemical storage containers are constructed of steel or plastic and are designed to be compatible with the contents.
- Tanks are operated within "Safe Fill" levels below the capacity limits of the tank.

Secondary Containment (§112.8(c)(2))

All bulk oil storage facilities have secondary containment designed to contain at least 110 percent of the maximum volume of the single largest tank in the containment area.

The secondary containment system provided for the bulk product storage tanks has the following design and construction characteristics:

- The calculated secondary containment volumes are detailed in Appendix B.
- The secondary containment is sufficiently impervious to contain a release until released material can be removed.

Drainage of Uncontaminated Rainwater ((§112.8(c)(3))

Rainwater within containments will be removed with pumps and vacuum lines as necessary.

Completely Buried Metallic Tanks (§112.8(c)(4))

The Facility does not contain any buried, partially buried or bunkered metallic tanks

Buried/Partially Buried Metallic Tanks (§112.8(c)(5))

The Facility does not contain any buried, partially buried or bunkered metallic tanks.

Testing of Aboveground Containers (§112.8(c)(6))

Integrity testing of aboveground containers is performed as required, and when repairs are made, in accordance with the facility PSM program. This program

details and records required inspections and personnel qualifications. The program and associated records are maintained at the facility. Plus, operations personnel will conduct periodic visual inspections of aboveground containers to determine if they have become compromised and/or leaking.

Internal Heating Coils (§112.8(c)(7))

There are internal heating coils within the HTF expansion vessels which are located within each Power Island. Each Power Island has four expansion vessels equipped with internal heating coils. Steam return and exhaust lines are monitored for contamination from leaking heating coils to ensure oils are not transferred into systems outside of spill containment areas.

Engineering to Prevent Releases (§112.8(c)(8))

The following engineering designs and practices are employed at the facility:

- Fail-safe engineering considerations include proper sizing of piping and gauging equipment.
- Audible communication between operators to prevent discharges due to overfilling or transfer equipment leaks.

Effluent Treatment Facilities (§112.8(c)(9))

The Mojave Solar LLC includes facilities for the treatment of water used during plant operations. An oil/water separator is used to treat water contaminated with oil. All wastewater from plant operations is treated and recycled back into the facility.

Visible Discharges (§112.8(c)(10))

Visible discharges of oil from a container are promptly remedied. Any accumulation of oil from these discharges is promptly removed.

Mobile or Portable Oil Storage Containers (§112.8(c)(11))

All mobile or portable oil storage containers have secondary containment designed to contain 110 percent of the maximum volume of the single largest container.

4.4 Facility Transfer Operations (§112.8(d)) (§112.12(d)) (Aboveground Valves, Piping Association with Transfer Operations)

Inspection of Buried Piping (§112.8(d)(1))

The facility does not operate any oil-containing buried piping.

Out-of-Service Piping (§112.8(d)(2))

Piping that is not in service or is in standby service for an extended period is capped or blind-flanged at the terminal connection of the transfer point. The origin of the piping is also marked.

Pipe Supports (§112.8(d)(3))

Pipe supports are designed to minimize any abrasion or corrosion of pipes and allows for expansion and contraction of the pipelines that are being supported.

Inspection of Aboveground Valves, Piping, and Appurtenances (§112.8(d)(4))

The following table lists equipment that is routinely inspected for spill and pollution prevention and control purposes:

- Flange joints
- Expansion joints
- Valve glands and bodies
- Catch pans
- Valves locks and/or seals
- Pipeline supports
- Metal surfaces

Problems identified during any inspection are documented and addressed as soon as possible, so as to prevent environmental and operating hazards. When required, follow-up inspections are performed and documented to ensure that appropriate corrective measures have been taken to ensure compliance.

All aboveground valves and pipelines are regularly examined during operating personnel rounds. During these examinations, operating personnel assess the general condition and necessity for corrective actions of the items.

Vehicles Entering Areas with Aboveground Pipelines (§112.8(d) (5))

All vehicle operators driving within the Facility are verbally notified of aboveground piping and oil transfer operations vulnerable to damage from vehicles

5 Appendix

Appendix A1- Overall Facility Maps

Appendix A2- Central Plant Layouts

Appendix A3- Location of Storage Facilities And Oil Filled Equiepment

Appendix B- List of Containers With Secondary Containment Calculations

Appendix C- Containment Diagrams

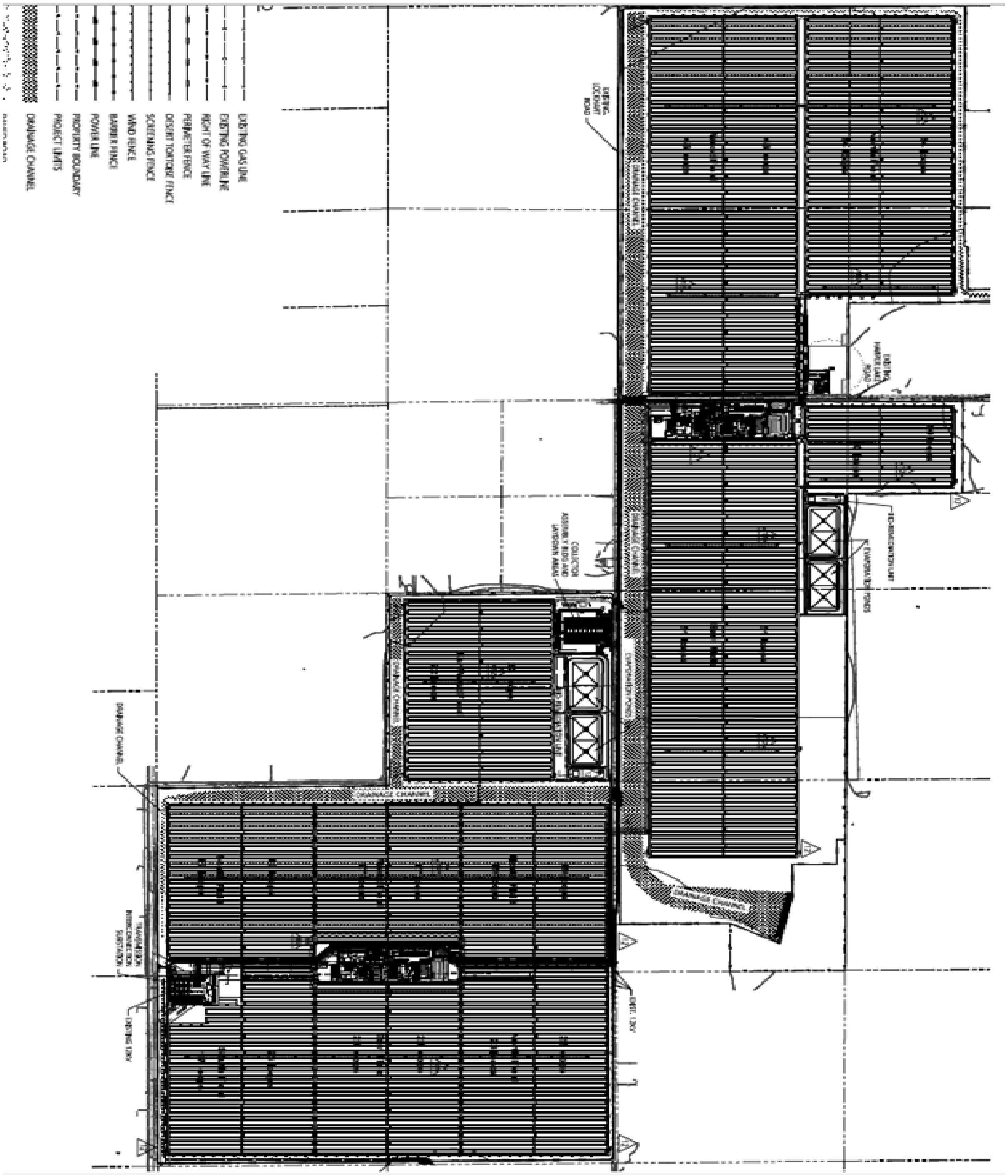
Appendix D1- SPCC Inspection form

Appendix D2- Inspection Checklists

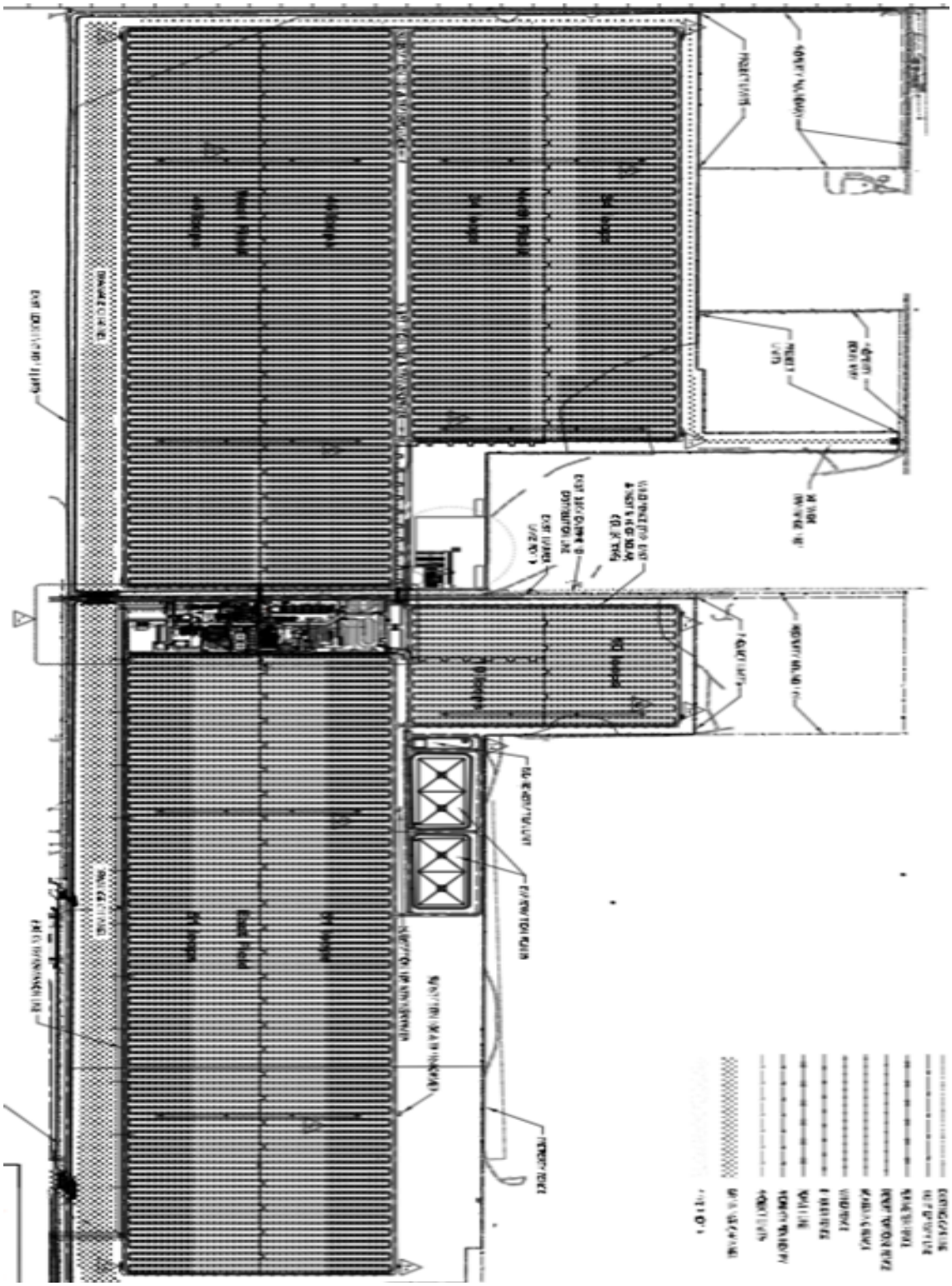
Appendix E- References

APPENDIX A-1

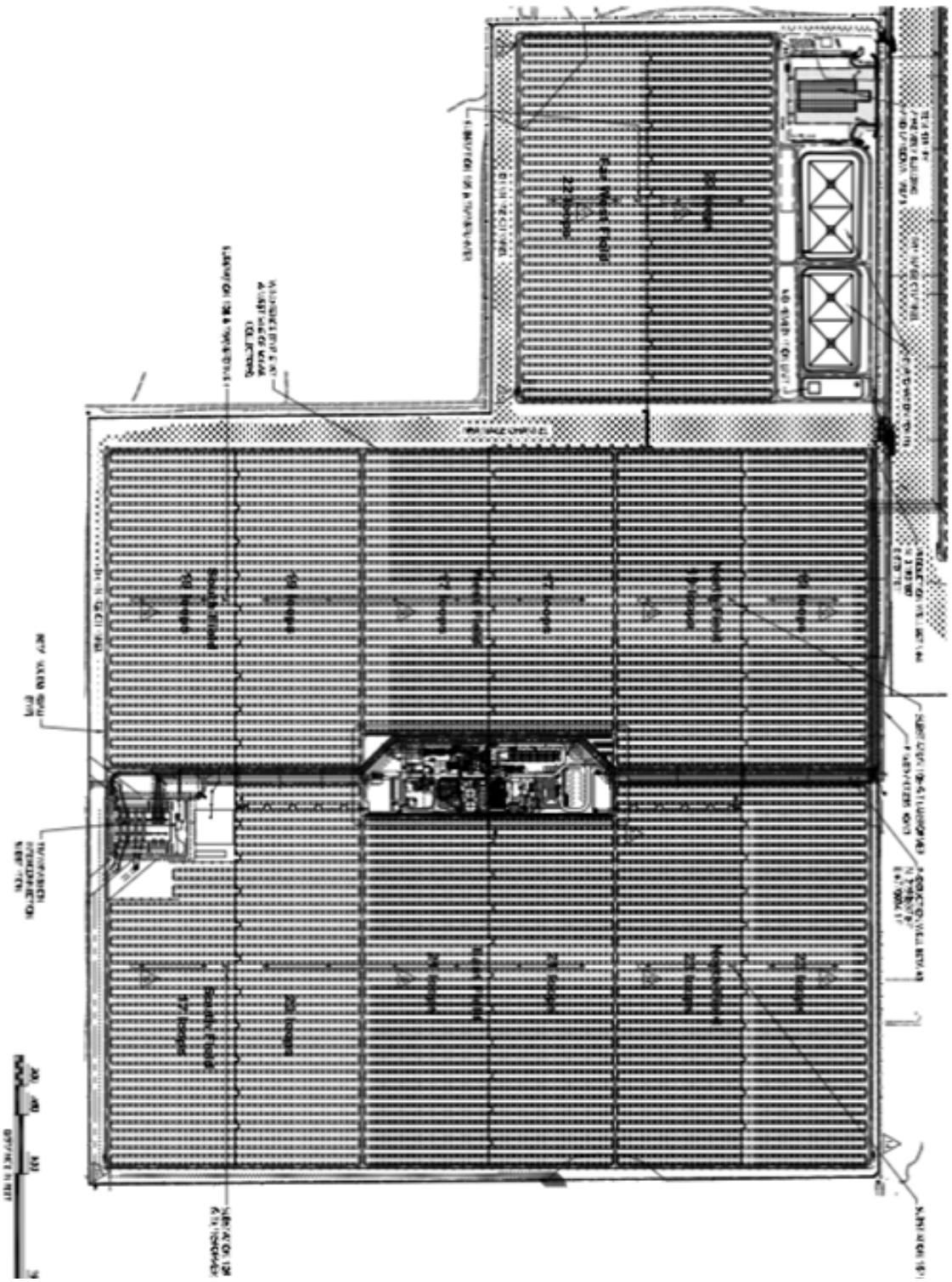
MOJAVE SOLAR PROJECT
OVERALL FACILITY MAPS


EXISTING GAS LINE
EXISTING POWERLINE
RIGHT OF WAY LINE
PERIMETER FENCE
DESERT TORTOISE FENCE
SCREENING FENCE
WIND FENCE
BARRIER FENCE
POWER LINE
PROPERTY BOUNDARY
PROJECT LIMITS
DRAINAGE CHANNEL
EVAPORATION PONDS

Alpha Plant Overall Map



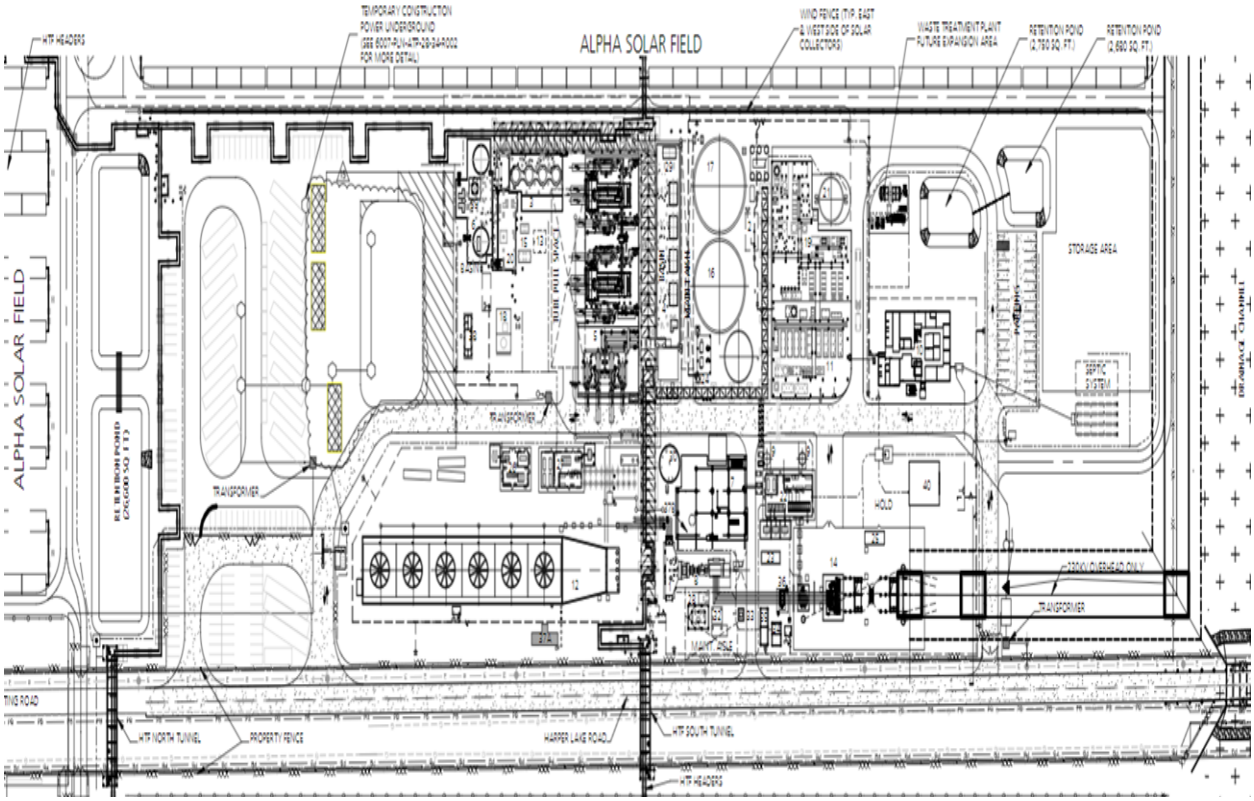
Beta Plant Overall Map



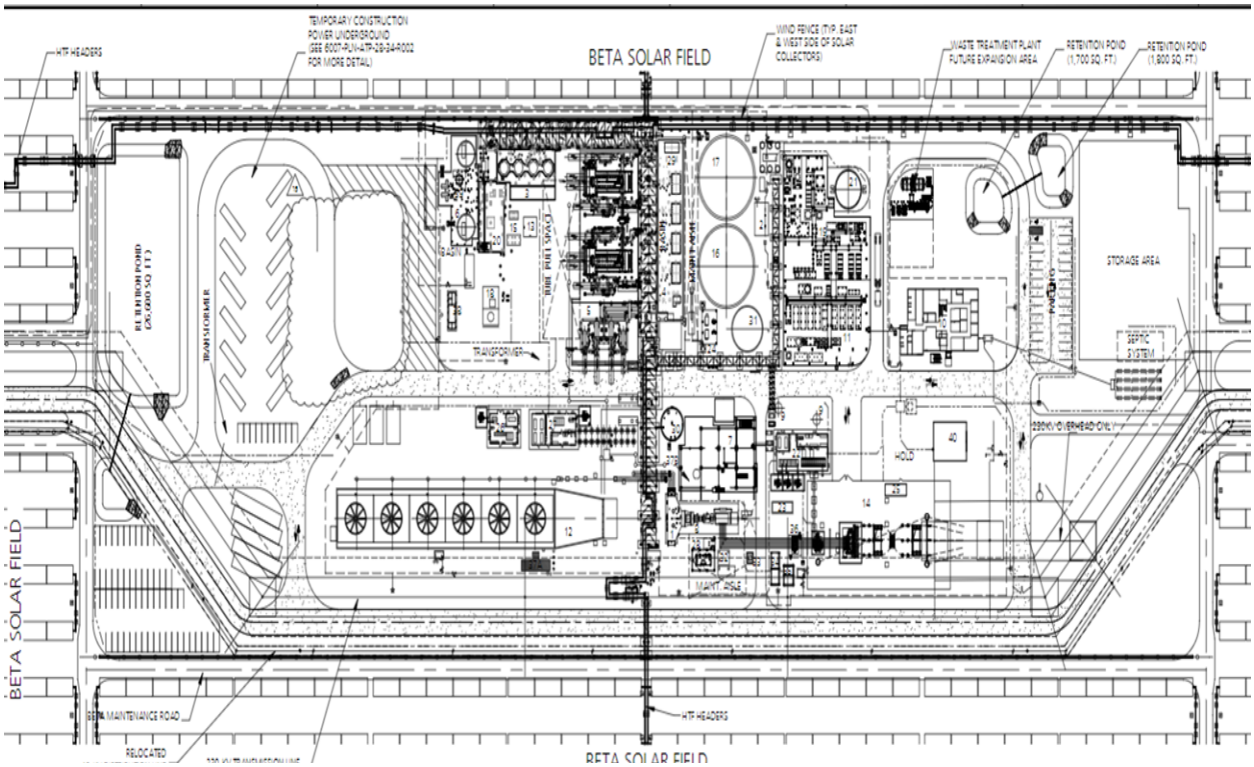
APPENDIX A-2

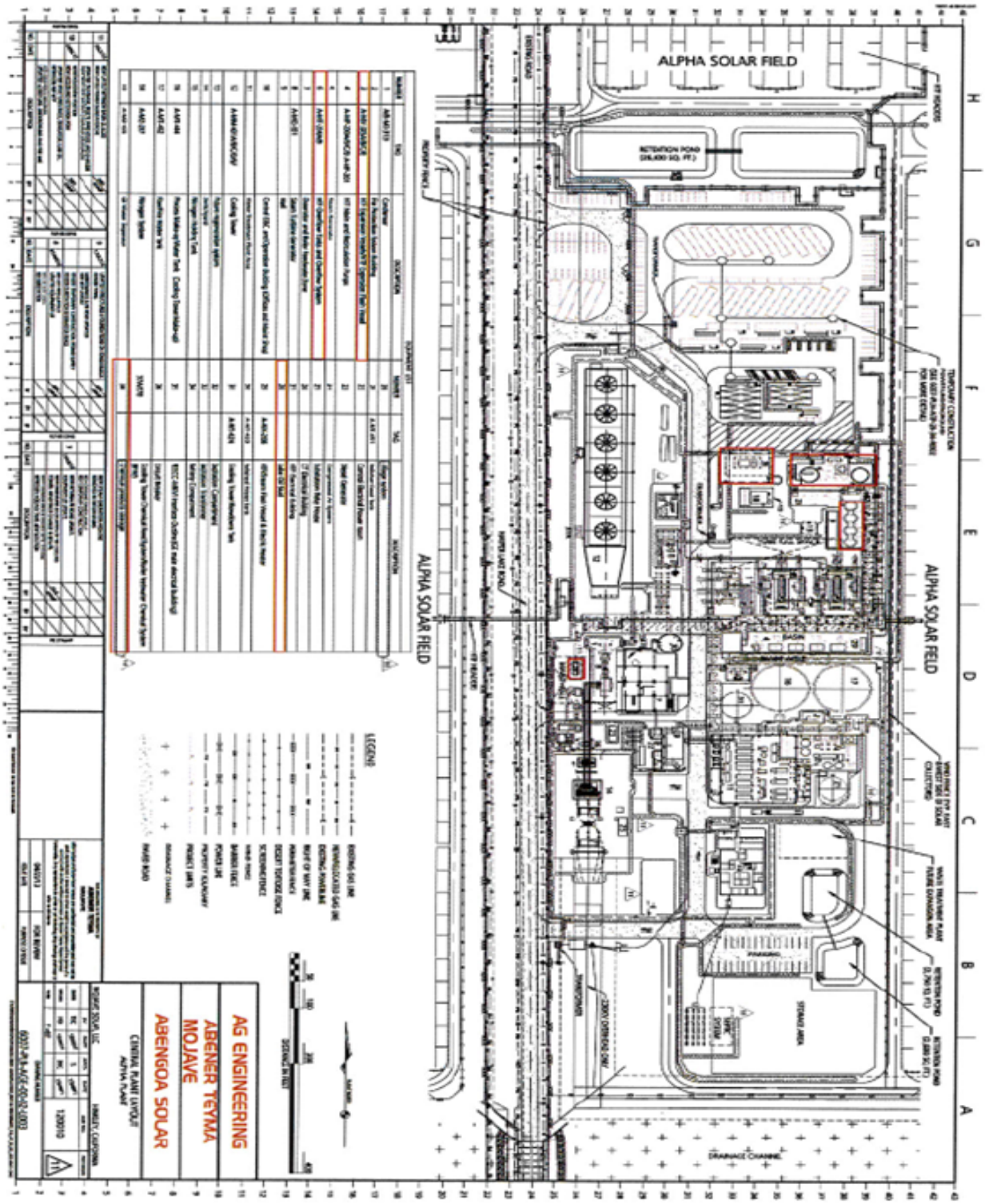
MOJAVE SOLAR PROJECT
CENTRAL PLANT LAYOUT

Alpha Plant



Beta Plant

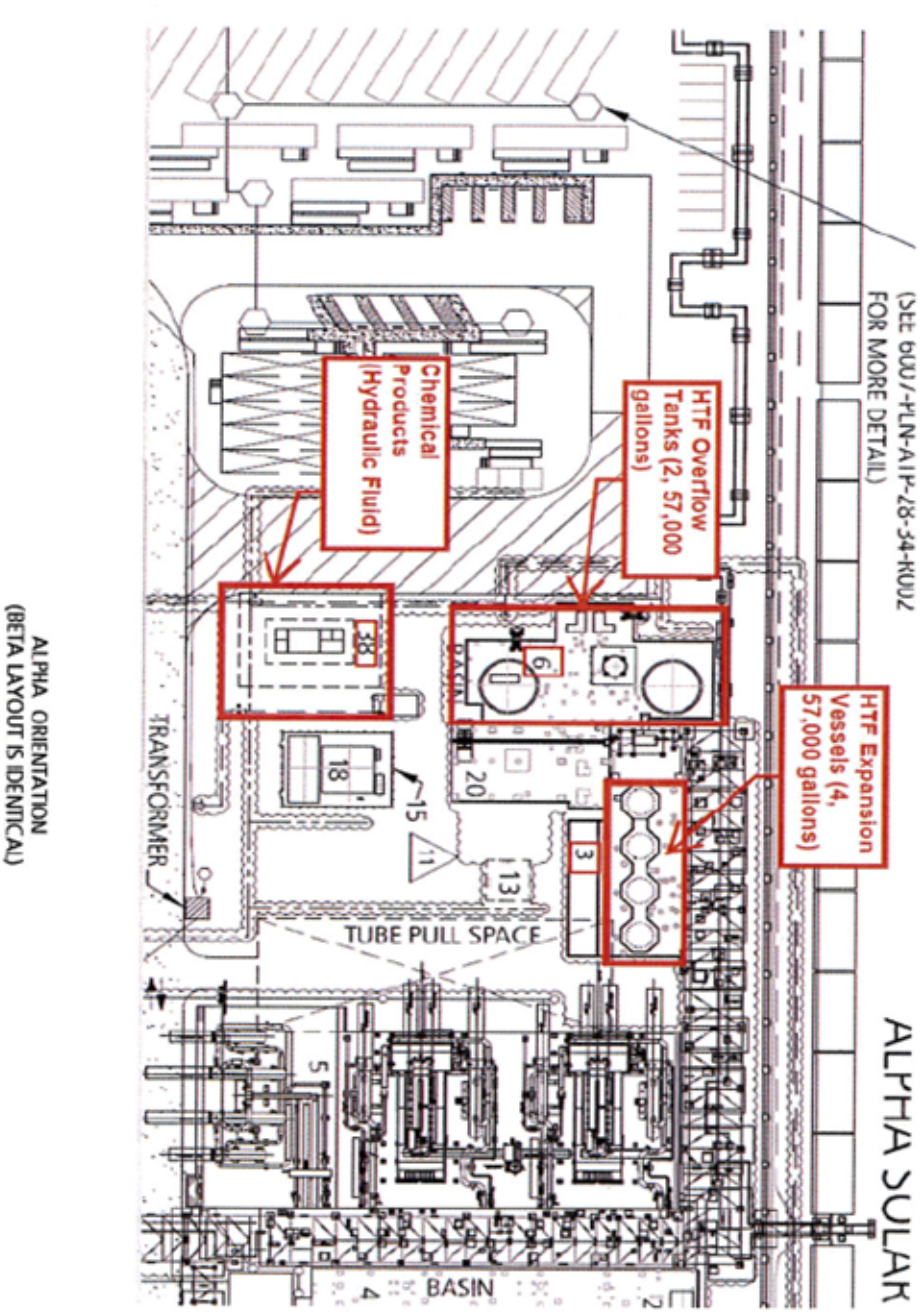

BETA SOLAR FIELD
HTF HEADERS
TEMPORARY CONSTRUCTION POWER UNDERGROUND
WIND FENCE (TYP. EAST & WEST SIDE OF SOLAR COLLECTORS)
WASTE TREATMENT PLANT FUTURE EXPANSION AREA
RETENTION POND (1,700 SQ. FT.)
RETENTION POND (1,800 SQ. FT.)
RETENTION POND (20,000 SQ. FT.)
TRANSFORMER
STORAGE AREA
SEPTIC SYSTEM
HOLD
MAINT. AISLE
BETA MAINTENANCE ROAD
RELOCATED
BETA SOLAR FIELD

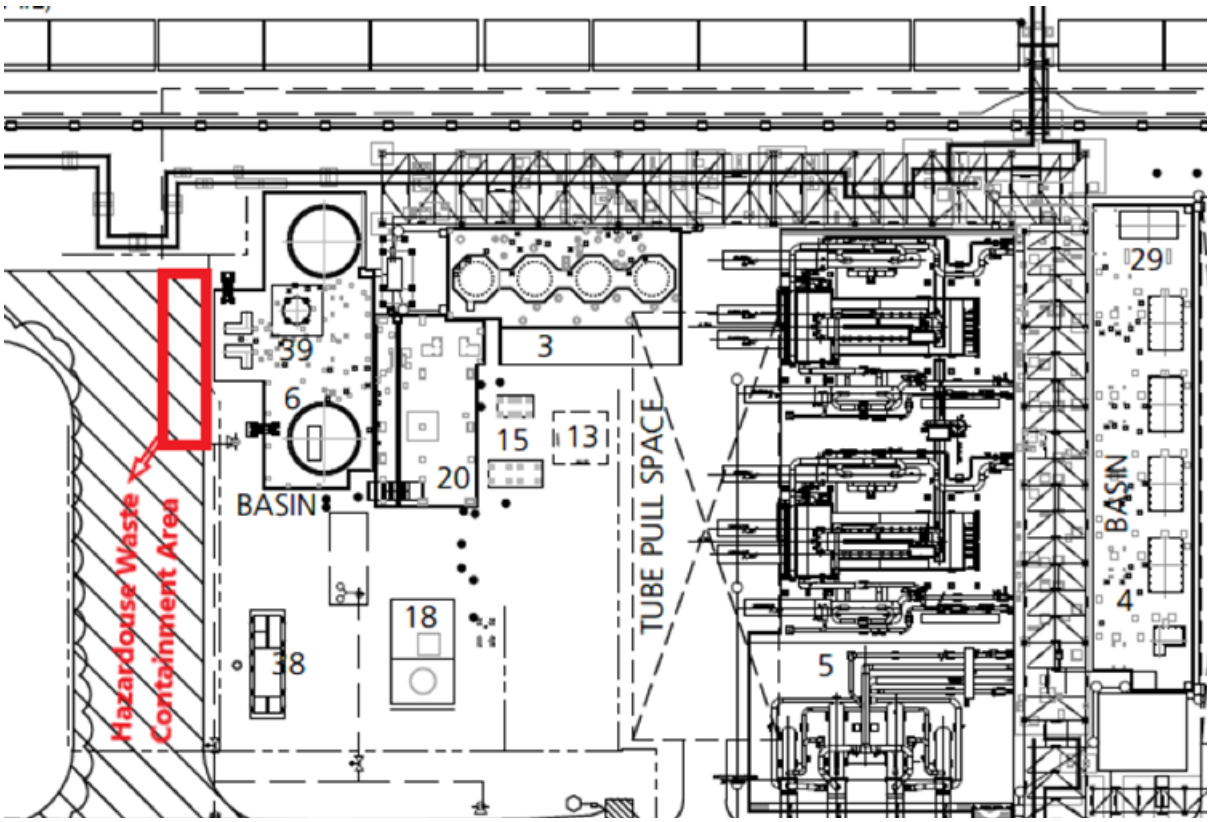

ALPHA SOLAR FIELD
ALPHA SOLAR FIELD
ALPHA SOLAR FIELD
AG ENGINEERING
ABENER TEYMA MOJAVE
ABENGOA SOLAR

APPENDIX A-3

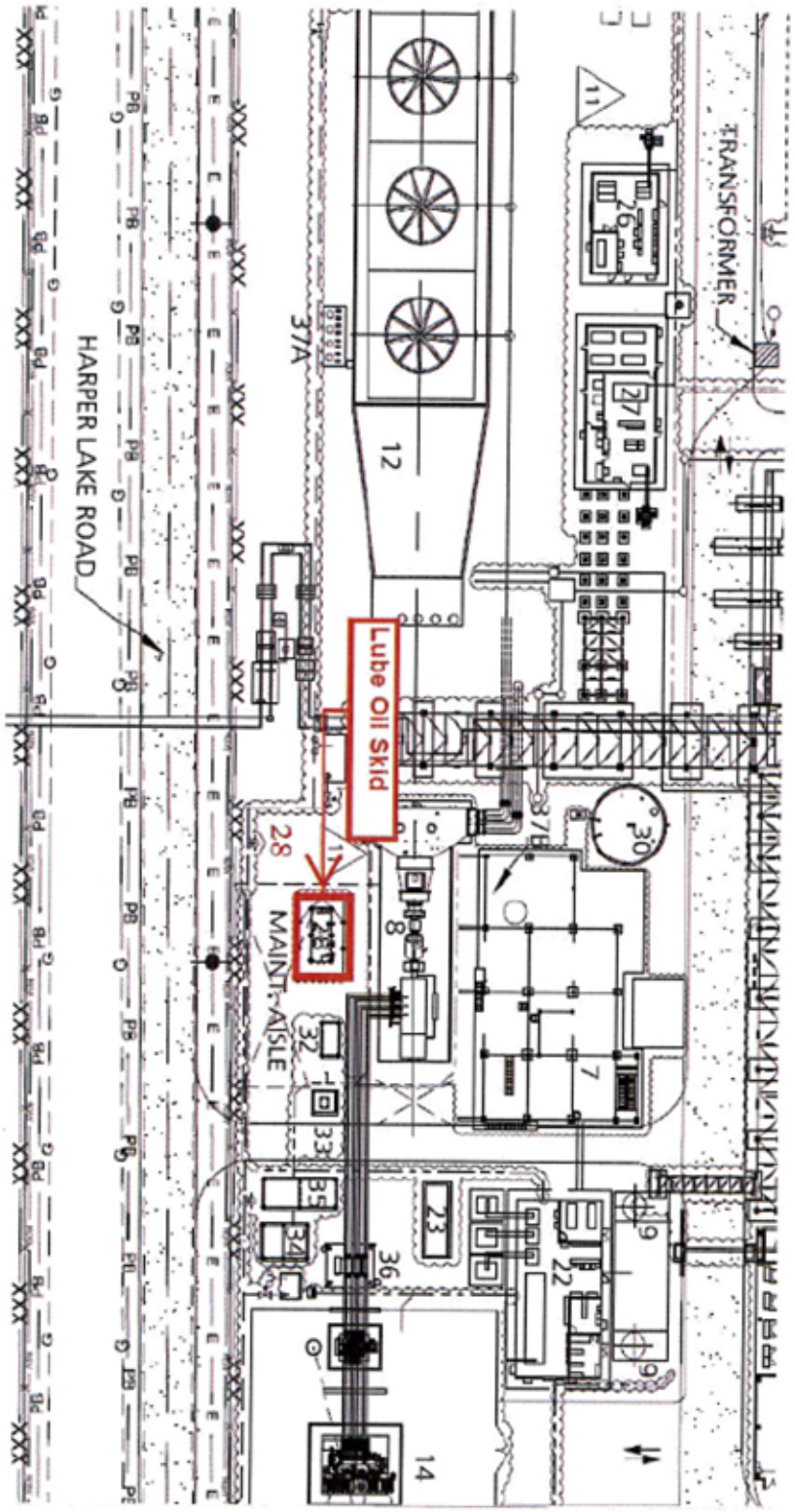
MOJAVE SOLAR Project
LOCATIONS OF OIL STORAGE FACILITIES AND OIL-FILLED EQUIPMENT

APPENDIX A-3
LOCATIONS OF OIL STORAGE AND OIL-FILLED EQUIPMENT



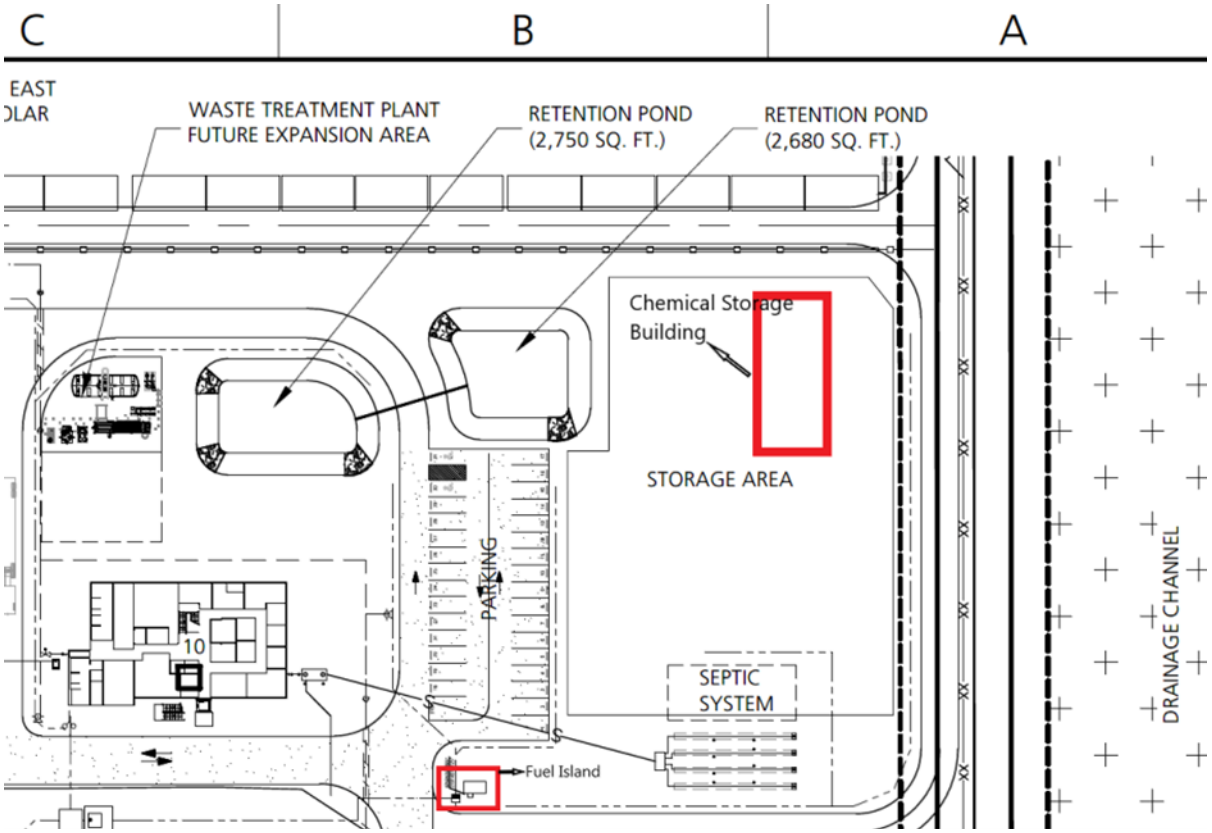

Hazardous Waste Containment Area
BASIN
TUBE PULL SPACE
BASIN
39
6
3
15
13
20
18
38
29
4
5

APPENDIX A-3
LOCATIONS OF OIL STORAGE AND OIL-FILLED EQUIPMENT



ALPHA ORIENTATION
(BETA LAYOUT IS IDENTICAL)

Alpha Plant Fuel Island and Chemical Storage Building



APPENDIX B

MOJAVE SOLAR Project
LIST OF CONTAINERS WITH SECONDARY CONTAINMENT CALCULATIONS

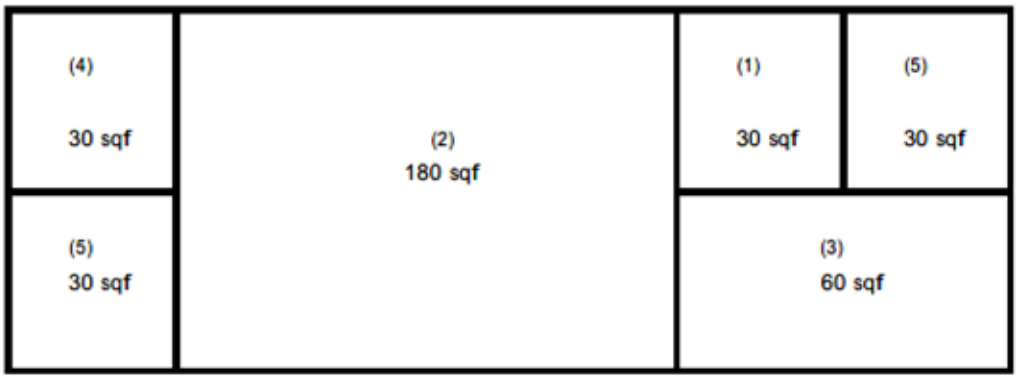
MOJAVE SOLAR LLC-Spill Potential List Alpha Power Island						
Equipment (Area or Tank Number Per Power Island Facility Plan)	Description Commodity	Alpha Power Island	Capacity (Gal)	Rate (Bbl/Hr)	Direction Of Flow	Secondary Containment Volume
Oil Storage (Subject To Secondary Containment Requirement)						
Gasoline Tank	Gasoline	Leak, Rupture	2000	Varies	Varies	>2000 Gal
Diesel Tank	Diesel	Leak, Rupture	2000	Varies	Varies	>2000 Gal
Diesel Tank	Diesel	Leak, Rupture	4,000	Varies	Varies	>3000 Gal
Diesel Tank	Diesel	Leak, Rupture	850	Varies	Varies	>850 Gal
Chemical Products Storage	Motor Oil	Leak, Rupture	110	Varies	Varies	>110 Gal
Chemical Products Storage	Hydraulic Oil	Leak, Rupture	5,280	Varies	Varies	>5,280 Gal
Oil -Filled Operational Equipment (Not Subject To Secondary Containment Requirement)						
6-1	Heat Transfer Fluid (Therminol) VP-1 Overflow Tank	Leak, Rupture	57,000	Varies	Varies	Secondary Containment Not Required
6-2	Heat Transfer Fluid (Therminol) VP-1 Overflow Tank	Leak, Rupture	57,000	Varies	Varies	
3-1	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
3-2	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
3-3	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
3-4	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
Transformer Facility	Mineral Oil	Leak	9,800	Varies	Varies	
Hydraulic System	Hydraulic Oil	Leak	660	Varies	Varies	
Total Aggregate (Per Power Island)			161,440			

MOJAVE SOLAR LLC-Spill Potential List Beta Power Island						
Equipment (Area or Tank Number Per Power Island Facility Plan)	Description Commodity	Major Type Of Failure	Capacity (Gal)	Rate (Bbl/Hr)	Direction Of Flow	Secondary Containment Volume
Oil Storage (Subject To Secondary Containment Requirement)						
Gasoline Tank	Gasoline	Leak, Rupture	2000	Varies	Varies	>2000 Gal
Diesel Tank	Diesel	Leak, Rupture	4,000	Varies	Varies	>3000 Gal
Diesel Tank	Diesel	Leak, Rupture	850	Varies	Varies	>850 Gal
Chemical Products Storage	Motor Oil	Leak, Rupture	110	Varies	Varies	>110 Gal
Chemical Products Storage	Hydraulic Oil	Leak, Rupture	5,280	Varies	Varies	>5,280 Gal
Oil -Filled Operational Equipment (Not Subject To Secondary Containment Requirement)						
6-1	Heat Transfer Fluid (Therminol) VP-1 Overflow Tank	Leak, Rupture	57,000	Varies	Varies	Secondary Containment Not Required
6-2	Heat Transfer Fluid (Therminol) VP-1 Overflow Tank	Leak, Rupture	57,000	Varies	Varies	
3-1	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
3-2	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
3-3	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
3-4	Heat Transfer Fluid Expansion Vessel	Leak, Rupture	9,245	Varies	Varies	
Transformer Facility	Mineral Oil	Leak	9,800	Varies	Varies	
Hydraulic System	Hydraulic Oil	Leak	660	Varies	Varies	
Total Aggregate (Per Power Island)			161,440			

Location Information			Chemical Identification	
1a*	201	203	205	215
CERSID	ChemicalLocation	MapNumber	ChemicalName	LargestContainer
10453255	Alpha and Beta plants	L003 and L004	Acetylene	70
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Amino Acid F Reagent	0.03
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Amino Acid Reagent	0.03
10453255	Alpha and Beta water treatment plants	L003 and L004	Anionic Flocculant DWT 672E	5
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Antiscalant Vitec 4000	528
10453255	Alpha and Beta plants	L003 and L004	Argon, Liquid	
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	AWC- A110	528
10453255	Alpha and Beta Cooling tower Chemical dosin	L003 and L004	Betz Dearborn DCL30	50
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Buffer Solution Hardness	0.03
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	CalVer 2 Calcium Indicator	0.03
10453255	Alpha and Beta plants	L003 and L004	Carbon Dioxide	50
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Carbon Dioxide, Liquid	34000
10453255	Alpha and Beta plants	L003 and L004	Carbonic acid sodium salt (1:2)	
10453255	Alpha and Beta plants	L003 and L004	Carbonic dihydrazide	
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Chemets Dissolved Oxygen Refi	0.001
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Citric Acid	55
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Citric Acid Reagent Solution	0.03
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Conductivity Standard Solution	0.05
10453255	Alpha and Beta power blocks	L003 and L004	Cortrol OS5607	200
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	DEHA 1 Reagent (Diethylhydrox	0.22
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	DEHA 2 Reagent	0.03
10453255	Alpha and Beta power blocks	L003 and L004	Diesel Exhaust Fluid - AdBlue	55
10453255	Alpha and Beta	L003 and L004	Diesel Fuel	4000
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Dihydroxy aluminum Sodium Ca	7660
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	DPD Free Chlorine Reagent	0.22
10453255	Alpha and Beta plants	L003 and L004	EDTA, TETRASODIUM	0.001
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Ferric Chloride	792
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	FerroZine® Iron Reagent	0.13
10453255	Alpha and Beta Cooling tower Chemical dosin	L003 and L004	Flogard MS6209	200
10453255	Alpha and Beta Transformers	L010	FR 3 Mineral oil	20
10453255	Alpha and Beta plants	L003 and L004	Galvanizing Compound	
10453255	Alpha plant only	L003	Gasoline	2000
10453255	Alpha and Beta Cooling tower Chemical dosin	L003 and L004	Gengard GN 8004	200
10453255	Alpha and Beta power blocks	L003 and L004	Glycerin	55
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Hydrated Lime, Calcitic Hydrate	21664
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Hydrochloric Acid	1
10453255	Alpha and Beta power blocks	L003 and L004	Hydrogen Cylinders	4698
10453255	Alpha and Beta	L010	Liquid Hazardous waste	55
10453255	Alpha and Beta solid waste. Located in Beta pl	L010	Solid Hazardous waste- Oily Rag	10
10453255	Alpha and Beta solid waste- Beta Tab, Alpha W	L010	Solid Hazardous waste- HTF Con	10
10453255	Alpha and Beta liquid waste	L003 and L004	Liquid Hazardous waste stage ar	275
10453255	Alpha and Beta liquid waste	L003 and L004	Liquid Hazardous waste- Oily W	528
10453255	Alpha and Beta liquid waste	L003 and L004	Liquid Hazardous waste- Used O	275
10453255	Alpha and Beta power blocks	L003 and L004	Liquid Nitrogen	26000
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Magnesium Sulfate	50000
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Molybdate 3 Reagent Solution	0.03
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Molybdate Reagent	0.03
10453255	Alpha and Beta power blocks	L003 and L004	Optisperse HP3100	200
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	ORP Solution	0.05
10453255	Alpha and Beta plants	L003 and L004	Oxygen	140
10453255	Alpha and Beta power blocks	L003 and L004	Paints	50
10453255	Alpha and Beta power blocks	L003 and L004	Petroleum Hydrocarbon	55
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	pH Buffer Solution 10.01	0.13
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	pH Buffer Solution 4.01	0.13
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	pH Buffer Solution 7.00	0.13
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	pH Storage Solution	0.13
10453255	Alpha and Beta power blocks	L003 and L004	Phenol isobutylenated phospha	55
10453255	Alpha and Beta power blocks, solar fields	L003 and L004	Propane	17
10453255	Alpha and Beta plants	L003 and L004	Propylene Glycol - HTF	55
10453255	Alpha and Beta power blocks	L003 and L004	Lubricant Oil- Shell Omala S2 G	55
10453255	Alpha and Beta plants	L003 and L004	Silicon Powder	
10453255	Alpha and Beta water treatment plants	L003 and L004	Sodium Bisulfite	528
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Sodium EDTA	55
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Sodium Hydroxide	528
10453255	Alpha and Beta water treatment plants	L003 and L004	Sodium Hypochlorite	2640
10453255	Alpha and Beta Cooling tower Chemical dosin	L003 and L004	Sodium Hypochlorite	1100
10453255	Alpha and Beta solid waste	L003 and L004	Solid hazardous waste- batterie	20
10453255	Alpha and Beta solid waste	L003 and L004	Solid hazardous waste stage are	20
10453255	Alpha and Beta solid waste	L003 and L004	Solid hazardous waste- Broken	10
10453255	Alpha and Beta Cooling tower Chemical dosin	L003 and L004	Spectrus BD 1500	200
10453255	Alpha and Beta power blocks	L003 and L004	Steamate PAS6074	200
10453255	Alpha and Beta Water Treatment Plants	L003 and L004	Sulfuric Acid	528
10453255	Alpha and Beta plants	L003 and L004	Therminol Biphenyl	57000
10453255	Water Treatment Plant	L003 and L005	AWC C-227	5
10453255	Water Treatment Plant	L003 and L006	AWC C-209	5
10453255	Alpha and Beta Plant		Sulfur Hexafluoride	129
10453255	Alpha and Beta Plant		Coolant, Antifreeze	55
10453255	Alpha and Beta Plant		Duraclear DC-5-F	55
10453255	Alpha and Beta Plant		Aqueous Film-Forming Foam 3%	350
10453255	Alpha and Beta Plant		Argon Gas	336
10453255	Alpha Chemical Storage Area		Fyrquel	55
10453255	Alpha&Beta Water Treatment Plant		RL9009	500
10453255	Alpha&Beta Water Treatment Plant		RL3400	528
10453255	Alpha&Beta Water Treatment Plant		RL2032	55
10453255	Alpha&Beta Water Treatment Plant		RL2000	55
10453255	Alpha&Beta Water Treatment Plant		RL100	55
10453255	Alpha&Beta Water Treatment Plant		RL100	55
10453255	Alpha&Beta Water Treatment Plant		P813E	5
10453255	Alpha&Beta Cooling Tower		CT790	500
10453255	Alpha&Beta Cooling Tower		CL5428	500
10453255	Alpha&Beta Power Block		BL8411	9000
10453255	Alpha&Beta Power Block		BL1794	500
10453255	Alpha&Beta Power Block		BL1260	500

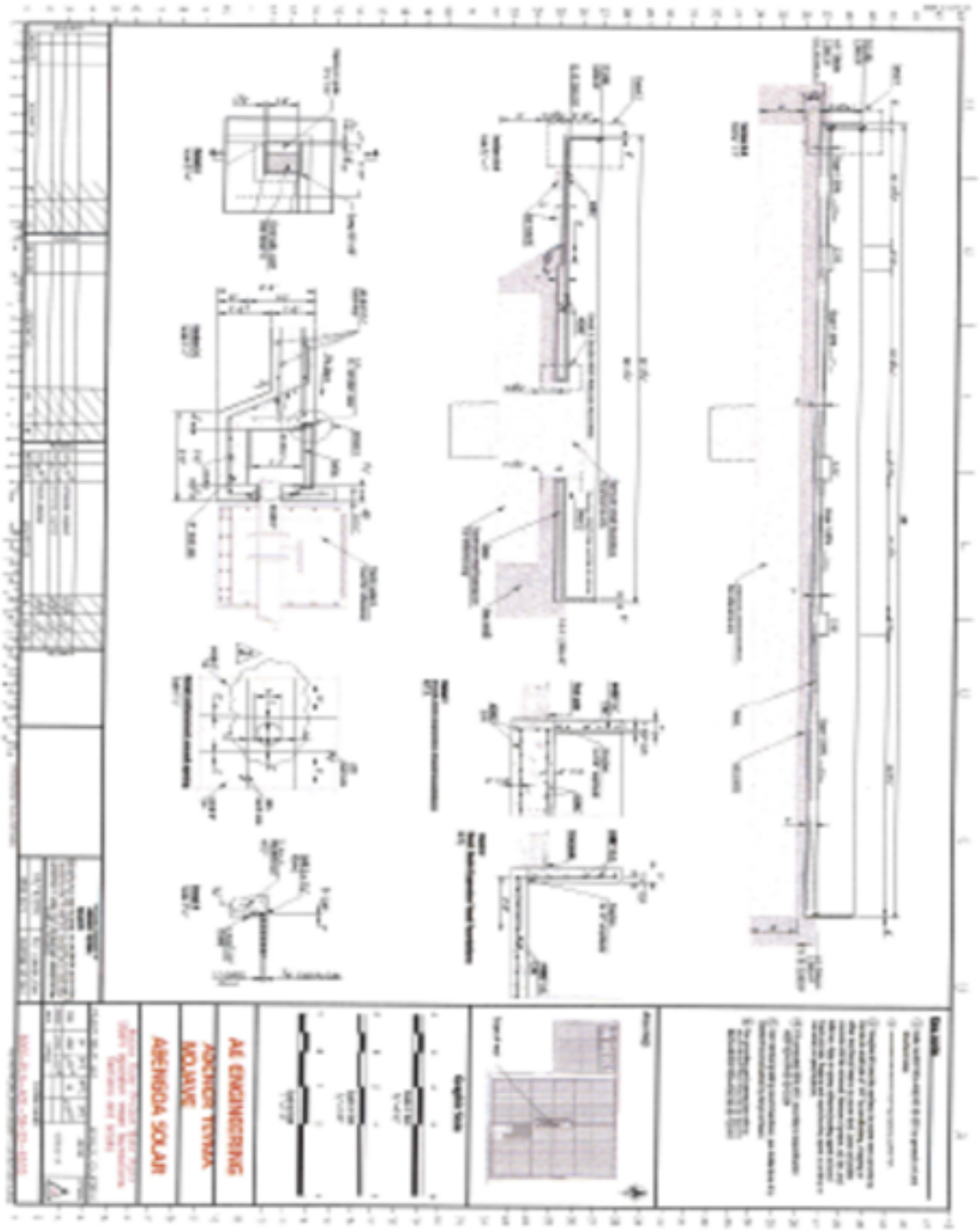
APPENDIX C

MOJAVE SOLAR LLC
CONTAINMENT DIAGRAMS



1- Ammonia; Carbohydrazide and Tri-phosphate
2- Inhibitor; Dispersant; Biodispersant; Bisulfite; Antiscalant RO; Coagulant and Flocculant
3- Sodium Hydroxide
4- Sulfuric Acid
5- Open

Total 360 sqf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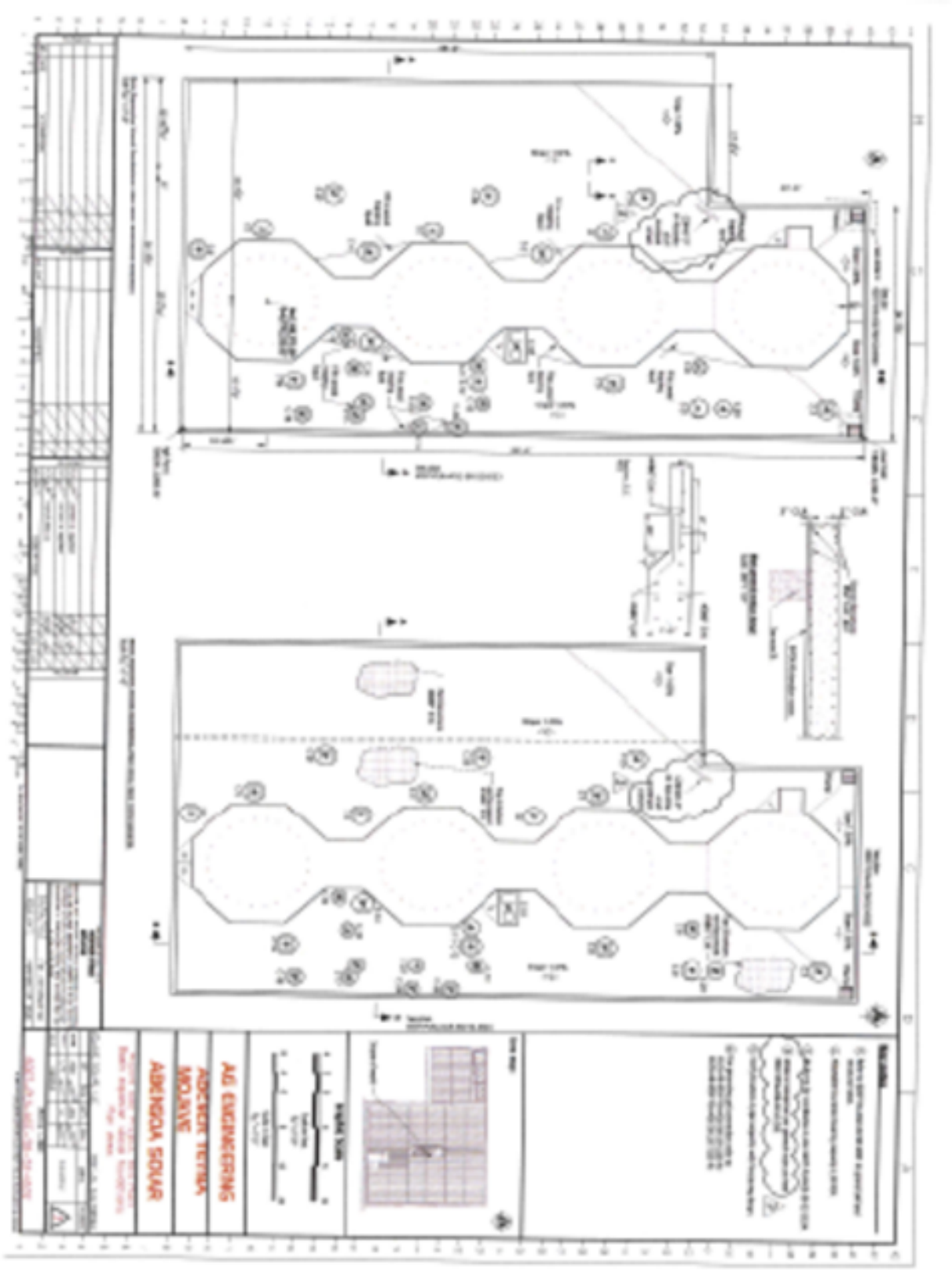
MOJAVE
ABENGOA SOLAR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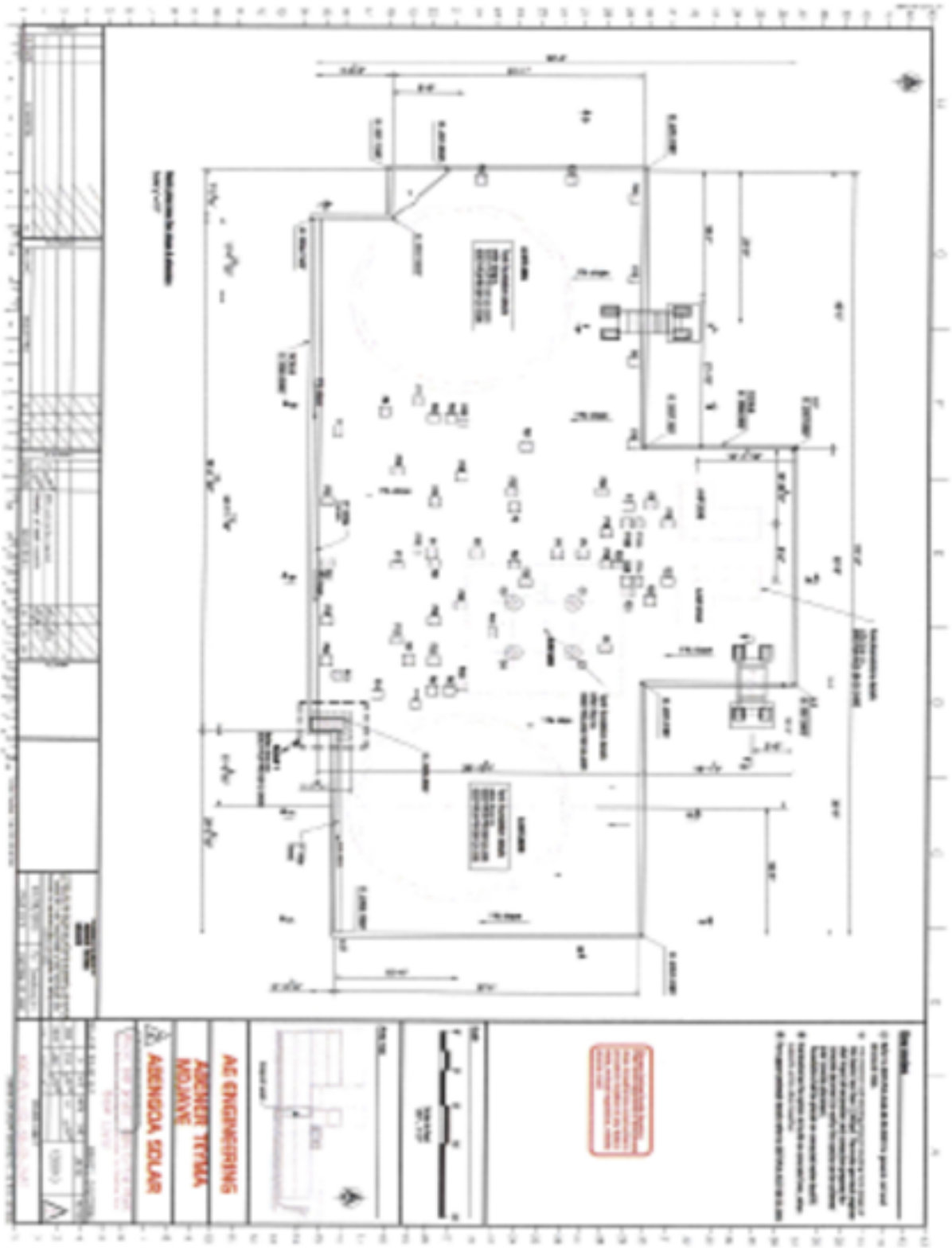
ABENGOA SOLAR


AC ENGINEERING
ABENGOA SOLAR

APPENDIX D-1

MOJAVE SOLAR PROJECT
SPCC INSPECTION FORM

Mojave Solar LLC

SPCC INSPECTION CHECKLIST

Date of Inspection _____ **FACILITY** _____

Inspection Item/Area	What to Look For	Check if no problems or N/A if Not Applicable	Problems (be specific)
Drainage ditches	oil or oil-contaminated soil		
Road ditches	oil or oil-contaminated soil		
Material handling areas (loading/unloading areas)	pollutants/spills/leaks		
Hazardous Waste storage areas	pollutants/spills/, deterioration of containers		
Tanks/gauge settings	deterioration and maintenance needs, leaks		
	Drip marks		
	Discoloration of tanks		
	Puddles containing stored material		
	Corrosion		
	Cracks		
	Localized dead vegetation		
Tank Foundations	Cracks		
	Discolorations		
	Puddles containing stored material		
	Settling		
	Gaps between tank and foundation		
	Damage caused by vegetation roots		
Tank piping	Droplets of stored material		
	Discoloration		
	Corrosion		
	Bowing of pipe between supports		
	Evidence of stored material see page on valves or seals		
	Localized dead vegetation		
Above ground valves & pipelines	oil or oil-contaminated soil maintenance needs, leaks		
Berms and secondary containment	wall integrity/erosion, accumulated liquids		
	Level or precipitation in dike/available capacity		
	Operational status of drainage valves		
	Dike or berm permeability		
	Debris		
	Erosion		
	Permeability of the earthen floor of diked area		
	Location/status ofpipes, inlets, drainage beneath tanks, etc.		
	Cracks		
	Location/status of pipes, inlets, drainage beneath		
	Cracks		
	Discoloration		
	Presence of stored material (standing **liquid**)		
	Corrosion		
	Stressed vegetation		

COMMENTS:
_____
_____
_____
_____
_____

Inspector Signature _____ Supervisor _____ Date: _____

APPENDIX D-2

MOJAVE SOLAR PROJECT
INSPECTION CHECKLIST

Atlantica
Sustainable Infrastructure

STI SP001 Monthly Inspection Checklist

General Inspection Information:

Inspection Date: _____ Alpha/Beta Plant Prior Inspection Date: _____ Retain until date: _____

Inspector Name (print): _____ Title: _____

Inspector's Signature _____

Tank(s) inspected ID _____

Regulatory facility name and ID number (if applicable) _____

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable). Inspections of multiple tanks may be captured on one form as long as the tanks are substantially the same.
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Upon discovery of water in the primary tank, secondary containment area, interstice, or spill container, remove promptly or take other corrective action. Inspect the liquid for regulated products or other contaminants and dispose of properly.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- **After severe weather (snow, ice, wind storms) or maintenance (such as coating) that could affect the operation of critical components (normal and emergency vents, valves), an inspection of these components is required as soon as the equipment is safely accessible after the event.**

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Sustainable Infrastructure

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank and Piping		
1	Is tank exterior (roof, shell, heads, bottom, connections, fittings, valves, etc.) free of visible leaks? **Note**: *If "No", identify tank and describe leak and actions taken.*	☐ Yes ☐ No	
2	Is the tank liquid level gauge legible and in good working condition?	☐ Yes ☐ No ☐ N/A	
3	Is the area around the tank (concrete surfaces, ground, containment, etc.) free of visible signs of leakage?	☐ Yes ☐ No	
4	Is the primary tank free of water or has another preventative measure been taken? NOTE: Refer to paragraphs 6.10 and 6.11 of the standard for alternatives for Category 1 tanks. N/A is only appropriate for these alternatives.	☐ Yes ☐ No ☐ N/A	
5	For double-wall or double bottom tanks or CE-ASTs, is interstitial monitoring equipment (where applicable) in good working condition?	☐ Yes ☐ No ☐ N/A	
6	For double-wall tanks or double bottom tanks or CE-ASTs, is interstice free of liquid? Remove the liquid if it is found. If tank product is found, investigate possible leak.	☐ Yes ☐ No ☐ N/A	
	Equipment on tank		
7	If overfill equipment has a "test" button, does it activate the audible horn or light to confirm operation? If battery operated, replace battery if needed.	☐ Yes ☐ No ☐ N/A	
8	Is overfill prevention equipment in good working condition?If it is equipped with a mechanical test mechanism, actuate the mechanism to confirm operation.	☐ Yes ☐ No ☐ N/A	
9	Is the spill container (spill bucket) empty, free of visible leaks and in good working condition?	☐ Yes ☐ No ☐ N/A	

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10	Are piping connections to the tank (valves, fittings, pumps, etc.) free of visible leaks? **Note**: *If "No", identify location and describe leak.*	☐ Yes ☐ No	
11	Do the ladders/platforms/walkways appear to be secure with no sign of severe corrosion or damage?	☐ Yes ☐ No ☐ N/A	
	Containment (Diking/Impounding)		
12	Is the containment free of excess liquid, debris, cracks, corrosion, erosion, fire hazards and other integrity issues?	☐ Yes ☐ No ☐ N/A	
13	Are dike drain valves closed and in good working condition?	☐ Yes ☐ No ☐ N/A	
14	Are containment egress pathways clear and any gates/doors operable?	☐ Yes ☐ No ☐ N/A	
	Concrete Exterior AST (CE-AST)		
15	Inspect all sides for cracks in concrete. Are there any cracks in the concrete exterior larger than 1/16"?	☐ Yes ☐ No ☐ N/A	
16	Inspect concrete exterior body of the tank for cleanliness, need of coating, or rusting where applicable. Tank exterior in acceptable condition?	☐ Yes ☐ No ☐ N/A	
17	Visual inspect all tank top openings including nipples, manways, tank top overfill containers, and leak detection tubes. Is the sealant between all tank top openings and concrete intact and in good condition?	☐ Yes ☐ No ☐ N/A	
	Other Conditions		
18	Is the system free of any other conditions that need to be addressed for continued safe operation?	☐ Yes ☐ No	

Additional Comments:

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APPENDIX E

REFERENCES

[1] Abeinsa EPC Mojave, Mojave Solar Project- Draft Spill Prevention, Control and Countermeasure Plan

[1] California Energy Commission, Environmental Assessment- Abengoa Mojave Solar Application For Certification (09-AFC-5) San Bernardino County, March 2010 pg. 3-9; (www.energy.ca.gov/2010publications/CEC; website accessed on 8/27/13)

.

[1] IBID pgs. 3-10 (Section 3-Project Description).

[1] AG Engineering-Abengoa Solar Central Plant Layout Alpha Plant (Facility Diagram dated 4/22/13).

Process Safety Management Plan, Rev 7

SP-O&M-MJV-087

Revision	Date	Reason for Revision
00	08/01/2013	Initial Release
01	09/04/2013	Update
02	10/07/2013	Update
03	01/24/2014	Clarification of referenced material and response to completion of PHA
04	11/01/2018	Update and general review. Company code. ASIO/Mojave Solar LLC companies included
05	02/03/2020	Update to ASI Corporate fonts and Logos. MEL – Applies to all documents included in this plan
06	09/09/2021	DOC# updated
07	01/19/2024	General Review

Produced by:	Department	Date
Fred Hrenchir Jose Manuel Bravo	Abengoa Solar	08/01/2013

Reviewed by:	Department	Date
Mahnaz Ghamati	Quality,Environmental Compliance	01/19/2024
Margaret Aguirre	Health and Safety	1/22/2024

Approved by:	Department	Date
David Rosas	Plant Manager	01/22/2024

Contents

1 Objective

This document generally covers policies of the Mojave Solar Project (referred to as the Facility) designed to carry out elements of Process Safety Management (PSM) to meet the requirement of the California Energy Commission (CEC) Adoption Order HAZ-2.

The Scope and purpose of PSM is preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. The establishment of the process safety management process is intended to eliminate to a substantial degree, the risks to which employees are exposed to at the Facility.

The 15 elements covered in this Plan are:

1. Employee Participation
2. Process Safety Information
3. Process Hazard Analysis
4. Operating Procedures
5. Training
6. Contractor Safety
7. Pre-Start up Safety Review
8. Mechanical Integrity
10. Management of Change
11. Incident Investigation
12. Emergency Planning and Response
13. Compliance Audits
14. Trade Secrets

Each element provides the actions that will be performed, by whom and who has the responsibility to see that the actions are completed. These elements will reference several Facility procedures and documents that will verify compliance with this plan.

areas and persons affected.

2 Definitions

CCR- California Code of Regulations

CFR- Code of Federal Regulations

IIPP- Injury and Illness Prevention Program

MOC- Management of Change

O/O- Owner/Operator

PSM- Process Safety Management

PSSR- Pre Startup Safety Review

3 Introduction

The Facility is committed to providing a safe and healthy workplace for employees, contractors and the surrounding community. In order to meet this goal, it is critical that employees participate in the facility's safety process. Additional information regarding each of the processes can be found in the Facility's Health, Safety and Environmental Program and the Process Safety Management Plan. All safety information is available to all personnel, whether employees or contractors, who work at the facility. If trade secrets are involved in the process, the information will be available to personnel as described in the Trade Secret Element of the PSM Program.

3.1 Employee Participation

This section summaries the processes which allow employees to participate in safety processes such as Process Hazard Analysis, Management of Change, Pre-Safety Startup Review, Accident Investigations, work permitting – Hot Work Permits, Management of Change, etc. Employees and contractors are encouraged and have the right to bring up unsafe or safe situation to management's attention without the fear of discipline or discriminatory actions.

3.1.1 Accident Investigation

Employees will participate in the investigation of PSM incidents. As part of the program a peer employee with relevant experience in the work process, which was involved in the incident, will participate as a member of the investigation team. A subcontractor representative is required to participate with the investigation team for any incident involving a subcontractor. (Refer to PSM Element 11 Incident Investigation for further details).

3.1.2 Work Permitting – Hot Work Permits

Issuing Hot Work Permits inside the facility is a key method of providing a safe work environment. Hot Work shall be issued by Operations personnel after all the condition of the permit has been met. (Refer to PSM Element 9 Hot Work Permit for further details.)

3.1.3 Management of Change (MOC)

Employee participation is covered under PSM Element 10 Management of Change (MOC). MOC is implemented to manage changes whenever there is a change or changes (except for "replacement in kind") to process chemicals, technology, and equipment, and changes to facilities. The Employees covered by the process shall be informed of and trained in the changes to the process as early as practicable prior to its start up, and during Plant operational stage.

3.1.4 Pre-Startup Safety Review

Pre-Start up Safety Reviews shall involve employees with expertise in process operations and engineering. The employees will be selected based upon their experience and understanding of the process systems being evaluated. {Refer to PSM Element 7 Pre-Startup Safety Review (PSSR) for further details}

3.1.5 Procedure Development

Specialized procedure will be developed by Subject Matter Experts (SME), reviewed by the Engineering Department, and approved by Management. Operating procedures will be developed in the same manner with the review of operations personnel.

3.1.6 Process Hazard Analysis

The process hazard analysis will be performed by a team with expertise in engineering and process operations, and the team will include at least one operating employee who has experience and knowledge specific to the process being evaluated. The team will also include one member knowledgeable in the specific process hazard analysis methodology being used. The final report containing the results of the hazard analysis for each process will be available in the respective work area for review by any person working in that area. (Refer to PSM Element 4 Process Hazard Analysis for further details).

3.1.7 Safety and Health Committee

A Safety and Health Committee will meet at least monthly as described in the Safety Plan. Refer to section 4.3 of the Injury, Illness, and Prevention Program (IIPP) for the details of the committee).

3.1.8 Safety Inspection/Audits

To help ensure a safe work environment, the Facility has implemented a safety inspection/audit process whereby employees, management and contractor personnel will perform field safety inspections. When at risk situations are discovered the supervisor responsible for the area in which the at-risk situation was discovered shall be informed of the situation and correct the situation as described in the Safety Inspection/audit section of the facility Safety Plan.

3.1.9 Safety Meetings

Safety Meetings are effective methods of communicating and sharing safety information among all personnel working at the Facility. Safety Meetings will be presented, attended and documented.

3.1.10 Safety Suggestions

All personnel working at the Mojave Solar LLC facility are encouraged to provide management with safety suggestions. The suggestions can be presented through any means of communication. The suggestions can be submitted anomalously and will be handled in the appropriate manner to properly address the suggestion.

3.1.11 Stop Work Authority

All personnel are encouraged to stop any unsafe or perceived unsafe situation. The personnel applying the Stop Work Authority shall not be subject to disciplinary actions for their actions to prevent a safety incident.

3.2 Process Safety Information

The purpose of written process safety information is to enable personnel to identify and understand any hazards posed by the process. Hard or electronic copies of this information shall be accessible to all employees who perform any duties in or near the process.

3.2.1 Information pertaining to the hazards of the chemicals

As a minimum this information shall consist of the following:
Toxicity information
Permissible exposure limits
Physical data
Reactivity data
Corrosivity data
Thermal and chemical stability data, and
Hazardous effects of inadvertent mixing of different materials that could possibly occur.
Safety Data Sheets (SDS) have been used to comply with this requirement.

3.2.2 Information pertaining to the technology.

The following process technology information shall be maintained for each covered process. An overview of the process, including the process chemistry; Maximum intended inventory located in the HMBP; Safe upper and lower limits for temperatures, pressures, flows and compositions; An evaluation of the consequences of deviations including those affecting the safety and health of the employees. Operating Manual and Process Hazard Analysis Report are used to satisfy this requirement.

3.2.3 Information Pertaining to the Equipment

The following drawings/information regarding the HTF, Water Treatment and Steam Generating processes are in the PSM Information binders:

Piping & instrument diagrams (P&IDs)
Plot plans or equivalent method of documenting relative spacing
Electrical area classification, documented on drawing(s) or other written materials.
Shutdown and interlock diagrams
Building or enclosure ventilation design basis.
Fire and gas detection details, including monitor location, upper and lower monitor detection limits, detectable gases, etc. Also included in this section are the locations and descriptions of beacons or horns associated with these devices.
Active fire systems (fire water systems, deluge systems, dry chemical, foam, and mobile or hand-held extinguishers, etc.).
Passive fire systems (fire walls, dikes, fire protection insulation, etc.)
Other safety systems such as emergency notification, uninterruptible power supply, etc.
Equipment specification data sheets shall include the information as required per design code.

3.2.4 Process Flow Diagrams

Process flow diagrams of the Facility will be available for inspection in the master drawing books and as electronic drawing files. The master drawing books are in the Operations/Control Building.

3.2.5 Process Chemistry

Several treatment chemicals are used in production of boiler feedwater, cooling tower control, and the clarifier system (zero water discharge). Applicable information is explained in the package vendor data books.

3.2.6 Maximum Intended Inventory

Calculations of maximum intended inventories within the plant have been developed. These calculations are available for inspection in the Operations/Control Building and are included in the Hazardous Material Business Plan (HMBP).

3.2.7 Safe Upper and Lower Limits

The design basis for the equipment is considered to be the safe upper and lower limits. Safe upper and lower limits are implemented into the Distributed Control System alarm set points and interlocks.

3.2.8 Consequences of Deviation

Consequences of deviation from normal operations shall be analyzed in the process hazards analyses. Those consequences that could affect the safety and health of personnel or cause

equipment damage shall be addressed by implementing engineering, administrative controls, and/or Personal Protective Equipment (PPE)
Engineering controls consist of alarms, shutdowns, relief valves, etc. Administrative controls consist of operating procedures and training for operations personnel. PPE consist of equipment such as eye, hand, foot, and hearing protection. These are documented in the PHA (Process Hazard Analysis).

3.2.9 Materials of Construction

The equipment manufacturer's data books and various catalogs provided by vendors contain information about materials of construction for specific equipment. This information can also be located in the PSM Information binders.

3.2.10 Piping and Instrument Diagrams (P&IDs)

A complete set of P&IDs is available for inspection in the master drawing books and as electronic drawing files. The master drawing books are located in the Operations/Control Building. These drawings are maintained by operations personnel and occasionally updated using a CAD program.

3.2.11 Electrical Area Classification and Ventilation System

Electrical area classifications have been established for the plant. These classifications may be found in the Master set of plant drawings located along with the other process safety information located in the Operations/Control Building.

3.2.12 Relief System Design and Design Basis

A review of the relief system design should be conducted in conjunction with the PHAs.
(See PSM Information Binder under Relief System Design)

3.2.13 Design Codes and Standards Employed

Design and construction of all process equipment has been conducted according to generally recognized, good engineering practices. Specific codes and standards may be found in individual equipment files or equipment manuals.

3.2.14 Material and Energy Balances

Material and energy balances are not required, as they would be in a plant with chemical change or separations of feeds into product streams. The process equipment is grouped into (a) HTF circulating system, (b) boiler feedwater and steam circulating system, and (c) cooling tower circulating system. There are no net feeds (except well water) and no net products (except sludge). Flow rates can be determined form Pump data on the P&ID's, and boiler/heat exchanger duties can also be read from equipment descriptions on the P&ID's.

3.2.15 Safety Systems

Alarm and shutdown system information is available in the Operating Manuals. The Operations Manuals are kept in the Operations/Control Building.

3.3 Process Hazard Analysis

The processes that are covered under the Process Hazard Analysis are the Steam Generation area, the Heat Transfer Fluid (HTF) system, and the chemical treatment portions of the Utilities area. The results of the PHA will be located in the PHA binder with recommendations and action sheets.

Each hazard analysis shall address:

- The hazards of the process;
- Engineering and administrative controls applicable to the hazards and their relationships;
- Consequences of failure of these controls;
- Facility Siting;
- Human Factors;
- A qualitative evaluation of a range of the possible safety and health effects of the failure of controls on facility employees; and
- The identification of any previous incident which had a likely potential for catastrophic consequences in the workplace.

The process hazard analysis will be performed by a team with expertise in engineering and process operations. The team shall include at least one operating employee who has experience and knowledge specific to the process being evaluated. The team shall also include one member knowledgeable in the specific process hazard analysis methodology being used. The final report containing the results of the hazard analysis for each process shall be available in the respective work area for review by any person working in that area.

Affected employees and where appropriate their recognized representatives shall be consulted on the development and conduct of hazard assessments performed at the facility. Affected employees and where applicable their representatives shall be provided access to the records required by this section.

The Facility or its designated contractor shall promptly address the team's findings and recommendations; document any actions taken to implement the team's recommendations; develop a written schedule of when these actions are to be completed; assure that the recommendations are resolved in a timely manner; make them available to operating, maintenance and any other persons whose work assignments are in the facility, and who are

affected by the recommendations or actions; and assure that the recommendations are evaluated in a timely manner or implement an alternative resolution which appropriately addresses the degree of hazard posed by the scenario.

3.4 Operating Procedures

Operating procedures are to provide clear instructions for safely conducting activities involved in the Heat Transfer Fluid (HTF), Steam Generation, Water Treatment and Utilities processes consistent with the process safety information (PSI).

Operating procedures have been developed for operating the Facility's process equipment before they are placed into service. These procedures include Operational Job Tasks and Safety and Health Procedures. A copy of the operating procedures is retained in a series of manuals. The Facility Operations Supervisor is responsible for maintaining and implementing the operating procedures.

In addition, the facility Operations Supervisor will maintain a master file of operating procedures kept in the Operations/Control Building. It is the responsibility of the Operators to advise the Supervisor of any changes.

The Operations procedures will be reviewed on an annual basis to ensure they reflect current practices, including adjustments that result from changes in process chemicals, technology, equipment, and to the facility.

The facility Operations Supervisor will annually certify that the operating procedures are current and accurate. The certification will be maintained on file at the facility.

Safe work practices that provide for the control of hazards during certain operations can be located in the following sections for facilities safety program:

- Hot Work Permit Procedures
- Lockout and Tagout Program
- Confined Space Entry Program
- Security and Access Control Practices

3.5 Training

Operational training for this facility will be accomplished utilizing computerized training, Classroom setting, video and/or one-on-one system.

Each employee presently involved in operating or maintaining a process, and each employee before working in a newly assigned process, shall be trained in an overview of the process and in the operating procedures for the process they will be assigned to work.

Refresher training will be provided at least every three years and more often if necessary. Refresher and supplemental training shall be provided to each maintenance or operating employee and other workers necessary to ensure safe operation of the facility. The Facility in

consultation with employees involved in operation or maintenance of a process shall determine the appropriate frequency of refresher training.

All employees involved in operation or maintenance of a process shall receive and successfully complete training for the processes in which they will be assigned to work. Each employee shall receive a certificate for completing the initial or refresher training and passing the required testing. The certification record shall contain the identity of the employee, the date of training, and the signatures of the persons administering the training.

3.6 Contract Safety

Prior to performing work at the Facility, the Purchasing Department will be responsible for the evaluation of contractors being considered for work at the facility. The contractor's safety programs, and performance shall be considered in this evaluation process.

Contractors shall be required to participate in the facility's security program. Contractors must sign in and sign out at the front desk daily. Those contractors with long-period contracts, will be issued identification badges to enter and exit the facility. Before starting work in processes areas, the contractor employees must communicate with the area operator.

An overview of the PSM covered process will be provided to the contract personnel before beginning work in or around the PSM covered process. This overview shall address the known potential fire, explosion, or toxic release hazards that a contractor may encounter. The overview shall also explain the provisions of the emergency plan which are applicable to the contractor. Contractors are required to follow all the Facility's established safe work practices while performing their services at the facility.

The safety performance of contract companies used on what might be considered a regular basis shall be periodically evaluated. The results of the evaluation shall be communicated to the contractor and the contractor shall be responsible to address the items of concern within a reasonable period of notification for the items.

All contractor injuries or illnesses shall be investigated and recorded using the Facility Incident Investigation Program. If the incident involves a PHA covered process, the contractor will assign one of its employees to participate on the PSM investigation team.

3.7 Pre-Start up Safety Plan

The Pre-Startup Safety Review (PSSR) is performed for new facilities, or modified facilities when the modifications are significant enough to require changes to be made in the written process safety information (See document 'MOC Program').

Employee Involvement: The Pre-Startup Safety Review involves employees with expertise in operations, engineering, and maintenance if their expertise is required. The employees will be selected based upon their experience and understanding of the process systems being evaluated. For example, a change consisting of a new bleeder may require only basic understanding of pipe specifications, while a new meter/control installation may require the

services of an instrument/ control tech to verify correct installation and operation. The PSSR review takes place prior to starting-up new or modified facilities, and shall confirm that:

- Construction and equipment are in accordance with design specifications.
- Safety, operating, maintenance and emergency procedures are in place and are adequate.
- For new facilities, a process hazard analysis has been performed and recommendations have been resolved or implemented before startup.
- Modified facilities meet the requirements of Management of Change.
- Training of each employee involved in operating a process has been completed.

The employee selected to complete the PSSR Checklist will review each item on the list. If the item is properly addressed, they will sign each item of the checklist. If the item has not been properly addressed the employee is to write a "comment" on the list and bring up the situation to their supervisor to have the item corrected. The final signature signifying that all checklist items are complete will be provided by the MOC Coordinator.

3.8 Mechanical Integrity

The program is based on recommended practices of the AICHE (American Institute of Chemical Engineers) and other industry organizations for chemicals at or above specified threshold quantities greater than 10,000 pounds in one location.

This Mechanical Integrity (MI) program addresses maintenance requirements for equipment, piping, instruments, and electrical in the following areas: the Facility Heat Transfer Fuel, Steam Turbine Generation Loop, Turbine Generator, Water Treatment and Utility Systems. The purpose of the program is to assure that equipment used to process, store, or handle hazardous chemicals is properly designed, constructed, installed and maintained to minimize the risk of releases. The primary focus of the MI program will be preventative, incorporating scheduled maintenance, corrosion monitoring, quality assurance of materials and installation. The program includes employee training.

Copies of this program can be found in the Control Building (Alpha and Beta) and will be accessible to all facility employees. The attached Mechanical Integrity Profile (MIP) identifies the major equipment groups and the proposed maintenance frequency.

The Maintenance Manager is responsible for implementing the Mechanical Integrity program.

The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturer's recommendations and good engineering practices. Inspection and test frequency may vary from manufacturer's recommendation if the operating experience with the equipment demonstrates the need for more or less frequent inspections.

3.8.1 Application

The requirements of this Mechanical Integrity Program apply to the following process equipment:

- Pressure vessels and storage tanks
- Piping systems (including piping components such as valves)
- Relief and vent systems and devices
- Emergency shutdown systems
- Controls (including monitoring devices and sensors, alarms and interlocks)
- Electrical equipment for power, controls, and lights.

3.8.2 Deficiencies

Deficiencies in equipment, which are outside acceptable limits, shall be corrected before further use or in a safe and timely manner when necessary means are taken to assure safe operation. Acceptable limits are defined in the Process Hazard Analysis, the supporting calculations and design information and in the facility engineering files, which combine to constitute the facility Process Safety Information.

3.8.3 Repair Parts

The Maintenance Manager shall assure that maintenance materials, spare parts, and equipment are suitable for the process application for which they will be used.

3.8.4 Mechanical Integrity Procedure

The Maintenance Manager will schedule and issue non- routing work orders for maintenance activities. The work order will specify who is responsible for carrying out each inspection or maintenance task. The documentation of the task shall include the date of inspection, equipment name, serial number of the equipment, the name of the person who performed the inspection or test, and the results of the inspection or test. The attached Mechanical Integrity Profile shall be followed to fulfill inspection and testing requirements. After the maintenance task or inspection is completed, the records will be kept according to the Facility's document retention policy.

3.8.5 Management of Change

The Maintenance Manager will assure the suitability of material and equipment for the construction of new facilities or the replacement of equipment. This assurance is provided under the Management of Change/Pre-Start up Safety Review.

3.8.6 Record Keeping

Documentation of inspections and maintenance will be maintained onsite. The records are maintained and stored by the Facility. The documentation shall identify:

- The date of the inspection.

- The name of the person who performed the inspection or test.
- The serial number or other identifier of the equipment on which the inspection or test was performed.
- The results of the inspection or test.

3.8.7 Training

Training will be provided to each employee involved in maintaining the on-going integrity of process equipment in the following:

- An overview of the process and its hazards.
- Procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.
- Certification for employees doing non-destructive tests, welding, etc.

4 Health, Safety and Environmental

All tasks described in this procedure must be implemented according with the specific safety directives and procedures existing in Atlantica Sustainable Infrastructure and following safety standards established on site where it performs works.

Likewise, hazards and preventive measures established in actual Workplace Hazard Assessment for the staff involved will be considered.

5 Appendix

Here is the list of safety procedures.

GP-O&M-MJV-011	Safe Work Permit Process
SP-O&M-MJV-005	Vehicle Maintenance Safety Procedure
SP-O&M-MJV-007	Document Information Procedure
SP-O&M-MJV-014	Nonconformity & Corrective Action
SP-O&M-MJV-015	Regulations, Information & Compliance
SP-O&M-MJV-016	Training and Competence
SP-O&M-MJV-085	Personal Electronic Device Policy
SP-O&M-MJV-086	Operations Injury Illness Prevention Program - IIPP
SP-O&M-MJV-087	Process Safety Management Plan
SP-O&M-MJV-088	Health General Procedure
SP-O&M-MJV-089	PPE Collective protection and Work Equipment General Procedure
SP-O&M-MJV-090	Access Control General Procedure
SP-O&M-MJV-092	Safety Clearance Lockout & Tag Out Procedure LOTO
SP-O&M-MJV-093	Boom Lift Works close to High Voltage Lines - Procedure for Grounding a Boom Lift
SP-O&M-MJV-094	MSLLC Employees working alone

SP-O&M-MJV-095	MSLLC Radio Communication
SP-O&M-MJV-158	Fire Protection System Maintenance
SP-O&M-MJV-160	Safety Committee Bylaws
SP-O&M-MJV-161	Hearing Conservation Written Program
SP-O&M-MJV-162	Site Specific Orientation
SP-O&M-MJV-163	Confined Space Procedure
SP-O&M-MJV-164	Confined Space Watch
SP-O&M-MJV-165	MSLLC Emergency Response and Preparedness Plan
SP-O&M-MJV-166	Heat Stress Protection Procedure
SP-O&M-MJV-167	Safety Rules
SP-O&M-MJV-168	Risk Assessment
SP-O&M-MJV-169	Works with HTF
SP-O&M-MJV-170	Accident Investigation Procedure
SP-O&M-MJV-171	H&S Reports in Solar Plants
SP-O&M-MJV-172	Heat Stroke Prevention
SP-O&M-MJV-173	Hot Works Procedure
SP-O&M-MJV-174	Work at Height
SP-O&M-MJV-175	Weekly Fire Pump Checks
SP-O&M-MJV-176	Weekly Safety Shower Check
SP-O&M-MJV-177	Lightning Mitigation Plan (CEC Approved)
SP-O&M-MJV-178	Fire Suppression System Impairment Communication Plan
SP-O&M-MJV-179	Seismic Event Response Procedure
SP-O&M-MJV-180	Emergency shut down Procedure
SP-O&M-MJV-186	Working over or near water rescue Plan
SP-O&M-MJV-218	Preventive culture
SP-O&M-MJV-224	Emergency Drill Guideline-Medical Emergency Requiring EMS
SP-O&M-MJV-229	Emergency Drill Guideline-Fire in Electrical/MCC Room
SP-O&M-MJV-263	Employee Improvement Incentive Program
SP-O&M-MJV-273	Fire Prevention Plan (Needs updated review)
SP-O&M-MJV-267	CAT Steer Loader Safety Inspection
PP-O&M-MJV-061	Mojave Risk Assessment
SP-O&M-MJV-268	Emergency Drill Guideline-Fire at Plant Equipment
SP-O&M-MJV-276	Mojave Incident Report Training

SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
US OSHA Hazard Communication Standard (29 CFR 1910.1200)

Revision date 31-Aug-2023 **Revision Number** 13

1. Identification

Product identifier

Product name CHEMGUARD NFF-331 3x3

Other means of identification

Product code A16381HLDY

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended use No information available

Uses advised against No information available

Details of the supplier of the safety data sheet

Company Name
Tyco Fire Protection Products
One Stanton Street
Marinette, WI 54143-2542
Telephone: 715-735-7411

E-mail psra@jci.com

Company Phone Number Product Stewardship at +1-715-735-7411

Emergency telephone CHEMTREC 001-800-424-9300 or 001-703-527-3887

2. Hazard(s) identification

Classification

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Serious eye damage/eye irritation	Category 2A

Label elements
Signal word
Warning

Hazard Statements
Causes serious eye irritation

Precautionary Statements - Prevention
Wear protective gloves/clothing and eye/face protection

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 or doctor/physician

Hazards not otherwise classified (HNOC)
Not applicable

Other information
No information available.

3. Composition/information on ingredients

Substance

Not applicable.

Mixture

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Chemical name	CAS No	Weight-%	Trade secret
2-(2-Butoxyethoxy)ethanol	112-34-5	3 - 7	*
1-Propanaminium, N-(3-Aminopropyl)-2-hydroxy-N,N-dimethyl-3-sulfo-, N-Coco-acylderivates	68139-30-0	1 - 5	*
Fatty Alcohol Sulfate, TEA-salt	139-96-8	1 - 5	*
Sodium Octyl Sulfate	142-31-4	1 - 5	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. First-aid measures

Description of first aid measures

Inhalation Remove to fresh air.

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water.

Ingestion Rinse mouth.

Most important symptoms and effects, both acute and delayed

Symptoms No information available.

Effects of Exposure No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Large Fire	CAUTION: Use of water spray when fighting fire may be inefficient.
Unsuitable extinguishing media	Do not scatter spilled material with high pressure water streams.
Specific hazards arising from the chemical	No information available.
Explosion data	
Sensitivity to mechanical impact	None.
Sensitivity to static discharge	None.
Special protective equipment and precautions for fire-fighters	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions	Ensure adequate ventilation.
For emergency responders	Use personal protection recommended in Section 8.

Environmental Precautions

Environmental Precautions	Prevent entry into waterways, sewers, basements or confined areas. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment	Prevent further leakage or spillage if safe to do so.
Methods for cleaning up	Pick up and transfer to properly labeled containers.

7. Handling and storage

Precautions for safe handling

Advice on safe handling	Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep container tightly closed in a dry and well-ventilated place.

8. Exposure controls/personal protection

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH
2-(2-Butoxyethoxy)ethanol 112-34-5	TWA: 10 ppm inhalable fraction and vapor	-	-

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection No special protective equipment required.

Skin and body protection No special protective equipment required.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	No information available
Color	light yellow
Odor	Characteristic
Odor threshold	No information available

Property	Values	Remarks • Method
pH	7	None known
pH (as aqueous solution)		None known
Melting point / freezing point	-9 °C / 16 °F	None known
Initial boiling point and boiling range	No data available	None known
Flash point	No data available	None known
Evaporation rate	No data available	None known
Flammability	No data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	No data available	None known
Relative vapor density	No data available	None known
Relative density	No data available	None known
Water solubility	No data available	None known
Solubility(ies)	No data available	None known
Partition coefficient	No data available	None known

Autoignition temperature	No data available	None known
Decomposition temperature		None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known

Other information

Explosive properties	No information available
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
VOC content	No information available
Liquid Density	1.12 g/ml
Bulk density	No information available

10. Stability and reactivity

Reactivity No information available.

Chemical stability Stable under normal conditions.

Possibility of hazardous reactions None under normal processing.

Conditions to avoid Extremes of temperature and direct sunlight.

Incompatible materials Strong oxidizing agents. Strong acids. Strong bases.

Hazardous decomposition products None known based on information supplied.

11. Toxicological information

Information on likely routes of exposure

Inhalation Specific test data for the substance or mixture is not available.

Eye contact Causes serious eye irritation.

Skin contact Specific test data for the substance or mixture is not available.

Ingestion Specific test data for the substance or mixture is not available.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms No information available.

Acute toxicity

Product information

Method	species	Exposure Route	Effective dose	Exposure time	Results
U.S. EPA Health Effects Test Guidelines, OPPTS 870.1100, Acute Oral Toxicity	Rat	oral	5000 mg/kg		LD50 > 5000 mg/kg
U.S. EPA Health Effects Test Guidelines, OPPTS 870.1200, Acute Dermal Toxicity	Rat	dermal		24 hours	LD50 > 5050 mg/kg
U.S. EPA Health Effects Test Guidelines, OPPTS 870.2500 , Dermal Irritation	Rabbit	dermal		4 hours	non irritating

Numerical measures of toxicity
No information available

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
2-(2-Butoxyethoxy)ethanol 112-34-5	= 5660 mg/kg (Rat)	= 2700 mg/kg (Rabbit)	-
Sodium Octyl Sulfate 142-31-4	= 3200 mg/kg (Rat)	> 2000 mg/kg (Rat)	-

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation No information available.

Serious eye damage/eye irritation Causes serious eye irritation.

Method	species	Exposure Route	Effective dose	Exposure time	Results
U.S. EPA Health Effects Test Guidelines, OPPTS 870.2400 , Ocular Irritation	Rabbit	eye			Irritant

Respiratory or skin sensitization No information available.

Germ cell mutagenicity No information available.

Carcinogenicity No information available.

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Aspiration hazard No information available.

Other adverse effects No information available.

Interactive effects No information available.

12. Ecological information

Ecotoxicity

Method	Species	Endpoint type	Effective dose	Exposure time	Results
OECD Test No. 203: Fish, Acute Toxicity Test	Oncorhynchus mykiss (rainbow trout)	NOEC	>100 mg/L	96 hours	NOEC: 50 mg/l
OECD Test No. 203: Fish, Acute Toxicity Test	Marine Species-Silverside Minnow, Menidia Beryllina	NOEC	37.5 mg/L	96 hours	NOEC: 25 mg/l

OECD Test No. 202: Daphnia sp., Acute Immobilization Test	Daphnia magna	NOEC	EC50 66.667 mg/L	48 hours	NOEC: 50 mg/l
U.S.EPA Health Effects Test Guidelines, OCSPP 850.1035: Static 96-hour Acute Toxicity Test	Mysidopsis bahia	NOEC	EC50 62.5 mg/L	96 hours	NOEC: 161.71 mg/l
OECD Test No. 201: Freshwater Alga and Cyanobacteria, Growth Inhibition Test	Pseudokirchneriella subcapitata	IC50	IC50: > 100 mg/L	72 hours	NOEC: 100 mg/l
OECD Test No. 209: Activated Sludge, Respiration Inhibition Test (Carbon and Ammonium Oxidation)	Activated sludge microorganisms	IC50		3 hours	IC50 > 1000 mg/l

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
2-(2-Butoxyethoxy)ethanol 112-34-5	EC50 (96h) > 100 mg/L Desmodesmus subspicatus	LC50 (96h) static = 1300 mg/L Lepomis macrochirus	-	EC50 (48h) > 100 mg/L Daphnia magna

Method	Exposure time	VALUE	Results
OECD Test No. 301F: Ready Biodegradability: Manometric Respirometry Test (TG 301 F)	28 days		Readily biodegradable

Persistence and degradability

Biodegradability (B.O.D./C.O.D.)

BOD/COD analysis
Concentrate:
BOD5: 356400 mg/L
BOD10: 406200 mg/L

BOD15: 426000 mg/L

BOD20: 442200 mg/L

BOD28: 470400 mg/L

COD: 589917 mg/L

Diluted (97% water, 3% Concentrate)
BOD5: 12240 mg/L
BOD10: 12940 mg/L

BOD15: 14000 mg/L

BOD20: 14200 mg/L

BOD28: 15620 mg/L

COD: 18033 mg/L

Bioaccumulation There is no data for this product.

Chemical name	Partition coefficient
2-(2-Butoxyethoxy)ethanol 112-34-5	1

Mobility	Keep out of waterways.
Other adverse effects	No information available.

13. Disposal considerations

Disposal methods

Waste from residues/unused products	Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.
Contaminated packaging	Do not reuse empty containers.

14. Transport information

DOT	Not regulated
TDG	Not regulated
MEX	Not regulated
ICAO (air)	Not regulated
IATA	Not regulated
IMDG	Not regulated

15. Regulatory information

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Does not comply
ENCS	Does not comply
IECSC	Does not comply
KECL	Does not comply
PICCS	Does not comply
AIIC	Complies
NZIoC	Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AIIC - Australian Inventory of Industrial Chemicals
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Chemical name	SARA 313 - Threshold Values %
2-(2-Butoxyethoxy)ethanol - 112-34-5	1.0

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Water 7732-18-5	-	-	X
2-(2-Butoxyethoxy)ethanol 112-34-5	X	-	X
Fermentation derived cellulose 9004-34-6	X	X	X
1,2-Propanediol 57-55-6	X	-	X
Glycerol 56-81-5	X	X	X
1-Decanol 112-30-1	-	-	X
Benzoic acid 65-85-0	X	X	X
Sodium Hydroxide 1310-73-2	X	X	X
sodium dodecylbenzene sulfonate 25155-30-0	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. Other information

NFPA	Health hazards	2	Flammability	0	Instability	0	Special hazards -
HMIS	Health hazards	2	Flammability	0	Physical hazards	0	Personal protection X

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: Exposure controls/personal protection

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
National Institute of Technology and Evaluation (NITE)
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
World Health Organization

Revision date 31-Aug-2023
Revision Note No information available.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

1. Identification

Product identifier BL1260

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

Skin corrosion/irritation	Category 2
Sensitization, skin	Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Causes skin irritation. May cause an allergic skin reaction.

Precautionary statement

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

Response If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.

Storage Not available.

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	%
Carbohydrazide		497-18-7	10 - < 20
Other components below reportable levels			80 - < 90

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	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	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	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 breathing mist/vapors. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. 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.

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

Components	Type	Value
Hydrazine (CAS 302-01-2)	PEL	1.3 mg/m3
		1 ppm

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value
Hydrazine (CAS 302-01-2)	TWA	0.01 ppm

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

Components	Type	Value
Hydrazine (CAS 302-01-2)	IDLH	2.9 %
		50 ppm

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

Components	Type	Value
Hydrazine (CAS 302-01-2)	Ceiling	0.04 mg/m3
		0.03 ppm

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

Exposure guidelines

US - California OELs: Skin designation

Hydrazine (CAS 302-01-2) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Hydrazine (CAS 302-01-2) Skin designation applies.

US - Tennessee OELs: Skin designation

Hydrazine (CAS 302-01-2) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Hydrazine (CAS 302-01-2) Danger of cutaneous absorption

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

Hydrazine (CAS 302-01-2) Can be absorbed through the skin.

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 Colorless to Light Straw

Odor Odorless

Odor threshold Not available.

pH 6 - 9 @ 20C (100% Dilution)

Melting point/freezing point 41.00 °F (5.00 °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	8.56
Specific gravity	1.02 - 1.03 @ 20C

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	Causes skin irritation. 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	Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash.

Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
Carbohydrazide (CAS 497-18-7)		
Acute		
Oral		
LD50	Rat	311 mg/kg
Hydrazine (CAS 302-01-2)		
Acute		
Dermal		
LD50	Rabbit	91 mg/kg
Oral		
LD50	Rat	60 mg/kg

Skin corrosion/irritation Causes skin 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 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

Hydrazine (CAS 302-01-2) 2A Probably carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Hydrazine (CAS 302-01-2) Reasonably Anticipated to be a Human Carcinogen.

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
BL1260			
Aquatic			
Crustacea	LC50	Ceriodaphnia dubia	158.38 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	159.32 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. 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.

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)

Hydrazine (CAS 302-01-2) Listed.

SARA 304 Emergency release notification

Hydrazine (CAS 302-01-2) 1 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)
Hydrazine	302-01-2	1	1000		

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Skin corrosion or irritation
Respiratory or skin sensitization

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Hydrazine	302-01-2	< 0.1

Other federal regulations

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

Hydrazine (CAS 302-01-2)

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

Hydrazine (CAS 302-01-2)

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

US state regulations

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Hydrazine (CAS 302-01-2)

California Proposition 65

WARNING: This product can expose you to Hydrazine, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Hydrazine (CAS 302-01-2) Listed: January 1, 1988

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).

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

Issue date 07-29-2022

Revision date 11-02-2023

Version # 03

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

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Revision information Composition / Information on Ingredients: Disclosure Overrides

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

SAFETY DATA SHEET

1. Identification

Product identifier BL1794

Other means of identification None.

Recommended use Boiler Water Treatment / Tratamento de água de caldeira / Tratamiento de agua de caldera / Traitement de l'eau de chaudière

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

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Causes skin irritation. Causes serious eye irritation.

Precautionary statement

Prevention Wash thoroughly after handling. Wear eye protection/face protection. Wear protective gloves.

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

Storage Not available.

Disposal Not available.

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	%
Trisodium phosphate		7601-54-9	3 - < 5
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. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. 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.
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.

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. 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	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 contact with eyes, skin, and clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. 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.

US. OARS. Workplace Environmental Exposure Level (WEEL) Guide

Components	Type	Value
Trisodium phosphate (CAS 7601-54-9)	STEL	5 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. 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).
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear appropriate chemical resistant clothing.
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.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Liquid. Liquid
Color	Not available.
Odor	Odorless
Odor threshold	Not available.
pH	≥ 11 - ≤ 14 100
Melting point/freezing point	37.40 °F (3.00 °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	> 0 - < 200 cps
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	8.67
Specific gravity	≥ 1.03 - ≤ 1.05 @ 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	Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
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.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Trisodium phosphate (CAS 7601-54-9)		
Acute		
Dermal		
LD50	Rabbit	>= 2 mg/kg
Inhalation		
LC50	Rat	>= 2.1600000000000001 mg/l, 1 Hours
Oral		
LD50	Rat	4.7999999999999998 mg/kg

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	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.

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	Dispose of this material and its container to hazardous or special waste collection point. 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)

Trisodium phosphate (CAS 7601-54-9) 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

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 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

Compliance Information: Food Regulations

21 CFR 173.310

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

Issue date 10-05-2023

Version # 01

HMIS® ratings Health: 1
Flammability: 0
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.

Other information

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

SAFETY DATA SHEET

1. Identification

Product identifier **BL8411**

Other means of identification

Product code BL8411

Recommended use Boiler Water Treatment

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	Flammable liquids	Category 3
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Sensitization, respiratory	Category 1
	Reproductive toxicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 2
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Flammable liquid and vapor. Harmful if swallowed. Causes severe skin burns and eye damage. Causes serious eye damage. Suspected of damaging fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure. Toxic 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. 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. Wash contaminated clothing before reuse. In case of fire: Use appropriate media to extinguish.
Storage	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	None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
cyclohexanamine		108-91-8	20 - < 30
Ethanolamine		141-43-5	10 - < 20
Amines, tallow alkyl, ethoxylated		61791-26-2	1 - < 3
N'-[(Z)-octadec-9-enyl]propane-1,3-diamine		7173-62-8	1 - < 3
Other components below reportable levels			60 - < 70

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
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	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. 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 all contaminated clothing immediately. 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

Use water spray to reduce vapors or divert vapor cloud drift. 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. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. 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. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Ethanolamine (CAS 141-43-5)	PEL	6 mg/m3
		3 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
cyclohexanamine (CAS 108-91-8)	TWA	10 ppm
Ethanolamine (CAS 141-43-5)	STEL	6 ppm
	TWA	3 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
cyclohexanamine (CAS 108-91-8)	TWA	40 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
		10 ppm
Ethanolamine (CAS 141-43-5)	STEL	15 mg/m3
		6 ppm
	TWA	8 mg/m3
		3 ppm

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

Exposure guidelines

US - California OELs: Skin designation

cyclohexanamine (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 Avoid contact with eyes. Wear safety glasses with side shields (or goggles) and a face shield. Wear a full-face respirator, if needed.

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.

Color Colorless.

Odor Moderate

Odor threshold Not available.

pH 12 - 14 @ 20C

Melting point/freezing point > 40.10 °F (> 4.50 °C)

Initial boiling point and boiling range 206 °F (96.67 °C)

Flash point 112.0 °F (44.4 °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 2.94 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	
Density	8.22 lbs/gal
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	8.22
Specific gravity	0.98 - 0.99 @ 20C

10. Stability and reactivity

Reactivity	Reacts violently with strong acids. This product may react with oxidizing agents.
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. Do not mix with other chemicals.
Incompatible materials	Strong acids. Strong oxidizing agents. Oxidizing agents. Aluminum.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns. Prolonged or repeated exposure may cause liver and kidney damage. These effects have not been observed in humans.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns. Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	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.

Information on toxicological effects

Acute toxicity Harmful if swallowed.

Components	Species	Test Results
Ethanolamine (CAS 141-43-5)		
Acute		
Dermal		
LD50	Rabbit	1025 mg/kg

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 May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful. May cause damage to organs through prolonged or repeated exposure. May be harmful if absorbed through skin.

Prolonged or repeated exposure may cause liver and kidney damage. These effects have not been observed in humans.

12. Ecological information

Ecotoxicity Toxic to aquatic life. Harmful to aquatic life with long lasting effects.

Product		Species	Test Results
BL8411			
Aquatic			
Acute			
Crustacea	LC50	Water flea (Ceriodaphnia dubia)	7.07 mg/l, 48 h
Fish	LC50	Fathead minnow (Pimephales promelas)	3.37 mg/l, 96 h

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)

cyclohexanamine	1.49
Ethanolamine	-1.31

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	UN2920
UN proper shipping name	Corrosive liquids, flammable, n.o.s., MARINE POLLUTANT
Transport hazard class(es)	
Class	8
Subsidiary risk	3
Label(s)	8, 3
Packing group	II
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	B2, IB2, T11, TP2, TP27
Packaging exceptions	None
Packaging non bulk	202
Packaging bulk	243

IATA

UN number	UN2920
UN proper shipping name	Corrosive liquid, flammable, n.o.s.
Transport hazard class(es)	
Class	8
Subsidiary risk	3
Packing group	II
Environmental hazards	Yes
ERG Code	8F
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN2920
UN proper shipping name	CORROSIVE LIQUID, FLAMMABLE, N.O.S., MARINE POLLUTANT
Transport hazard class(es)	
Class	8
Subsidiary risk	3
Packing group	II
Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-C
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

Marine pollutant

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)

cyclohexanamine (CAS 108-91-8) 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)
cyclohexanamine	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
Specific target organ toxicity (single or repeated 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)

cyclohexanamine (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 07-23-2021

Revision date 05-12-2022

Version # 04

HMIS® ratings Health: 3*
Flammability: 3
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.

Revision information Physical & Chemical Properties: Multiple Properties

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

SAFETY DATA SHEET

Section 1. Chemical Product and Company Identification

Product Name:	ChemTreat CL5428
Product Use:	Cooling Water Treatment
Supplier's Name:	ChemTreat, Inc.
Emergency Telephone Number:	(800)424−9300 (Toll Free)
Address (Corporate Headquarters):	5640 Cox Road Glen Allen, VA 23060
Telephone Number for Information:	(800)648−4579
Date of SDS:	October 16, 2020
Revision Date:	October 16, 2020
Revision Number:	20101601AN

Section 2. Hazard(s) Identification

Signal Word: **None**

GHS Classification(s): Non−Hazardous Substance

Hazard Statement(s): Non−Hazardous Substance

Precautionary Statement(s): No significant health risks are expected from exposures under normal conditions of use.

Prevention: None.

Response: None.

Storage: None.

Disposal: None.

System of Classification Used: Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards Not Otherwise Classified: None.

Section 3. Composition/Hazardous Ingredients

Component	CAS Registry #	Wt.%
Components not listed are either non hazardous or in concentration of less than 1%	N/A	N/A

Comments If chemical identity and/or exact percentage of composition has been withheld, this information is considered to be a trade secret.

Section 4. First Aid Measures

Inhalation: Call a POISON CENTER or doctor/physician if you feel unwell.

Eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

Skin: Call a poison center or doctor/physician if you feel unwell.

Ingestion: Rinse mouth. Call a poison center or doctor/physician if you feel unwell.

Most Important Symptoms: N/D

Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary: N/A

Section 5. Fire Fighting Measures

Flammability of the Product: Not flammable.

Suitable Extinguishing Media: Use extinguishing media suitable to surrounding fire.

Specific Hazards Arising from the Chemical: None known.

Protective Equipment: If product is involved in a fire, wear full protective clothing including a positive−pressure, NIOSH approved, self−contained breathing apparatus.

Section 6. Accidental Release Measures

Personal Precautions: Wear a self−contained breathing apparatus and appropriate Personal Protective Equipment (PPE).

Environmental Precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

Methods for Cleaning up: Contain and recover liquid when possible. Flush spill area with water spray.

Other Statements: None.

Section 7. Handling and Storage

Handling: Wear appropriate Personal Protective Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust.

Storage: Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only.
Store above Freeze Point.

Section 8. Exposure Controls/Personal Protection

Exposure Limits

Component	Source	Exposure Limits
Components not listed are either non hazardous or in concentration of less than 1%	N/E	N/E

Engineering Controls: Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

Personal Protection

Eyes:	Safety glasses are recommended if risk of eye contact.
Skin:	Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.
Respiratory:	If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

Section 9. Physical and Chemical Properties

Physical State and Appearance:	Liquid, Light Straw, Clear
Specific Gravity:	1.146 @ 20°C
pH:	4.7 @ 20°C, 100.0%
Freezing Point:	34°F
Flash Point:	N/A
Odor:	Mild
Melting Point:	N/D
Initial Boiling Point and Boiling Range:	N/D
Solubility in Water:	Complete
Evaporation Rate:	N/D
Vapor Density:	N/D
Molecular Weight:	N/D
Viscosity:	<100 CPS @ 20°C
Flammability (solid, gas):	N/D
Flammable Limits:	N/A
Autoignition Temperature:	N/A
Density:	9.56 LB/GA
Vapor Pressure:	N/D
% VOC:	N/D
Odor Threshold	N/D
n−octanol Partition Coefficient	N/D
Decomposition Temperature	N/D

Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures.

Incompatibility with Various Substances: Strong oxidizers, Strong bases.

Hazardous Decomposition Products: Oxides of carbon.

Possibility of Hazardous Reactions: None known.

Reactivity: N/D

Conditions To Avoid: N/D

Section 11. Toxicological Information

Acute Toxicity

Chemical Name	Exposure	Type of Effect	Concentration	Species
N/D	N/D	N/D	N/D	N/D

Carcinogenicity Category

Component	Source	Code	Brief Description
Components not listed are either non hazardous or in concentration of less than 1%	N/E	N/E	N/E

Likely Routes of Exposure: N/D

Symptoms

Inhalation: N/D

Eye Contact: N/D

Skin Contact: N/D

Ingestion: N/D

Skin Corrosion/Irritation: N/D

Serious Eye Damage/Eye Irritation: N/D

Sensitization: N/D

Germ Cell Mutagenicity: N/D

Reproductive/Developmental Toxicity: N/D

Specific Target Organ Toxicity

Single Exposure: N/D

Repeated Exposure: N/D

Aspiration Hazard: N/D

Comments: None.

Section 12. Ecological Information

Ecotoxicity

Species	Duration	Type of Effect	Test Results
Ceriodaphnia dubia	48h	LC50	888 mg/l
Fathead Minnow	96h	LC50	3314 mg/l
Bluegill Sunfish	96h	LC50	>1000 mg/l
Rainbow Trout	96h	LC50	>1000 mg/l
Mysid Shrimp	48h	LC50	>1000 mg/l
Inland Silverside	86h	LC50	>1000 mg/l
Daphnia magna	48h	EC50	>1000 mg/l

Persistence and Biodegradability: N/D

Bioaccumulative Potential: N/D

Mobility In Soil: N/D

Other Adverse Effects: N/D

Comments: Aquatic toxicity data is based on testing of a similar product.

Section 13. Disposal Considerations

Dispose of in accordance with local, state and federal regulations.

Section 14. Transport Information

Controlling Regulation	UN/NA#:	Proper Shipping Name:	Technical Name:	Hazard Class:	Packing Group:
DOT	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
IMDG	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
TDG	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A

Note: N/A

Section 15. Regulatory Information

Inventory Status

United States (TSCA): All ingredients listed.
Canada (DSL/NDSL): All ingredients listed.

Federal Regulations

SARA Title III Rules

Sections 311/312 Hazard Classes

Fire Hazard: No
Reactive Hazard: No
Release of Pressure: No
Acute Health Hazard: Yes
Chronic Health Hazard: No

Other Sections

Component	Section 313 Toxic Chemical	Section 302 EHS TPQ	CERCLA RQ
Components not listed are either non hazardous or in concentration of less than 1%	N/A	N/A	N/A

Comments: None.

State Regulations

California Proposition 65: None known.

Special Regulations

Component	States
Components not listed are either non hazardous or in concentration of less than 1%	None.

Compliance Information

NSF: N/A

Food Regulations: N/A

KOSHER: This product has not been evaluated for Kosher approval.

Halal: This product has not been evaluated for Halal approval.

FIFRA: N/A

Other: None

Comments: None.

Section 16. Other Information

HMIS Hazard Rating

Health: 0
Flammability: 0
Physical Hazard: 0
PPE: X

Notes:

The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha−numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end−user must determine if the code is appropriate for their use.

Abbreviations

Abbreviation	Definition
<	Less Than
>	Greater Than
ACGIH	American Conference of Governmental Industrial Hygienists
EHS	Environmental Health and Safety Dept
N/A	Not Applicable
N/D	Not Determined
N/E	Not Established
OSHA	Occupational Health and Safety Dept
PEL	Personal Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weight Average
UNK	Unknown

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

Revision Date: October 16, 2020

Disclaimer

SAFETY DATA SHEET

1. Identification

Product identifier **CT790**

Other means of identification

Product code CT790

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
Skin corrosion/irritation	Category 1B
Serious eye damage/eye irritation	Category 1

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 2
Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Causes severe skin burns and eye damage. Causes serious eye damage. Harmful if inhaled. Toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Do not breathe mist/vapors. 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.

Response 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. Wash contaminated clothing before reuse. Collect spillage.

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 41.01% of the mixture consists of component(s) of unknown acute inhalation toxicity. 41.01% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 41.01% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Phosphoric Acid		7664-38-2	40 - < 50
ZINC OXIDE		1314-13-2	10 - < 20
Other components below reportable levels			40 - < 50

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 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 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.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. 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 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. Do not breathe 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

This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Should not be released into the environment.

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. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Do not breathe mist/vapors. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Use only outdoors or in a well-ventilated area. 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 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.

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

Components	Type	Value	Form
Phosphoric Acid (CAS 7664-38-2)	PEL	1 mg/m3	
ZINC OXIDE (CAS 1314-13-2)	PEL	5 mg/m3	Respirable fraction.
		5 mg/m3	Fume.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 Permissible Exposure Limits (PEL) for Mineral Dusts (29 CFR 1910.1000)

Components	Type	Value	Form
ZINC OXIDE (CAS 1314-13-2)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value	Form
Phosphoric Acid (CAS 7664-38-2)	STEL	3 mg/m3	
	TWA	1 mg/m3	
ZINC OXIDE (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

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

Components	Type	Value
Phosphoric Acid (CAS 7664-38-2)	IDLH	1000 mg/m3
ZINC OXIDE (CAS 1314-13-2)	IDLH	500 mg/m3

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

Components	Type	Value	Form
Phosphoric Acid (CAS 7664-38-2)	STEL	3 mg/m3	
	TWA	1 mg/m3	
ZINC OXIDE (CAS 1314-13-2)	Ceiling	15 mg/m3	Dust.
	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		5 mg/m3	Dust.

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. 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.

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 1

Melting point/freezing point -44.32 °F (-42.40 °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	
Density	14.47 lb/gal
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	14.47
Specific gravity	≥ 1.71 - ≤ 1.76 @ 20C

10. Stability and reactivity

Reactivity	Reacts violently with strong alkaline substances. This product may react with reducing agents.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Do not mix with other chemicals.
Incompatible materials	Bases. Reducing 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	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	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.

Information on toxicological effects

Acute toxicity Harmful if inhaled.

Components	Species	Test Results
Phosphoric Acid (CAS 7664-38-2)		
Acute		
Dermal		
LD50	Rabbit	2740 mg/kg
Oral		
LD50	Rat	1530 mg/kg
ZINC OXIDE (CAS 1314-13-2)		
Acute		
Inhalation		
LC50	Mouse	> 5.7000000000000002 mg/l, 4 Hours
Oral		
LD50	Rat	> 5 g/kg

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	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 with long lasting effects. Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
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	Dispose of this material and its container to hazardous or special waste collection point. 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	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	UN1805
UN proper shipping name	Phosphoric acid solution, MARINE POLLUTANT (ZINC OXIDE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	
Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

UN number	UN1805
UN proper shipping name	Phosphoric acid solution
Transport hazard class(es)	
Class	8
Subsidiary risk	-

Label(s)	8
Packing group	III
Environmental hazards	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1805
UN proper shipping name	Phosphoric acid solution, MARINE POLLUTANT
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	Not assigned.
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

Marine pollutant

General information IMDG Regulated Marine Pollutant. DOT Regulated Marine Pollutant.

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)

Phosphoric Acid (CAS 7664-38-2)	Listed.
ZINC OXIDE (CAS 1314-13-2)	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)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
ZINC OXIDE	1314-13-2	10 - < 20

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.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Phosphoric Acid (CAS 7664-38-2)	High priority

US state regulations

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Phosphoric Acid (CAS 7664-38-2)

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
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

Country(s) or region	Inventory name	On inventory (yes/no)*
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 05-05-2023

Version # 01

HMIS® ratings
Health: 3
Flammability: 0
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.

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

SAFETY DATA SHEET

1. Identification

Product identifier **P813E**

Other means of identification

Product code P813E

Recommended use Water Clarification/Solids Conditioning

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 Serious eye damage/eye irritation Category 2

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Causes serious eye irritation.

Precautionary statement

Prevention Wash thoroughly after handling. Wear eye protection/face protection.

Response If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. 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 waste and residues in accordance with local authority requirements.

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

Supplemental information 24.25% of the mixture consists of component(s) of unknown acute oral toxicity. 26.75% 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	%
Distillates (petroleum), Hydrotreated Light		64742-47-8	20 - < 30
Alcohols, C10-16, Ethoxylated		68002-97-1	1 - < 3
Alcohols, C12-14, Ethoxylated		68439-50-9	1 - < 3
Alcohols, C12-16-ethoxylated		68551-12-2	1 - < 3
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	Wash off with soap and water. Get medical attention if irritation develops and persists.
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. If eye irritation persists: Get medical advice/attention.
Ingestion	Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. 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.
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.

5. Fire-fighting measures

Suitable extinguishing media	Alcohol resistant foam. Powder. Dry chemicals. 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	Cool containers exposed to heat with water spray and remove container, if no risk is involved.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Will burn if involved in a fire. 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. 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	Use water spray to reduce vapors or divert vapor cloud drift. 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 contact with eyes. Avoid prolonged or repeated contact with skin. Avoid prolonged exposure. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Keep away from heat and sources of ignition. 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. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Distillates (petroleum), Hydrotreated Light (CAS 64742-47-8)	TWA	100 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. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear suitable protective clothing.

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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid. Emulsion

Color Not available.

Odor Mild

Odor threshold Not available.

pH Not available.

Melting point/freezing point 32.00 °F (0 °C) =

Initial boiling point and boiling range 347 °F (175 °C) estimated

Flash point > 200.0 °F (> 93.3 °C) >

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 0.7 % estimated

Flammability limit - upper (%) 5 % estimated

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 0.64 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 410 °F (210 °C) estimated

Decomposition temperature Not available.

Viscosity 400 - 3000 cps

Other information

Density	9.01 lbs/gal
Explosive properties	Not explosive.
Flammability class	Combustible IIIB estimated
Oxidizing properties	Not oxidizing.
Pounds per gallon	9.01
Specific gravity	1 - 1.1 @ 20C
VOC	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	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid temperatures exceeding the flash point. 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	No adverse effects due to skin contact are expected.
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.

Information on toxicological effects

Acute toxicity	Not known.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Causes serious eye 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 applicable.
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.

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. 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.

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)
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)
Aspiration hazard

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.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Distillates (petroleum), Hydrotreated Light (CAS 64742-47-8)

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)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
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 03-05-2021

Version # 01

HMIS® ratings
Health: 0
Flammability: 1
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

Section 1. Chemical Product and Company Identification

Product Name:	ChemTreat RL100
Product Use:	Reverse Osmosis Treatment & Membrane Cleaner Product
Supplier's Name:	ChemTreat, Inc.
Emergency Telephone Number:	(800)424−9300 (Toll Free)
Address (Corporate Headquarters):	5640 Cox Road Glen Allen, VA 23060
Telephone Number for Information:	(800)648−4579
Date of SDS:	February 7, 2019
Revision Date:	February 7, 2019
Revision Number:	19020701AN

Section 2. Hazard(s) Identification

Signal Word: **WARNING**

GHS Classification(s):
Eye damage/irritation − Category 2b
Acute Toxicity Dermal − Category 4
Acute Toxicity Inhalation − Category 4
Acute Toxicity Oral − Category 4

Hazard Statement(s):
H320 Causes eye irritation.
H312 Harmful in contact with skin.
H332 Harmful if inhaled.
H302 Harmful if swallowed.

Precautionary Statement(s): This product contains a chelating agent and ingestion of large amounts may cause hypo−calcemic tetany with spontaneous recovery.

Prevention:
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink, or smoke when using this product.
P271 Use only outdoors or in a well−ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.
P337 + P313 If eye irritation persists, get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.

Storage: None.

Disposal: P501 Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations.

System of Classification Used: Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards Not Otherwise Classified: None.

Section 3. Composition/Hazardous Ingredients

Component	CAS Registry #	Wt.%
Ethylene diamine tetraacetic acid, tetrasodium salt	64−02−8	30 − 60
Sodium hydroxide	1310−73−2	0.5 − 1.9
Nitrilotriacetic acid, trisodium salt	5064−31−3	0.1 − 1

Comments If chemical identity and/or exact percentage of composition has been withheld, this information is considered to be a trade secret.

Section 4. First Aid Measures

Inhalation:	Remove to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Eyes:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
Skin:	Wash with plenty of soap and water. Call a poison center or doctor/physician if you feel unwell.
Ingestion:	DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician.
Most Important Symptoms:	N/D
Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary:	N/A

Section 5. Fire Fighting Measures

Flammability of the Product:	Not flammable.
Suitable Extinguishing Media:	Use extinguishing media suitable to surrounding fire.
Specific Hazards Arising from the Chemical:	Use water spray to keep containers cool.
Protective Equipment:	If product is involved in a fire, wear full protective clothing including a positive−pressure, NIOSH approved, self−contained breathing apparatus.

Section 6. Accidental Release Measures

Personal Precautions: Use appropriate Personal Protective Equipment (PPE).

Environmental Precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

Methods for Cleaning up: Contain and recover liquid when possible. Flush spill area with water spray.

Other Statements: If RQ (Reportable Quantity) is exceeded, report to National Spill Response Office at 1−800−424−8802.

Section 7. Handling and Storage

Handling: Wear appropriate Personal Protective Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust.

Storage: Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only.
Do not store or handle in aluminum, zinc, copper, or their alloys.
Store above Freeze Point.

Section 8. Exposure Controls/Personal Protection

Exposure Limits

Component	Source	Exposure Limits
Ethylene diamine tetraacetic acid, tetrasodium salt	N/E	N/E
Sodium hydroxide	ACGIH TLV	2 mg/m³ Ceiling
	OSHA PEL	2 mg/m³ TWA
Nitrilotriacetic acid, trisodium salt	N/E	N/E

Engineering Controls: Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

Personal Protection

Eyes:	Wear chemical splash goggles or safety glasses with full−face shield. Maintain eyewash fountain in work area.
Skin:	Maintain quick−drench facilities in work area. Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.
Respiratory:	If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

Section 9. Physical and Chemical Properties

Physical State and Appearance:	Liquid, Light Straw, Clear
Specific Gravity:	1.295 @ 20°C
pH:	13.7 @ 20°C, 100.0%
Freezing Point:	<−11°F
Flash Point:	N/D
Odor:	Mild
Melting Point:	N/A
Initial Boiling Point and Boiling Range:	220°F
Solubility in Water:	Complete
Evaporation Rate:	<1
Vapor Density:	As Water
Molecular Weight:	N/D
Viscosity:	N/D
Flammability (solid, gas):	N/D
Flammable Limits:	N/A
Autoignition Temperature:	N/A
Density:	10.80 LB/GA
Vapor Pressure:	<17.5
% VOC:	0
Odor Threshold	N/D
n−octanol Partition Coefficient	N/D
Decomposition Temperature	N/D

Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures.

Incompatibility with Various Substances: Strong oxidizers, Acids, Aluminum/aluminum alloys, Zinc.

Hazardous Decomposition Products: Oxides of nitrogen, Ammonia.

Possibility of Hazardous Reactions: None known.

Reactivity: N/D

Conditions To Avoid: N/D

Section 11. Toxicological Information

Acute Toxicity

Chemical Name	Exposure	Type of Effect	Concentration	Species
Ethylene diamine tetraacetic acid, tetrasodium salt	Oral	LD50	3030 MG/KG	Rat
	Dermal	LD50	>5000 MG/KG	Rabbit
Sodium hydroxide	Oral	LD50	300 MG/KG	Rat
	Dermal	LD50	1350 MG/KG	Rabbit

Carcinogenicity Category

Component	Source	Code	Brief Description
Ethylene diamine tetraacetic acid, tetrasodium salt	N/E	N/E	N/E
Sodium hydroxide	N/E	N/E	N/E
Nitrilotriacetic acid, trisodium salt	IARC	IARC−2B	Possibly carcinogenic to humans
	MAK	MAK−3A	Possibly carcinogenic−not conclusive because of lack of data
	NTP	NTP−R	Reasonably anticipated to be a human carcinogen

Likely Routes of Exposure: N/D

Symptoms

Inhalation: N/D

Eye Contact: N/D

Skin Contact: N/D

Ingestion: N/D

Skin Corrosion/Irritation: N/D

Serious Eye Damage/Eye Irritation: N/D

Sensitization: N/D

Germ Cell Mutagenicity: N/D

Reproductive/Developmental Toxicity: N/D

Specific Target Organ Toxicity

Single Exposure: N/D

Repeated Exposure: N/D

Aspiration Hazard: N/D

Comments: None.

Section 12. Ecological Information

Ecotoxicity

Species	Duration	Type of Effect	Test Results
Sheepshead Minnow	96h	LC50	>1000 mg/l
Mysid Shrimp	48h	LC50	>1000 mg/l
Ceriodaphnia dubia	48h	LC50	683 mg/l
Fathead Minnow	96h	LC50	707 mg/l

Persistence and Biodegradability: N/D

Bioaccumulative Potential: N/D

Mobility In Soil: N/D

Other Adverse Effects: N/D

Comments: None.

Section 13. Disposal Considerations

Dispose of in accordance with local, state and federal regulations.
EPA corrosivity characteristic hazardous waste D002 when disposed of in the original product form.

Section 14. Transport Information

Controlling Regulation	UN/NA#:	Proper Shipping Name:	Technical Name:	Hazard Class:	Packing Group:
DOT	UN3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	(ETHYLENE DIAMINE TETRAACETIC ACID, TETRASODIUM SALT AND SODIUM HYDROXIDE)	8	PGIII
TDG	UN3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	(ETHYLENE DIAMINE TETRAACETIC ACID, TETRASODIUM SALT AND SODIUM HYDROXIDE)	8	PGIII
ICAO	UN3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	(ETHYLENE DIAMINE TETRAACETIC ACID, TETRASODIUM SALT AND SODIUM HYDROXIDE)	8	PGIII

Note: When shipped by ground in the U.S., by exception 49 CFR 173.154 (d) (1) not subject to transport as a hazardous material when in authorized packaging that will not react dangerously or be degraded by the corrosive material.

Section 15. Regulatory Information

Inventory Status

United States (TSCA): All ingredients listed.
Canada (DSL/NDSL): All ingredients listed.

Federal Regulations

SARA Title III Rules

Sections 311/312 Hazard Classes

Fire Hazard:	No
Reactive Hazard:	No
Release of Pressure:	No
Acute Health Hazard:	Yes
Chronic Health Hazard:	No

Other Sections

Component	Section 313 Toxic Chemical	Section 302 EHS TPQ	CERCLA RQ
Ethylene diamine tetraacetic acid, tetrasodium salt	N/A	N/A	N/A
Sodium hydroxide	N/A	N/A	1000
Nitrilotriacetic acid, trisodium salt	N/A	N/A	N/A

Comments: None.

State Regulations

California Proposition 65: This product contains chemical(s) known to the State of California to cause cancer and/or to cause birth defects or other reproductive harm: Nitrilotriacetate acid, trisodium salt CAS # 5064−31−3.

Special Regulations

Component	States
Ethylene diamine tetraacetic acid, tetrasodium salt	None.
Sodium hydroxide	MA, MN, NY, PA, WA
Nitrilotriacetic acid, trisodium salt	MA

Compliance Information

NSF: Certified to NSF/ANSI Standard 60
Maximum use rate for potable water − 20 mg/L
This product ships as NSF from:
Ashland, VA
Nederland, TX

Food Regulations: N/A

KOSHER: This product has not been evaluated for Kosher approval.

Halal: This product has not been evaluated for Halal approval.

FIFRA: N/A

Other: None

Comments: None.

Section 16. Other Information

HMIS Hazard Rating

Health:	2
Flammability:	0
Physical Hazard:	0
PPE:	X

Notes: The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha−numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end−user must determine if the code is appropriate for their use.

Abbreviations

Abbreviation	Definition
<	Less Than
>	Greater Than
ACGIH	American Conference of Governmental Industrial Hygienists
EHS	Environmental Health and Safety Dept
N/A	Not Applicable
N/D	Not Determined
N/E	Not Established
OSHA	Occupational Health and Safety Dept
PEL	Personal Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weight Average
UNK	Unknown

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

Revision Date: February 7, 2019

Disclaimer

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SAFETY DATA SHEET

Section 1. Chemical Product and Company Identification

Product Name:	ChemTreat RL2000
Product Use:	Reverse Osmosis Treatment
Supplier's Name:	ChemTreat, Inc.
Emergency Telephone Number:	(800)424−9300 (Toll Free)
Address (Corporate Headquarters):	5640 Cox Road Glen Allen, VA 23060
Telephone Number for Information:	(800)648−4579
Date of SDS:	February 7, 2019
Revision Date:	February 7, 2019
Revision Number:	19020701AN

Section 2. Hazard(s) Identification

Signal Word: **WARNING**

GHS Classification(s):
Acute Toxicity Dermal − Category 5
Acute Toxicity Inhalation − Category 5
Acute Toxicity Oral − Category 5

Hazard Statement(s):
H313 May be harmful in contact with skin.
H333 May be harmful if inhaled.
H303 May be harmful if swallowed.

Precautionary Statement(s): No significant health risks are expected from exposures under normal conditions of use.

Prevention: None.

Response: None.

Storage: None.

Disposal: None.

System of Classification Used: Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Hazards Not Otherwise Classified: None.

Section 3. Composition/Hazardous Ingredients

Component	CAS Registry #	Wt.%
Citric acid	77−92−9	10 − 30
Sodium citrate	68−04−2	3 − 7

Comments If chemical identity and/or exact percentage of composition has been withheld, this information is considered to be a trade secret.

Section 4. First Aid Measures

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

Eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

Skin: Wash with plenty of soap and water. Call a poison center or doctor/physician if you feel unwell.

Ingestion: DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.

Most Important Symptoms: N/D

Indication of Immediate Medical Attention and Special Treatment Needed, If Necessary: N/A

Section 5. Fire Fighting Measures

Flammability of the Product: Not flammable.

Suitable Extinguishing Media: Use extinguishing media suitable to surrounding fire.

Specific Hazards Arising from the Chemical: Use water spray to keep containers cool.

Protective Equipment: If product is involved in a fire, wear full protective clothing including a positive−pressure, NIOSH approved, self−contained breathing apparatus.

Section 6. Accidental Release Measures

Personal Precautions: Use appropriate Personal Protective Equipment (PPE).

Environmental Precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

Methods for Cleaning up: Contain and recover liquid when possible. Flush spill area with water spray.

Other Statements: None.

Section 7. Handling and Storage

Handling: Wear appropriate Personal Protective Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust.

Storage: Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only.
Store above Freeze Point.

Section 8. Exposure Controls/Personal Protection

Exposure Limits

Component	Source	Exposure Limits
Citric acid	N/E	N/E
Sodium citrate	N/E	N/E

Engineering Controls: Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

Personal Protection

Eyes:	Wear chemical splash goggles or safety glasses with full−face shield. Maintain eyewash fountain in work area.
Skin:	Maintain quick−drench facilities in work area. Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.
Respiratory:	If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

Section 9. Physical and Chemical Properties

Physical State and Appearance:	Liquid, Light Straw, Clear
Specific Gravity:	1.110 @ 20°C
pH:	3.5 @ 20°C, 100.0%
Freezing Point:	34°F
Flash Point:	N/D
Odor:	Mild
Melting Point:	N/A
Initial Boiling Point and Boiling Range:	212°F
Solubility in Water:	Complete
Evaporation Rate:	N/D
Vapor Density:	Similar to water
Molecular Weight:	N/D
Viscosity:	N/A
Flammability (solid, gas):	N/D
Flammable Limits:	N/A
Autoignition Temperature:	N/A
Density:	9.26 LB/GA
Vapor Pressure:	Similar to water
% VOC:	0
Odor Threshold	N/D
n−octanol Partition Coefficient	N/D
Decomposition Temperature	N/D

Section 10. Stability and Reactivity

Chemical Stability: Stable at normal temperatures and pressures.

Incompatibility with Various Substances: Strong oxidizers, Strong bases.

Hazardous Decomposition Products: Oxides of carbon.

Possibility of Hazardous Reactions: None known.

Reactivity: N/D

Conditions To Avoid: N/D

Section 11. Toxicological Information

Acute Toxicity

Chemical Name	Exposure	Type of Effect	Concentration	Species
N/D	N/D	N/D	N/D	N/D

Carcinogenicity Category

Component	Source	Code	Brief Description
Citric acid	N/E	N/E	N/E
Sodium citrate	N/E	N/E	N/E

Likely Routes of Exposure: N/D

Symptoms

Inhalation: N/D

Eye Contact: N/D

Skin Contact: N/D

Ingestion: N/D

Skin Corrosion/Irritation: N/D

Serious Eye Damage/Eye Irritation: N/D

Sensitization: N/D

Germ Cell Mutagenicity: N/D

Reproductive/Developmental Toxicity: N/D

Specific Target Organ Toxicity

Single Exposure: N/D

Repeated Exposure: N/D

Aspiration Hazard: N/D

Comments: None.

Section 12. Ecological Information

Ecotoxicity

Species	Duration	Type of Effect	Test Results
Ceriodaphnia dubia	48h	LC50	2176 mg/l
Fathead Minnow	96h	LC50	6830 mg/l

Persistence and Biodegradability: N/D

Bioaccumulative Potential: N/D

Mobility In Soil: N/D

Other Adverse Effects: N/D

Comments: None.

Section 13. Disposal Considerations

Dispose of in accordance with local, state and federal regulations.
Not a RCRA−regulated hazardous waste when disposed in the original product form.

Section 14. Transport Information

Controlling Regulation	UN/NA#:	Proper Shipping Name:	Technical Name:	Hazard Class:	Packing Group:
DOT	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
IMDG	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
ICAO	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A
TDG	N/A	COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID	N/A	N/A	N/A

Note: N/A

Section 15. Regulatory Information

Inventory Status

United States (TSCA): All ingredients listed.
Canada (DSL/NDSL): All ingredients listed.

Federal Regulations

SARA Title III Rules

Sections 311/312 Hazard Classes

Fire Hazard:	No
Reactive Hazard:	No
Release of Pressure:	No
Acute Health Hazard:	Yes
Chronic Health Hazard:	No

Other Sections

Component	Section 313 Toxic Chemical	Section 302 EHS TPQ	CERCLA RQ
Citric acid	N/A	N/A	N/A
Sodium citrate	N/A	N/A	N/A

Comments: None.

State Regulations

California Proposition 65: None known.

Special Regulations

Component	States
Citric acid	None.
Sodium citrate	None.

Compliance Information

NSF: N/A

Food Regulations: N/A

KOSHER: This product has not been evaluated for Kosher approval.

Halal: This product has not been evaluated for Halal approval.

FIFRA: N/A

Other: None

Comments: None.

Section 16. Other Information

HMIS Hazard Rating

Health:	1
Flammability:	0
Physical Hazard:	0
PPE:	X

Notes: The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha−numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end−user must determine if the code is appropriate for their use.

Abbreviations

Abbreviation	Definition
<	Less Than
>	Greater Than
ACGIH	American Conference of Governmental Industrial Hygienists
EHS	Environmental Health and Safety Dept
N/A	Not Applicable
N/D	Not Determined
N/E	Not Established
OSHA	Occupational Health and Safety Dept
PEL	Personal Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weight Average
UNK	Unknown

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

Revision Date: February 7, 2019

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SAFETY DATA SHEET

1. Identification

Product identifier **RL2032**

Other means of identification

Product code C-SERIES™ RL2032

Recommended use Reverse Osmosis and Resin Cleaner

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

Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Causes severe skin burns and eye damage. Causes serious eye damage.

Precautionary statement

Prevention Do not breathe mist/vapors. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response 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. 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	%
Phosphoric Acid		7664-38-2	5 - < 10

Chemical name	Common name and synonyms	CAS number	%
Phosphonic Acid, 1-(1-hydroxyethylidene)bis-		2809-21-4	3 - < 5
Other components below reportable levels			80 - < 90

4. First-aid measures

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

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
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.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically. 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 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. Do not breathe 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
Should not be released into the environment.

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
Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling
Do not breathe mist/vapors. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. 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 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Phosphoric Acid (CAS 7664-38-2)	PEL	1 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value
Phosphoric Acid (CAS 7664-38-2)	STEL	3 mg/m3
	TWA	1 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Phosphoric Acid (CAS 7664-38-2)	STEL	3 mg/m3
	TWA	1 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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Color Amber

Odor Mild

Odor threshold Not available.

pH 0 - 1 @ 20°C

Melting point/freezing point 32.72 °F (0.40 °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

Flammability limit - lower (%) Not available.

Flammability limit - upper (%)	Not available.
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	0 - 200 cps
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	9.21

10. Stability and reactivity

Reactivity	Reacts violently with strong alkaline substances. This product may react with reducing agents.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Do not mix with other chemicals.
Incompatible materials	Bases. Reducing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	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.

Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
Phosphoric Acid (CAS 7664-38-2)		
Acute		
Dermal		
LD50	Rabbit	2740 mg/kg
Oral		
LD50	Rat	1530 mg/kg

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	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	Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
Persistence and degradability	No data is available on the degradability of any ingredients in the mixture.
Bioaccumulative potential	
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. 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

UN number	UN1760
UN proper shipping name	Corrosive liquids, n.o.s. (Phosphoric Acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
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	154
Packaging non bulk	202
Packaging bulk	242
Reportable quantity (RQ lbs)	66667

IATA

UN number	UN1760
UN proper shipping name	Corrosive liquid, n.o.s. (Phosphoric Acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN1760
UN proper shipping name	CORROSIVE LIQUID, N.O.S. (Phosphoric Acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
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)

Phosphoric Acid (CAS 7664-38-2) 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

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.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Phosphoric Acid (CAS 7664-38-2) High priority

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.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Phosphoric Acid (CAS 7664-38-2)

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: Kosher

This product is certified by the Orthodox Unionas Kosher pareve

Only when prepared by the following ChemTreat facilities:
Nederland, TX

Compliance Information: NSF Whitebook

Compliance Information: NSF Standard 60

This product is certified to NSF/ANSI Standard 60 for the following approved function:Membrane Cleaner. This product is designed to be used off-line and flushed out prior to using the system for drinking water. . This product ships as NSF from:

09131 - Nederland TX

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

Issue date	02-17-2023
Revision date	04-03-2023
Version #	02
HMIS® ratings	Health: 3 Flammability: 0 Physical hazard: 0 Personal protection: B
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	Product and Company Identification: Product and Company Identification Composition / Information on Ingredients: Component Summary Physical & Chemical Properties: Multiple Properties Transport Information: Material Transportation Information Regulatory information: Compliance Information:Kosher Regulatory information: Compliance Information:NSF Location (STD-60)
Other information	Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

SAFETY DATA SHEET

1. Identification

Product identifier **RL3400**

Other means of identification

Product code C-SERIES™ RL3400

Recommended use Reverse Osmosis and Resin Cleaner

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

Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Causes severe skin burns and eye damage. Causes serious eye damage.

Precautionary statement

Prevention Do not breathe mist/vapors. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response 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. 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	%
Sodium hydroxide		1310-73-2	1 - < 3
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 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 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.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. 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 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. Do not breathe 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 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 Do not breathe mist/vapors. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. 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
Sodium hydroxide (CAS 1310-73-2)	PEL	2 mg/m3

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m3

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

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	IDLH	10 mg/m3

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

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Color Straw

Odor Mild

Odor threshold Not available.

pH 12 - 14

Melting point/freezing point 20.84 °F (-6.20 °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 -0.01 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

Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	9.99
Specific gravity	1.17 - 1.22 @ 20°C

10. Stability and reactivity

Reactivity	Reacts violently with strong acids. This product may react with oxidizing agents.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Do not mix with other chemicals.
Incompatible materials	Strong acids. Oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	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.

Information on toxicological effects

Acute toxicity Not known.

Components	Species	Test Results
Sodium hydroxide (CAS 1310-73-2)		
Acute		
Dermal		
LD50	Rabbit	1350 mg/kg
Oral		
LD50	Rat	140 - 340 mg/kg

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	Risk of cancer cannot be excluded with prolonged exposure.

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. Prolonged exposure may cause chronic effects.

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.

Components		Species	Test Results
Sodium hydroxide (CAS 1310-73-2)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	>= 34.59 - <= 47.13 mg/l, 48 hours
Fish	LC50	Western mosquitofish (Gambusia affinis)	125 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

UN number UN3266

UN proper shipping name Corrosive liquid, basic, inorganic, n.o.s. (Sodium hydroxide)

Transport hazard class(es)

Class 8

Subsidiary risk -

Label(s) 8

Packing group II

Environmental hazards

Marine pollutant No.

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

Special provisions B2, IB2, T11, TP2, TP27

Packaging exceptions 154

Packaging non bulk 202

Packaging bulk	242
Reportable Quantity (LBS)	18832

IATA

UN number	UN3266
UN proper shipping name	Corrosive liquid, basic, inorganic, n.o.s. (Sodium hydroxide)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN3266
UN proper shipping name	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (SODIUM HYDROXIDE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
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)

Sodium hydroxide (CAS 1310-73-2) 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

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

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Sodium hydroxide (CAS 1310-73-2)

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
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

Not established.

Compliance Information: Kosher

This product is certified by the Orthodox Unionas Kosher pareve

Only when prepared by the following ChemTreat facilities:

Ashland, VA
Nederland, TX

Compliance Information: NSF Whitebook

Compliance Information: NSF Standard 60

This product is certified to NSF/ANSI Standard 60 for the following approved function:Membrane Cleaner. This product is designed to be used off-line and flushed out prior to using the system for drinking water. . This product ships as NSF from:

09131 - Nederland TX
09132 - Ashland VA

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

Issue date	02-23-2023
Revision date	05-23-2023
Version #	03
HMIS® ratings	Health: 3 Flammability: 0 Physical hazard: 0 Personal protection: B
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	Product and Company Identification: Certifications Composition / Information on Ingredients: Ingredients Physical & Chemical Properties: Multiple Properties Physical and chemical properties: Color Regulatory information: Compliance Information:Kosher Location Regulatory information: Compliance Information:NSF Location (STD-60) GHS: Classification
Other information	Prepared by: Product Compliance Department; ProductCompliance@chemtreat.com

SAFETY DATA SHEET

1. Identification

Product identifier **RL9009**

Other means of identification

Product code RL9009

Recommended use Reverse Osmosis 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	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Causes severe skin burns and eye damage. Causes serious eye damage.

Precautionary statement

Prevention Do not breathe mist/vapors. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response 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. 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 19.38% of the mixture consists of component(s) of unknown acute oral toxicity. 26.08% of the mixture consists of component(s) of unknown acute dermal toxicity. 26.08% of the mixture consists of component(s) of unknown acute inhalation toxicity. 24.43% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 24.43% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
2-Butenedioic acid (Z)-, homopolymer		26099-09-2	5 - < 10
2-phosphonobutane-1,2,4-tricarboxylic Acid		37971-36-1	5 - < 10
Diethylenetriaminepenta(methylene Phosphonic Acid), Sodium Salt		22042-96-2	5 - < 10
Other components below reportable levels			80 - < 90

4. First-aid measures

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

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
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.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically. 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 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. Do not breathe 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
Should not be released into the environment.

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
Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Do not breathe mist/vapors. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. 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. OARS. Workplace Environmental Exposure Level (WEEL) Guide

Components	Type	Value	Form
2-phosphonobutane-1,2,4-tricarboxylic Acid (CAS 37971-36-1)	TWA	10 mg/m3	Aerosol.

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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

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.

9. Physical and chemical properties

Appearance Clear

Physical state Liquid.

Form Liquid. Liquid

Color Amber

Odor Mild

Odor threshold Not available.

pH ≥ 1.8 - ≤ 3 @ 100%

Melting point/freezing point 36.50 °F (2.50 °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 -0.01 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

Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Pounds per gallon	9.52
Specific gravity	≥ 1.29 - ≤ 1.14 @ 20C

10. Stability and reactivity

Reactivity	Reacts violently with strong alkaline substances. This product may react with reducing agents.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Do not mix with other chemicals.
Incompatible materials	Bases. Reducing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	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.

Information on toxicological effects

Acute toxicity	Not known.
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	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	Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
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. 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

UN number	UN3265
UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. (2-phosphonobutane-1,2,4-tricarboxylic Acid and Diethylenetriaminepenta(methylene Phosphonic Acid))
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	
Marine pollutant	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	B2, IB2, T11, TP2, TP27
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN3265
UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. (2-phosphonobutane-1,2,4-tricarboxylic Acid and Diethylenetriaminepenta(methylene Phosphonic Acid))
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN3265

UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. (2-phosphonobutane-1,2,4-tricarboxylic Acid and Diethylenetriaminepenta(methylene Phosphonic Acid))
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	Not assigned.
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)

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	Corrosive to metal Skin corrosion or irritation Serious eye damage or eye irritation

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 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

Compliance Information: NSF Whitebook

Compliance Information: NSF Standard 60

This product is certified to NSF/ANSI Standard 60 for the following approved function:RO Antiscalant. Maximum use rate for potable water - 20. This product ships as NSF from:

09132 - Ashland VA
09133 - Eldridge IA
09131 - Nederland TX

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

Issue date	08-09-2022
Revision date	04-11-2023
Version #	02
HMIS® ratings	Health: 1 Flammability: 0 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

Mahnaz Ghamati

From: CERS Automated Messaging - DO NOT REPLY <DoNot.ReplyTo.Cers@calepa.ca.gov>
Sent: Tuesday, February 13, 2024 10:02 AM
To: Mahnaz Ghamati
Subject: Aboveground Petroleum Storage Act for CERS ID 10453255 Accepted By Regulator

Your **Aboveground Petroleum Storage Act** submittal on *January 19, 2024* for *Mojave Solar LLC* (CERS ID 10453255) was **Accepted** by San Bernardino County Fire Department on February 13, 2024. This indicates the regulator has reviewed the submittal element and finds the data/documents meet state and local reporting requirements. The regulator has not necessarily field-verified the submitted data. Any comments from the regulator are shown below.

Accepted pending field verification. If you have any questions, please contact Aleasha Enciso at aenciso@sbcfire.org or (909) 386-8401.

Facility Name: Mojave Solar LLC
CERS ID: 10453255
Facility Address: 42134 Harper Lake Rd, Hinkley, CA 92347

This is an automated email sent from the CERS System. Please DO NOT REPLY.

Mahnaz Ghamati

From: CERS Automated Messaging - DO NOT REPLY <DoNot.ReplyTo.Cers@calepa.ca.gov>
Sent: Tuesday, February 13, 2024 10:07 AM
To: Mahnaz Ghamati
Subject: Emergency Response and Training Plans for CERS ID 10453255 Accepted By Regulator

Your **Emergency Response and Training Plans** submittal on *January 22, 2024* for *Mojave Solar LLC* (CERS ID 10453255) was **Accepted** by San Bernardino County Fire Department on February 13, 2024. This indicates the regulator has reviewed the submittal element and finds the data/documents meet state and local reporting requirements. The regulator has not necessarily field-verified the submitted data. Any comments from the regulator are shown below.

Accepted pending field verification. If you have any questions, please contact Aleasha Enciso at aenciso@sbcfire.org or (909) 386-8401.

Facility Name: Mojave Solar LLC
CERS ID: 10453255
Facility Address: 42134 Harper Lake Rd, Hinkley, CA 92347

This is an automated email sent from the CERS System. Please DO NOT REPLY.

Mahnaz Ghamati

From: CERS Automated Messaging - DO NOT REPLY <DoNot.ReplyTo.Cers@calepa.ca.gov>
Sent: Tuesday, February 13, 2024 10:21 AM
To: Mahnaz Ghamati
Subject: Facility Information for CERS ID 10453255 Accepted By Regulator

Your **Facility Information** submittal on *February 13, 2024* for *Mojave Solar LLC* (CERS ID 10453255) was **Accepted** by San Bernardino County Fire Department on February 13, 2024. This indicates the regulator has reviewed the submittal element and finds the data/documents meet state and local reporting requirements. The regulator has not necessarily field-verified the submitted data. Any comments from the regulator are shown below.

Accepted pending field verification. If you have any questions, please contact Aleasha Enciso at aenciso@sbcfire.org or (909) 386-8401.

Facility Name: Mojave Solar LLC
CERS ID: 10453255
Facility Address: 42134 Harper Lake Rd, Hinkley, CA 92347

This is an automated email sent from the CERS System. Please DO NOT REPLY.

Mahnaz Ghamati

From: CERS Automated Messaging - DO NOT REPLY <DoNot.ReplyTo.Cers@calepa.ca.gov>
Sent: Tuesday, February 13, 2024 10:03 AM
To: Mahnaz Ghamati
Subject: Facility Information for CERS ID 10453255 Not Accepted By Regulator

DO NOT REPLY directly to this automated email sent from the CERS System. Direct any response to your local regulator.

Your **Facility Information** submittal on *January 22, 2024* for *Mojave Solar LLC* (CERS ID 10453255) was **Not Accepted** by *San Bernardino County Fire Department* on February 13, 2024. This indicates the regulator has reviewed the submittal element and finds the data/documents do not meet state and local reporting requirements. The regulator's review comments are shown below.

SUPERSEDED: The information in this submittal is no longer current. A more recent submittal has been submitted and will be reviewed. No further action is required for this submittal. If you have any questions, please contact Aleasha Enciso at aenciso@sbcfire.org or (909) 386-8401.

Facility Name: Mojave Solar LLC
CERS ID: 10453255
Facility Address: 42134 Harper Lake Rd, Hinkley, CA 92347

This is an automated email sent from the CERS System. Please DO NOT REPLY.

Mahnaz Ghamati

From: CERS Automated Messaging - DO NOT REPLY <DoNot.ReplyTo.Cers@calepa.ca.gov>
Sent: Tuesday, February 13, 2024 10:00 AM
To: Mahnaz Ghamati
Subject: Hazardous Materials Inventory for CERS ID 10453255 Accepted By Regulator

Your **Hazardous Materials Inventory** submittal on *January 19, 2024* for *Mojave Solar LLC* (CERS ID 10453255) was **Accepted** by San Bernardino County Fire Department on February 13, 2024. This indicates the regulator has reviewed the submittal element and finds the data/documents meet state and local reporting requirements. The regulator has not necessarily field-verified the submitted data. Any comments from the regulator are shown below.

CONDITIONALLY ACCEPTED. This submittal was accepted, however the following must be corrected: ** Must mark “No” to trade secret for items on hazardous materials inventory. If item is a trade secret, a trade secret disclosure form must be submitted for review. ** If you have any questions, please contact Aleasha Enciso at aenciso@sbcfire.org or (909) 386-8401.

Facility Name: Mojave Solar LLC
CERS ID: 10453255
Facility Address: 42134 Harper Lake Rd, Hinkley, CA 92347

This is an automated email sent from the CERS System. Please DO NOT REPLY.

Mojave Solar LLC
42134 Harper Lake Road
Hinkley, California 92347
Phone: 760 308 0400

Appendix O

HAZ-6

Site Security

January 25, 2024

Submitted Electronically

ATTN: California Energy Commission
RE: Affidavit of Compliance for Project Owners

To Whom it May Concern:

I, Ryan Carkhuff, People & Culture Manger, do hereby certify that background investigations to ascertain the accuracy of the identity of all employees of:

Mojave Solar LLC, ASI Operations LLC

for employment at:

Mojave Solar Project
42134 Harper Lake RD
Hinkley, CA

have been conducted as required by the California Energy Commission for the above-named project.

Dated this 25 day of January 2024.

Signature

25 ene.. 2024
Date

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

UNIVAR SOLUTIONS SECURITY PROGRAM

As an international distributor of industrial chemicals, a participant in the National Association of Chemical Distributors Responsible Distributor program, and an active member of the communities we serve, Univar Solutions USA LLC (Univar) has long had policies and procedures in place to ensure the security of our products, facilities, employees and communities. The following summary outlines the major provisions of Univar's Security Program which reflects not only prudent measures to maximize the secure and safe handling of chemicals, but also the security requirements of various federal programs related to management of hazardous materials including DOT hazardous material transportation requirements, DHSCFAT program and Department of Commerce import rules among others. Note that this description is necessarily a broad overview of Univar's security program as various agencies limit the security related information that can be disclosed.

For our business partners that are C-TPAT certified please consider the following outline a demonstration of the degree to which Univar complies with C-TPAT security criteria.

BUSINESS PARTNER REQUIREMENT

Univar has a written and verifiable process for the selection of business partners including manufacturers, product suppliers and vendors. Other internal requirements such as; capability of meeting contractual security requirements and financial soundness are included in the verification process.

POINT OF ORIGIN

Univar ensures its foreign business partners have security criteria in place that enhances the integrity of the shipment at point of origin. Periodic reviews of foreign business partners' processes and facilities are conducted based on risk.

CONTAINER SECURITY

Container integrity is maintained as mandated by international cargo transport laws and regulations.

EN ROUTE SECURITY

Hazardous cargo is secured while in transit. Additionally, products and routes are annually evaluated to assess potential security risks.

COMMON CARRIER EVALUATION

In addition to the above security measures, Univar has taken steps to verify our common carriers' compliance with DOT's HM-232 rules. Each common carrier has been asked to certify their security compliance with regards to HM-232.

PERSONNEL SECURITY

Personnel security begins with hiring qualified employees. Univar has established policies and procedures to ensure we hire and maintain qualified employees. These policies and procedures include, but are not limited to:

- Pre-employment background checks
- Pre-employment and random drug tests for drivers and warehouse staff
- Policy on "Standards of Conduct" (included in the Employee Handbook)
- Policy on "Confidential Information" (included in the Employee Handbook)
- Checkout procedures for terminating employees
- Referral of illegal or criminal activities to law enforcement

PHYSICAL ACCESS CONTROLS & SECURITY, PROCEDURAL & IT SECURITY

SECURITY & VULNERABILITY ASSESSMENT

Due to the hazardous nature of the chemicals we manage and distribute, Univar constantly assesses its security and vulnerability concerning internal or external threats that could potentially disrupt operations or harm our employees, communities or the environment. Univar's security program addresses the following potential sources of loss or disruption:

- Theft, vandalism, and break-ins
- Theft of confidential business information
- Sabotage of equipment, utilities, and records
- Product contamination and tampering
- Bomb threats
- Civil unrest disrupting plant access and operations
- Workplace violence and assaults

Additionally, Univar has developed a risk-based matrix to identify areas of concern and has taken steps to address those areas of concern.

The initial security evaluations periodically reviewed by the site security official to evaluate the integrity and effectiveness of security policies, procedures and systems.

UNAUTHORIZED ACCESS

Univar has established minimum facility security guidelines that must be implemented and adhered to by each facility. Those minimum guidelines include but are not limited to:

- Perimeter and warehouse security
- Equipment security
- Access controls for production areas, warehouses, utility facilities, and offices
- Signs to direct visitors and vehicles to the appropriate entry points
- Visitor control

Univar employees have been trained to question unescorted person(s) within the operating areas, and to be watchful for unusual activity on company property or in the immediate surrounding areas.

SITE SECURITY COORDINATOR

Each Univar facility has designated an employee, and an alternate, as the site security coordinator. This person(s) is responsible for performing the following security management functions:

- Prepare and implement a site specific security program consistent with the requirements herein
- Establish relationships with law enforcement and emergency response agencies
- Manage incident reporting procedures, conduct incident investigations, and if necessary, conduct investigations into breaches of company security policy
- Train employees about security awareness
- Address security issues in an emergency, participate in crisis management planning and ensure appropriate execution in emergency
- Periodically reassess the facility's site security program

TRAINING

The Security Coordinator or his/her designee will train site personnel upon hire and every three years thereafter on the site security program. At a minimum, training includes:

- Company security objectives
- Specific site security procedures:
    - Product integrity
    - Personnel security
    - Facility security
    - En-route security
- Employee responsibilities

Should you have any general questions regarding Univar site and transit security program, please contact Jack Spicuzza, Vice President, North America Environnmental, Health, Safety and Quality at (614)309-8728 or Jeff Dixon, Director, International Trade Services at (281)543-8771.

Respectfully,

Jack Spicuzza

Jack Spicuzza
Vice President, North America Environmental, Health, Safety and Quality

Univar Solutions | 3075 Highland Pkwy #200 | Downers Grove, IL 60515 | USA

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I, Krista Harsono, Compliance Director

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.802 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

Advanced Chemical Transport LLC DBA ACTenviro

(Company name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

Krista W. Harsono

(Signature of officer or agent)

Dated this 10th day of January, 20 25.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I, Mark Lehner, Area Vice President

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.802 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

Airgas USA LLC.

(Company name)

for hazardous materials delivery to

Compressed Gases and Carbon Dioxide to Mojave Solar LLC Hinkley CA.

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

(Signature of officer or agent)

Dated this 14 day of January, 2025.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I, MARY DESCARO

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.802 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

BECK OIL, INC.

(Company name)

for hazardous materials delivery to

MOJAVE SOLAR LLC. HINKLEY, CA.

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

Mary Descaro

(Signature of officer or agent)

Dated this TWENTY-FIFTH day of JANUARY, 20 24.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

January 28, 2025

To Whom It May Concern:

This letter serves to confirm that all ChemTreat associates must successfully complete a preemployment background check as a condition of employment offer.

For additional questions, please do not hesitate to reach out to me.

Natalie Ferguson
HR Manager, North America Commercial
5640 Cox Road | Glen Allen, VA 23060
(**m**) 804-774-1899

Desert
Environmental
Services, Inc.

Jan 10, 2025

I, Erica Timmons, Office Manager hereby certify that a background investigation to insure the accuracy of the identity and employment of all Employees of:

Desert Environmental Services, Inc.

For employment at:

Mojave Solar, LLC
42134 Harper Lake Road
Hinkley, CA 92347

Has been concluded as required by the California Energy Commission for the above referenced project.

Erica Timmons

This affidavit of compliance shall be appended to this Project Security Plant and shall be retained at all times at the project site for review by the California Energy Commission Compliance Project Manager.

Mojave Solar LLC
42134 Harper Lake Road
Hinkley, California 92347
Phone: 760 308 0400

Appendix P

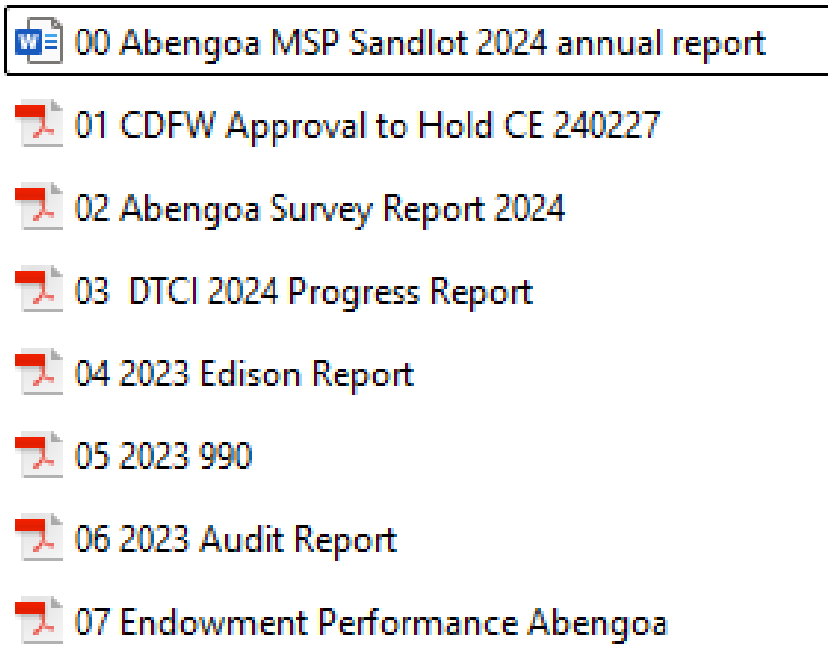
LAND-1

Farmland Mitigation

Abengoa Mojave Solar Project Mitigation Property and Edison Sandlot Transmission Upgrade Mitigation Property 2024 Annual Report

Transition Habitat Conservancy
PO Box 721300, Pinon Hills, CA 92372
(661) 603-2247
Prepared by Sam Easley
Sam@TransitionHabitat.org

Table of Contents



Background

Transition Habitat Conservancy (THC) is a Land Trust Alliance-accredited organization committed to the conservation of protected species and their habitat. THC owns and manages lands within the Bureau of Land Management (BLM) designated Limited Use area of the Fremont-Kramer (F-K) and Superior-Cronese (S-C) which overlaps with the U.S. Fish and Wildlife Service (USFWS) designated Critical Tortoise Habitat Units (CHU).

The **Limited Use** designation permits off-highway vehicle (OHV) access on designated BLM routes, presenting unique challenges for land management. Due to the region's historically complex checkerboard landownership—including properties managed by BLM, Fort Irwin Military Base, China Lake Naval Weapons Center, California Department of Fish and Wildlife (CDFW), THC, Wildlands Inc., and others—effective habitat management has required a multi-faceted approach.

Through years of experience, THC has identified a strategic combination of actions that have significantly improved habitat conditions in this sensitive area. These actions include:

1. **Regular presence** of conservation staff and stewards
2. **Route signage** to guide responsible recreation
3. **Public education** on responsible desert use
4. **Collaboration with law enforcement** to deter illegal activities
5. **Habitat restoration efforts**, including the disguise and closure of unauthorized routes

This comprehensive, adaptive management approach has yielded measurable improvements in habitat quality within the Limited Use region. To support these efforts, THC regularly monitors the region from September through May, aligning with peak recreational use periods.

In 2024, a combination of funding from the **SB 34 Endowment** and **California State Parks OHV Green Sticker Grants** enabled THC to sustain staffing and deploy restoration crews on its lands. These crews conducted targeted habitat restoration, enhancing ecosystem resilience both on THC-owned properties and within the broader landscape. A key achievement included the installation of protective fencing at both ends of a unique canyon, successfully preventing vehicle access to one of the only available wildlife water sources within miles.

THC remains committed to the long-term conservation of these critical habitat areas and continues to refine its management strategies to balance ecological preservation with responsible public access.

Exhibit 01 CDFW Approval to hold CE 240227

Transition Habitat Conservancy (THC) acquired fee title to 234 acres owned by Solucar Inc., a subsidiary of Abengoa, in August of 2014. This acquisition serves to mitigate for the loss of desert tortoise habitat from the construction of the Abengoa Mojave Solar Project and the transmission upgrades for Edison known as Sandlot. THC manages and monitors the land use of the property in perpetuity in order to detect changes harmful to the habitat values of the property, and to take action when necessary to correct these issues. This mitigation satisfies the following permits:

- **For Mojave Solar: The Abengoa Mojave Solar Project ("AMSP")** in San Bernardino County, California, pursuant to California Energy Commission ("CEC") License Decision CEC-800-2010-008-CMF, dated September 2010 (the "CEC License Decision") (hereinafter "AMSP Requirements")
- **For SCE: Incidental Take Permit No. 2081-2011-055-06 (the "ITP")** issued by the California Department of Fish and Wildlife ("CDFW") for the Special Protection System for the Abengoa Mojave Solar Project ("SPS Project") and Lockhart Substation Project CPUC A.11-05-006, State Clearinghouse Number 2011051041, July 2011 (hereinafter "SPS Upgrade Requirements")

THC continues to acquire conserved land in this region, which now requires CDFW approval for each mitigation project. In 2024, THC received approval to hold the CE on a new conservation bank for DT/MGS.

Annual Monitoring

Monitoring of all parcels occurred in 2024. Most of our monitoring was accomplished using satellite imagery provided through the LENS program. This was done for a variety of reasons from cost-effectiveness to safety of our staff. However, we also monitored hundreds of restoration sites along the legal route system in this area and oversaw restoration crews in the field. Our staff spent dozens of days patrolling our lands and adjacent public land. To view a full report, open the file:

Exhibit 02 Abengoa Survey Report 2024

Tortoise Surveys and Plans

In 2023 Edison International provided a $20,000 grant to Transition Habitat Conservancy (THC) for a multi-faceted research project on a tortoise "hotspot" on these mitigation parcels, as well as adjacent conservation land. Prior research by Hardshell Labs, administered by THC, had identified this approximately one square mile area as having an exceptionally dense tortoise population and one with very good demographic characteristics. The grant was acquired in 2023, and project activities occurred throughout 2023-2024. Multiple years of grant received from Edison has also led to a scaled-up proposal that we presented to the Wildlife Conservation Board at their November meeting. We were awarded $1.9 million to continue studying these "hotspots" and testing innovative conservation technologies for use in desert tortoise habitat protection. Please see the attached update for more detail on the great work that we've been up to in 2024 since receiving that WCB grant.

New (and continuing) threats in 2024

The Desert Tortoise Conservation Implications of Widespread Marijuana Cultivation in the West Mojave Desert

Many of these operations seem to have been raided, shut down, or abandoned since they were first observed a few years ago. It appears that most of the illegal activity has ceased or slowed down, with one known active operation in the area. Impacts remain, such as cleared vegetation from the foot print of the operation and heavy vehicular travel from access. Left behind are copious abandoned structures, chemicals, and other potentially hazardous waste. The following points should be considered when examining continued threats from these grow operations.

- **Conservation Investment**

There has been a huge investment in desert tortoise conservation in the Fremont-Kramer Critical Tortoise Habitat Unit by federal, state, and conservation organizations; this area should be a top priority for enforcement efforts. Conservation investment allows for military base expansion and renewable energy and power transmission development in the west Mojave desert. Failure to protect this habitat will degrade lands already purchased for mitigation and prevent future mitigation efforts. These vital mitigation lands allow for development.

- **Habitat destruction**

Clearance of the footprint of the greenhouses and their support structures along with the establishment of many new roads providing access to remote grow ops result in direct habitat destruction, further reducing the habitat available to tortoises. Even though operations have been mostly shut down, there has not been guidance about how to move forward with restoring their massive impacts. Trash is spreading from these abandoned structures and (possibly toxic) dust is blowing across the desert where families are camping and riding.

- **Habitat degradation**

The damage to tortoise habitat has already occurred and restoration will take decades, if not longer, without some kind of intervention. We need funding for cleanups on private land or some kind of mechanism to acquire those parcels with management funding. This will be a major project, but it is a blight on our landscape to not clean up this mess.

Solar Facility Expansion

During Summer of 2024, ground was broken for an expansion within the Mojave Solar Project adjacent to one of the most dense tortoise populations in the area. This project expanded from the existing solar facility to the West, over Hoffman road towards our Abengoa “hotspot.” Multiple tortoises (approximately 6) were translocated to a different area and a few acres of mixed creosote and alkali bush habitat was lost during this expansion. We will be monitoring the impacts to the population within our project area.

Annual Land Monitoring

Annual Monitoring of all parcels occurred in 2024. M of our monitoring was accomplished using satellite imagery provided through the LENS program. This was done for a variety of reasons, from cost-effectiveness to the safety of our staff. We have maintained our contract with the military for drone use within the restricted airspace for as needed follow up visits. We also visited approximately 20% of our properties on the ground, as we are required by the LTA to complete in-person visits of every fee-title owned parcel every five years.

Annual Restoration Completed

We've been taking a systematic approach to tackling incursions in the Critical Habitat Unit by mapping out every restoration site that we have ever worked on and revisiting them twice a year to note the status of our restoration. We have learned that most sites require multiple touch-ups or revisits to secure them against future incursions. This means that we are constantly aware of which regions need the most attention and we can send our contracted crews and staff directly to where their labor is needed. In 2024, an ACE crew installed a fence at Husky's Monument and just south of Bird Springs canyon with assistance from the BLM in efforts to protect the precious water source and cultural resources within the area and enforce the recent route closure. With the route passing directly through the spring, the water source was stressed with altered erosion, overall destruction, and potential contamination from vehicles. This water source was also a source of water for indigenous peoples, where cultural resources remain in and around the spring. A 300-foot hard barrier was placed at the North end near Husky's Monument, and a 200 foot hard barrier was placed just south of the spring allowing people to still access it on foot. This project is to be expanded in the future to improve compliance of vehicular use in the area. The ACE crew also assisted with restoration sites near Husky's monument and one of the dry lake beds.

Tortoise Surveys and Plans

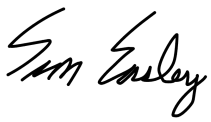
The Desert Tortoise Council awarded THC a $9,000 grant to Transition Habitat Conservancy (THC) for tortoise and vegetation surveys to reveal new tortoise "hot spot" characterization and identification on THC land. THC has also been awarded $1.9 million to expand studies within known "hotspots" and test innovative conservation technologies for use in desert tortoise habitat protection. 2024 was the pilot year for dandelion planting, vegetation surveys, and tortoise surveys. Please see the attached workplans for more detail on our planned grant activities on these lands.

Financials

THC had Audited Financial Statements produced by an independent CPA and those are attached. This year, our Authorization to Hold Mitigation Lands from CDFW was renewed in order to hold the Conservation Easement on the West Harper Lake Conservation Bank, authorization is attached. This process is now required on a per-project basis. THC's financial position is strong thanks to rebounding endowment performance, successful grant proposals, charitable contributions, ongoing mitigation work, and shrewd investments elsewhere. Tax returns and endowment performance are also attached as exhibits below.

Exhibits
05. 2023 990
06. 2023 Audit Report
07. Endowment Performance Abengoa

Sincerely Yours,



Sam Easley, Executive Director
Transition Habitat Conservancy
(661) 603-2247
Sam@transitionhabitat.org
PO Box 721300
Pinon Hills, CA 92372

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

February 27, 2024

Jill Bays
President
Transition Habitat Conservancy
1681 Hillview Rd.
Pinion Hills, CA 92372
Jill@TransitionHabitat.org

APPROVAL FOR TRANSITION HABITAT CONSERVANCY TO HOLD CONSERVATION EASEMENT FOR WEST HARPER CONSERVATION BANK 1798-2022-01-R6

Dear Jill Bays:

The Inland Deserts Region of California Department of Fish and Wildlife (CDFW) received a proposal for Transition Habitat Conservancy (THC) to hold the Conservation Easement for the West Harper Conservation Bank 1798-2022-01-R6 (Project). Pursuant to Government Code § 65967(c) and its regulatory authority under the Fish and Game Code, CDFW has exercised the required due diligence process in reviewing the qualifications and supporting documentation for THC. We are pleased to inform you that THC is approved to hold the Conservation Easement for this Project.

This approval is contingent on accuracy of the information provided. THC must notify CDFW (at mitland@wildlife.ca.gov) of any substantial changes, including but not limited to, staff/consultant oversight or management of the project, business status, and financial status. At such point, CDFW will provide information on the documentation needed to reevaluate THC's qualifications.

CDFW's regional staff reviews a proposed entity's qualifications for specific projects on a project-by-project basis. If THC is proposed to hold a conservation easement or manage and steward mitigation land for another project, CDFW regional staff will conduct a separate project specific review. CDFW may request additional documentation or updates to the information previously submitted for their review.

If you have questions, please contact Marina Barton at marina.barton@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Kim Freeburn
84F92FFEEFD24C8...

Kim Freeburn
Environmental Program Manager
Inland Deserts Region

cc: Wildlands
Shiree Rezendes, Asst. Conservation Planner
srezendes@heronpacific.com

ec: California Department of Fish and Wildlife

Habitat Conservation Planning Branch
mitland@wildlife.ca.gov

Crystal Leininger
Senior Land Agent
Crystal.Leininger@wildlife.ca.gov

Marina Barton
Senior Environmental Scientist (Specialist)
Marina.Barton@wildlife.ca.gov

Transition Habitat CONSERVANCY

Abengoa Annual Monitoring Survey

Contents

Executive Summary

The Transition Habitat Conservancy (THC) acquired fee title to 234 acres owned by Solucar Inc., a subsidiary of Abengoa, in August of 2014. This acquisition serves to mitigate for the loss of desert tortoise habitat from the construction of the Abengoa Mojave Solar Project and the transmission upgrades for Edison known as Sandlot. THC manages and monitors the land use of the property in perpetuity in order to detect changes harmful to the habitat values of the property, and to take action when necessary to correct these issues. This mitigation satisfies the following permits:

- **For Mojave Solar: The Abengoa Mojave Solar Project ("AMSP")** in San Bernardino County, California, pursuant to California Energy Commission ("CEC") License Decision CEC-800-2010-008-CMF, dated September 2010 (the "CEC License Decision") (hereinafter "AMSP Requirements")
- **For SCE: Incidental Take Permit No. 2081-2011-055-06 (the "ITP")** issued by the California Department of Fish and Wildlife ("CDFW") for the Special Protection System for the Abengoa Mojave Solar Project ("SPS Project") and Lockhart Substation Project CPUC A.11-05-006, State Clearinghouse Number 2011051041, July 2011 (hereinafter "SPS Upgrade Requirements")

The parcels subject to this monitoring parcel are owned by the Transition Habitat Conservancy and are subject to a Conservation Easement with specific conservation values described in the section "Legal Description of Property and Conservation Values." In order to ensure these specific conservation values are upheld, yearly monitoring is prescribed.

Monitoring Plan: Annual Monitoring of all parcels occurred in 2024. Most of our monitoring was accomplished using satellite imagery provided through the LENS program. This was done for a variety of reasons from cost-effectiveness to the safety of our staff.

The parcels were also visited several times throughout the year due to its accessible location and various tortoise surveys that occurred on the property. The large number of informal visits throughout the year ensures that we have a very good understanding about what is happening on this property. Other than three designated routes that traverse the parcels, there were no new observed land uses on the property.

Property Description Sandlot

Conservation Area Name: Fremont-Kramer Desert Wildlife Management Area

Assessor Parcel No: 0490-222-39 (previously 0490-184-48)

Acres: ± 102 acres

Landowner: Transition Habitat Conservancy

Conservation Easement Grantee: California Department of Fish and Wildlife

Summarized Legal Description: The property is a portion of the W½ of the E½ of Sections 23 and 26, Township 11 North, Range 5 West, San Bernardino Base and Meridian, County of San Bernardino, State of California.

Property Description MSP

Assessor Parcel No(s): 0490-222-39 (previously 0490-223-35 & 0490-223-37)

Acres: 73 ± acres (0490-223-35) and 58 ± acres (0490-223-37)

Total acreage: 132.78 ± acres

Landowner: Transition Habitat Conservancy

Conservation Easement Grantee: California Department of Fish and Wildlife

Summarized Legal Description: The property is a portion of the W½ of the E½ of Sections 23 and 26, Township 11 North, Range 5 West, San Bernardino Base and Meridian, County of San Bernardino, State of California. USGS Quadrangle: 1986, 7.5-minute series, Lockhart, California Quadrangle, provisional edition.

Directions to Property: From Kramer Junction, CA, travel east on CA Highway 58 for approximately 13 miles. Turn north and travel on Harper Lake Road for approximately seven miles. Turn west on Hoffman Road and travel for approximately 2.4 miles to reach the east boundary of the property.

Monitor(s): Allie Anderson, Sarah Berryman, and Tim Shields

Date of inspection: May 13, 2024 (image from 5/5/24) and informally throughout the year

Season of Inspection: Summer 2024

Legal Description of Property and Conservation Values

Parcel APN 0490-184-48 is located in the valley surrounding Harper Dry Lake, three miles west of Harper Dry Lake and 19 miles northwest of Barstow, California. The Easement Area rests on the relatively flat bajada draining into Harper Dry Lake. The Easement Area consists of one assessor parcel located within Township 11 North, Range 5 West, San Bernardino Base and Meridian, County of San Bernardino, State of California, and is described as the southeast quarter of Section 23 excepting therefrom the north half of the north half of said southeast quarter, also excepting therefrom the easterly 1,700 feet of the southeast quarter of said Section 23, together with the northeast quarter of Section 26 excepting therefrom the easterly 1,700 feet of said northeast quarter.

The Easement Area is within the Fremont-Kramer Desert Wildlife Management Area and forms a portion of THC's Lockhart Ecological Reserve. The Easement Area conserves critical habitat for the federally threatened desert tortoise and the state-listed Mohave ground squirrel, and also provides protection for special vegetation communities, including shadscale and spinescale scrub. The terrain on the parcel is relatively level with a slight downward gradient to the northeast. The elevation ranges between 2,090 and 2,130 feet above mean sea level.

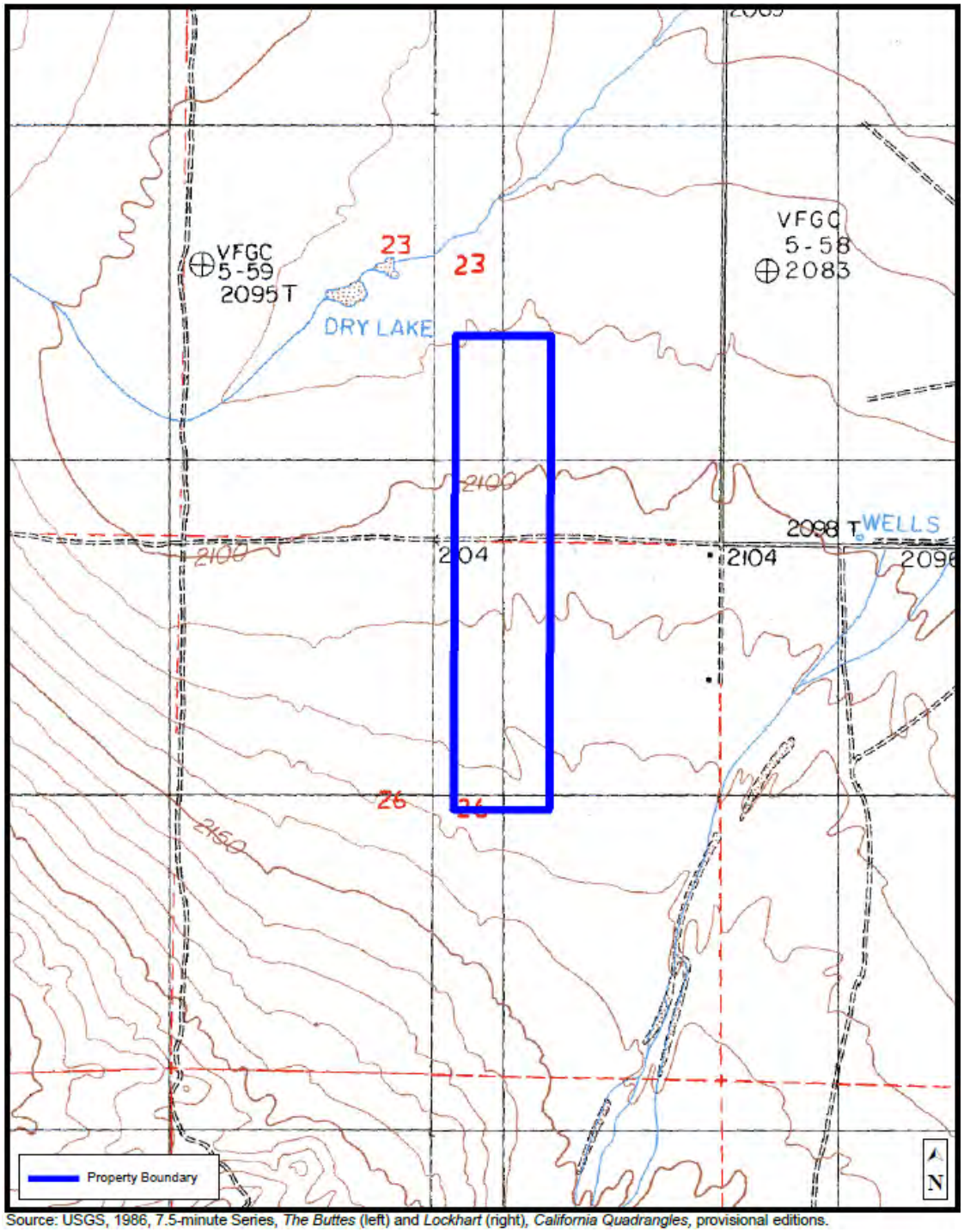
The specific Conservation Values as described in the Conservation Easement are: land being in an unimproved natural condition, with high quality habitat for desert tortoise, Mohave ground squirrel, and containing shadscale scrub intergrading with spinescale scrub.

Parcels APN 0490-223-35 and APN 0490-223-37, These parcels are located in the valley surrounding Harper Dry Lake, three miles west of Harper Dry Lake and 19 miles northwest of Barstow, California. The parcels rest on the relatively flat bajada draining into Harper Dry Lake but contain low hills in its northernmost one-quarter. The two parcels are located within Township 11 North, Range 5 West, San Bernardino Base and Meridian, County of San Bernardino, State of California, and are described as the north half of the north half of the east half of Section 23, excepting therefrom the easterly 1,700 feet, together with the south half of the north half of the east half of Section 23, excepting therefrom the easterly 1,700 feet, together with the north half of the north half of the south half of the east half of Section 23, excepting therefrom the easterly 1,700 feet (APN 0490-223-35) and the east half of the south half of Section 14, excepting therefrom the easterly 1,700 feet (APN 0490-223-37).

The Easement Area is within the Fremont-Kramer Desert Wildlife Management Area and forms a portion of THC's Lockhart Ecological Reserve. The properties conserve critical habitat for the federally threatened desert tortoise and the state-listed Mohave ground squirrel and provide protection for the burrowing owl and other special-status plant and animal species. The terrain of the Easement Area is relatively level in the southern three-quarters and contains low, rocky hills in the northern one-quarter, with an overall downward gradient to the northeast. The elevation ranges between 2,080 and 2,250 feet above mean sea level.

The specific Conservation Values as described in the Conservation Easement are: land being in a natural condition, with high quality habitat for desert tortoise, Mohave ground squirrel, burrowing owl, and other special-status plant and animal species.

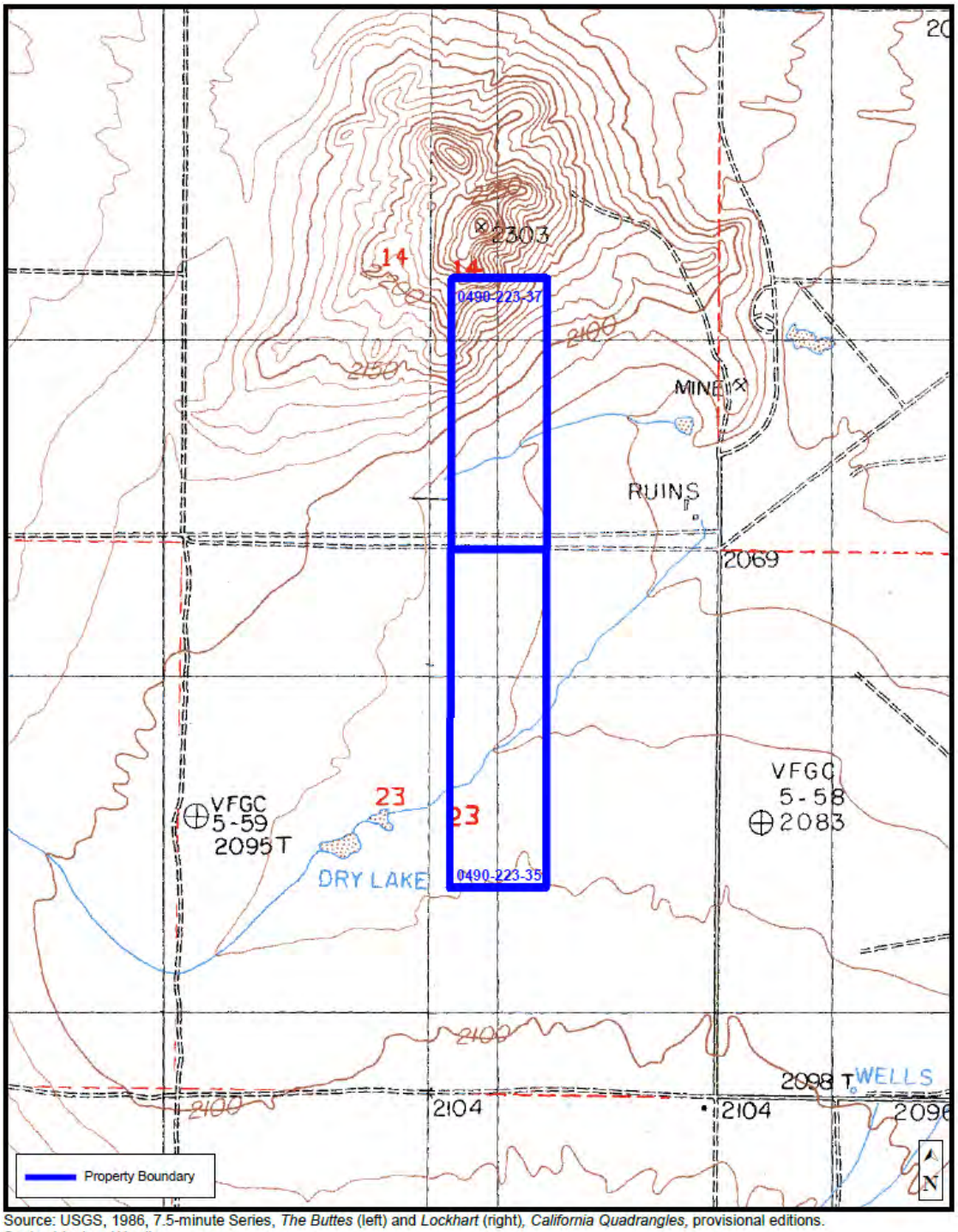
Location Maps



Source: USGS, 1986, 7.5-minute Series, *The Buttes* (left) and *Lockhart* (right), *California Quadrangles*, provisional editions.

FIGURE 1. Aerial view of parcel 0490-184-48

Location Maps



Source: USGS, 1986, 7.5-minute Series, *The Buttes* (left) and *Lockhart* (right), *California Quadrangles*, provisional editions.
Scale: 1 inch = 1/4 mile

FIGURE 2. Aerial view of parcel 0490-223-35 and 0490-223-37

Summary of Site Inspection

Inspection Items	None	Onsite	Nearby
Landscape Alterations	X		
Roads, paved	X		
Dump areas of any kind	X		
Utility lines outside existing locations	X		
Wells and/or other water developments outside existing locations	X		
Structures of any type except fencing	X		
Mines, shafts, pits	X		
Pipelines (water or otherwise) outside existing locations	X		
Billboards	X		
Off-Road Vehicle Use		X	X
Physical Improvements of Any Kind	X		
Grading or excavation	X		
Commercial uses	X		

Summary Land Use Changes Observed

Persistent tracks on an old roadbed along the western boundary of parcel 0490-223-37 but no recent trespass is observed heading onto the property. The main vehicle route in the area that passed through this tortoise hotspot was decommissioned and disguised by THC in 2021 and touched up by more volunteers in 2023. No other land uses of note.

Signature Page

Prepared by:

Name: Allie Anderson **Signature:** Alexandra Anderson **Date:** 01/29/2025

Title: Conservation Biologist

Approved by:

Name: Sam Easley **Signature:** **Date:**

Title: Executive Director

Detailed Monitoring Report

See following pages.

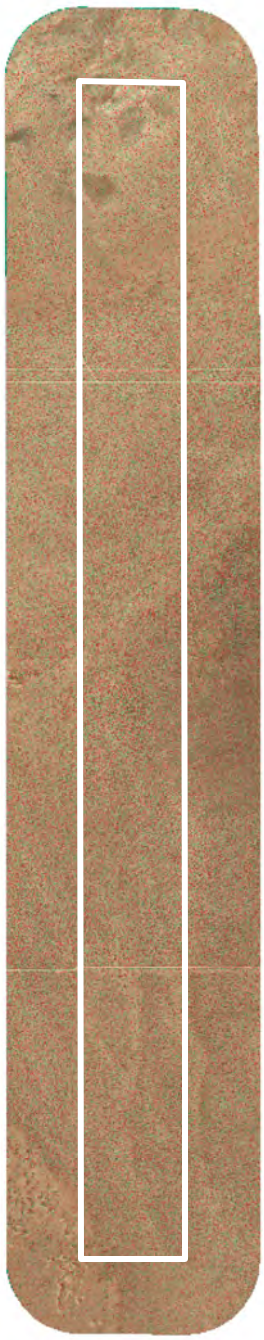
AbengoaA - Fremont-Kramer

Remote Monitoring Report

Transition Habitat Conservancy

December 30, 2024

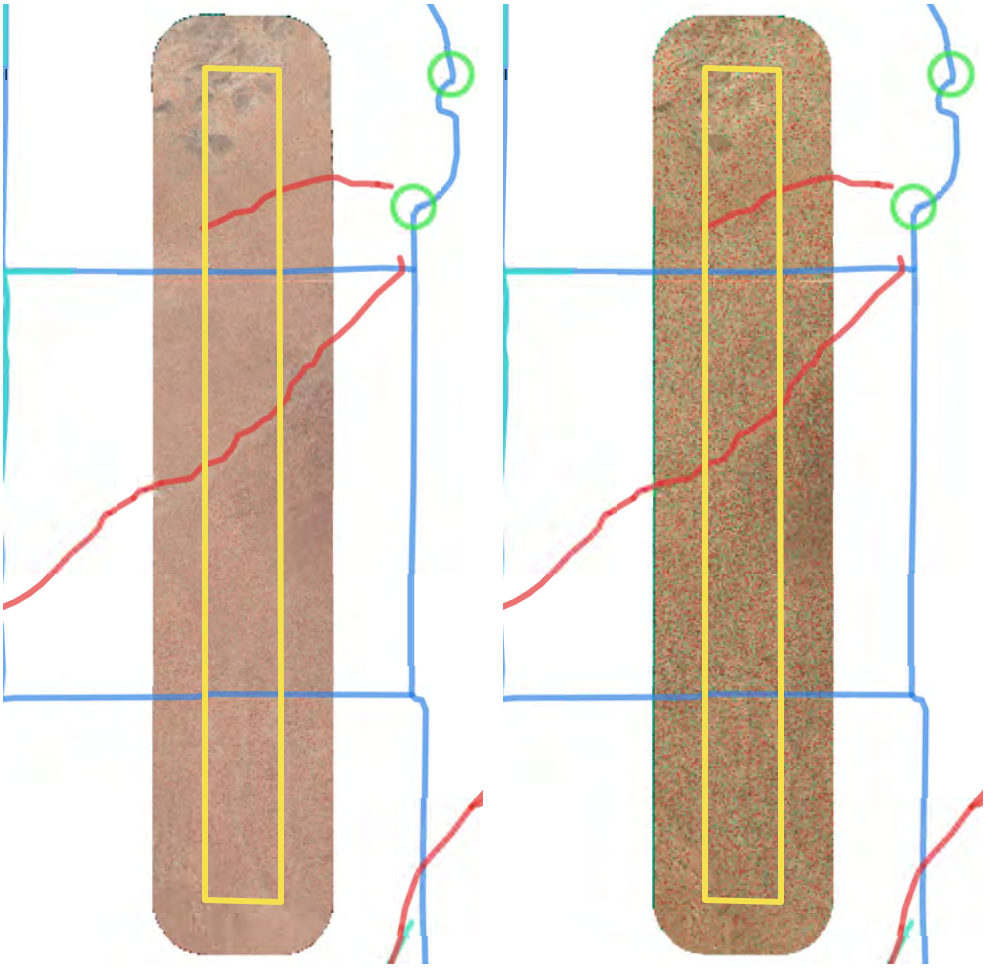
Property Overview



1000 ft

Image: May 5, 2024. Source: high-res-truecolor, Airbus Pléiades Neo (0.3m).

Note 1



Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Image, left: June 14, 2023. Source: Truecolor, Maxar WorldView (0.5m). Includes copyrighted material of Maxar Technologies Inc. 2023

Image, right: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

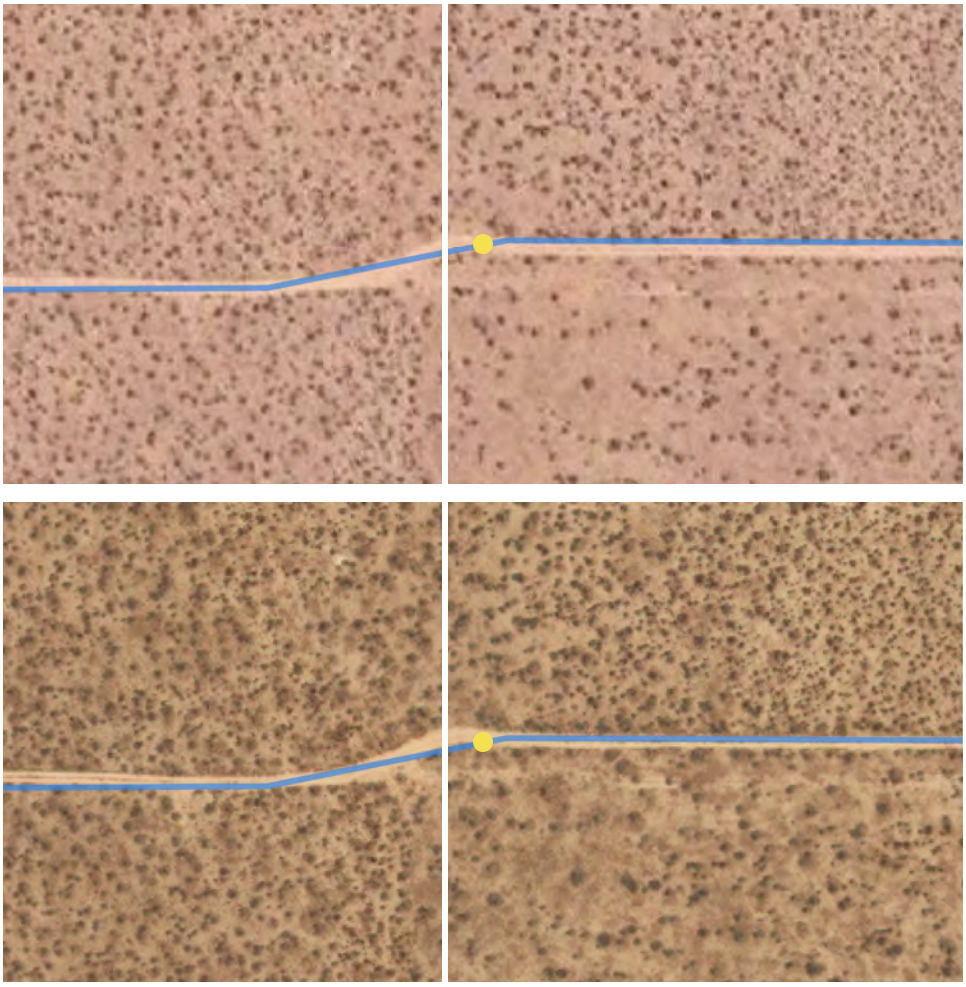
Center: 35.03132, -117.37392

Area: 233.68 acres

Interpretation: Allie Anderson on May 13, 2024

Note: There have been no significant changes in land usage between 2023 and 2024

Note 2



Image, top: June 14, 2023. Source: Truecolor, Maxar WorldView (0.5m). Includes copyrighted material of Maxar Technologies Inc. 2023

Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.02577, -117.37512

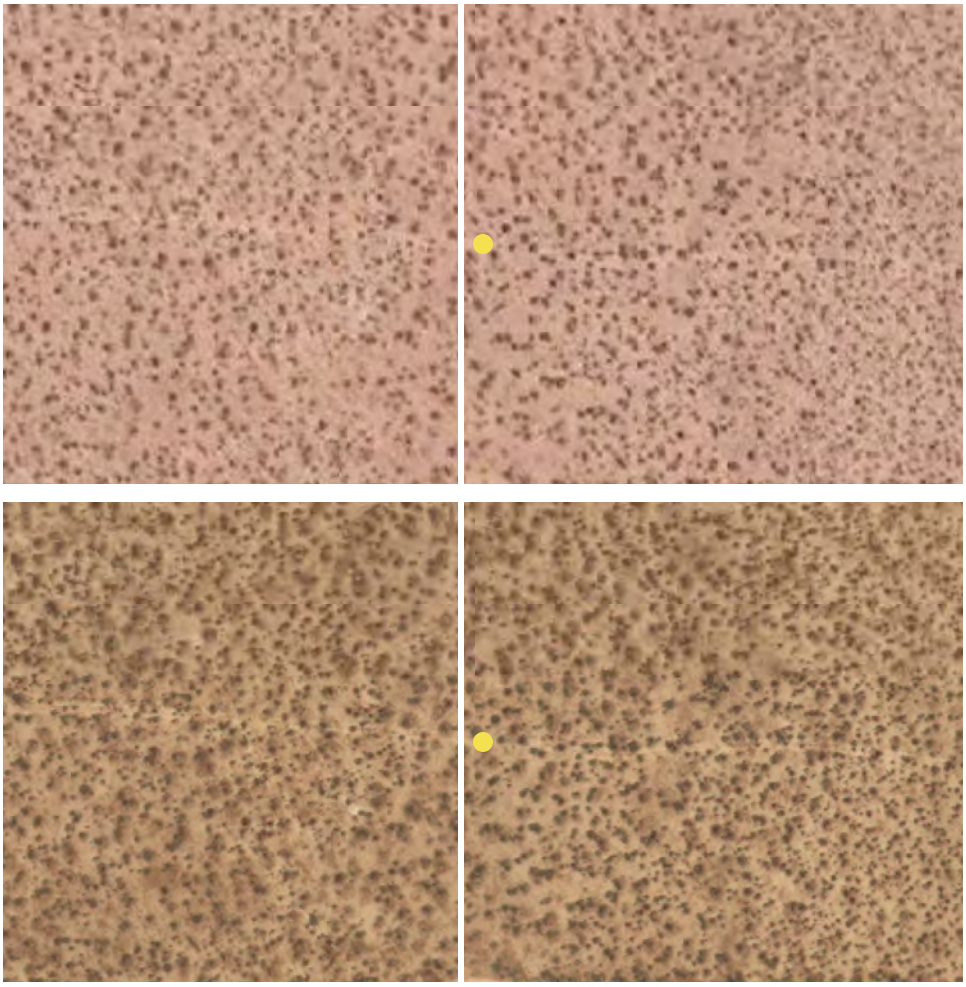
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: WEMO safety route FP5334 runs East - West here

Note 3



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Location: 35.02632, -117.37516

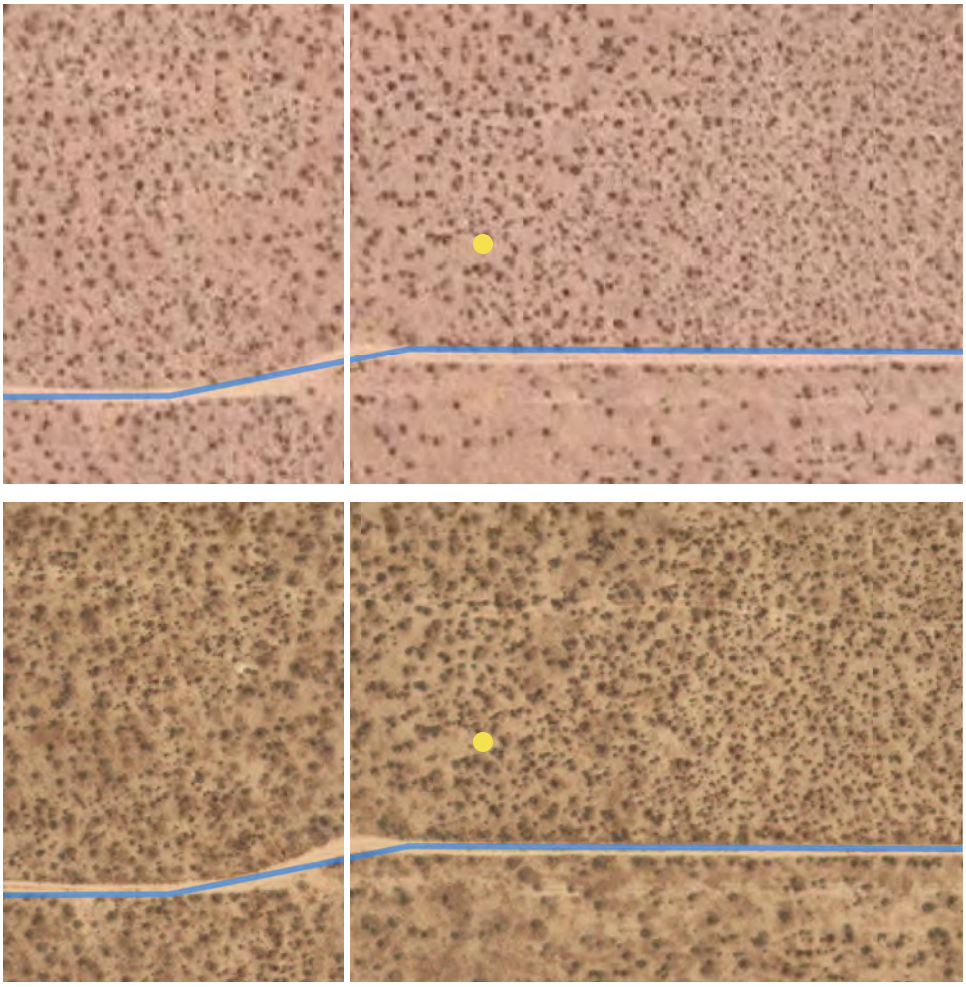
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Old route visible crossing through property here, parallel to FP5334

Note 4



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Location: 35.02601, -117.37486

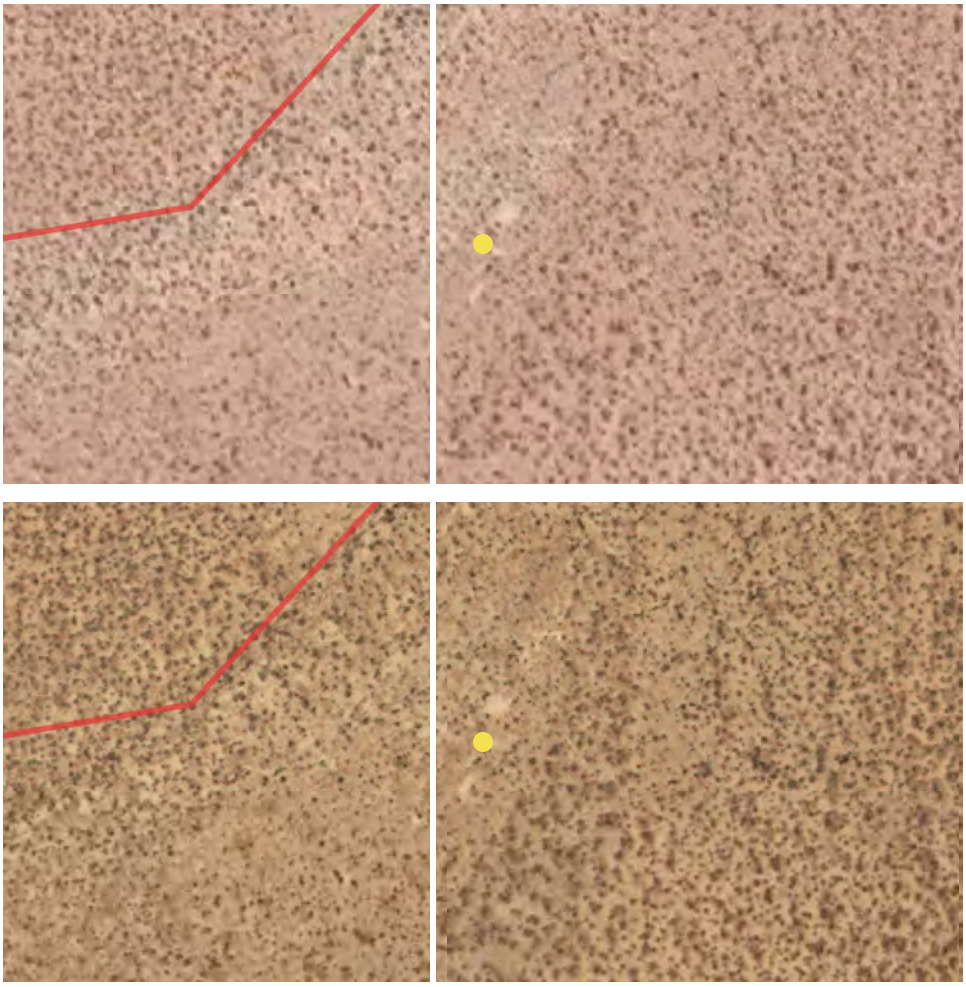
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Possibly old route that connects to other incursion just West of property

Note 5



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Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.03329, -117.37509

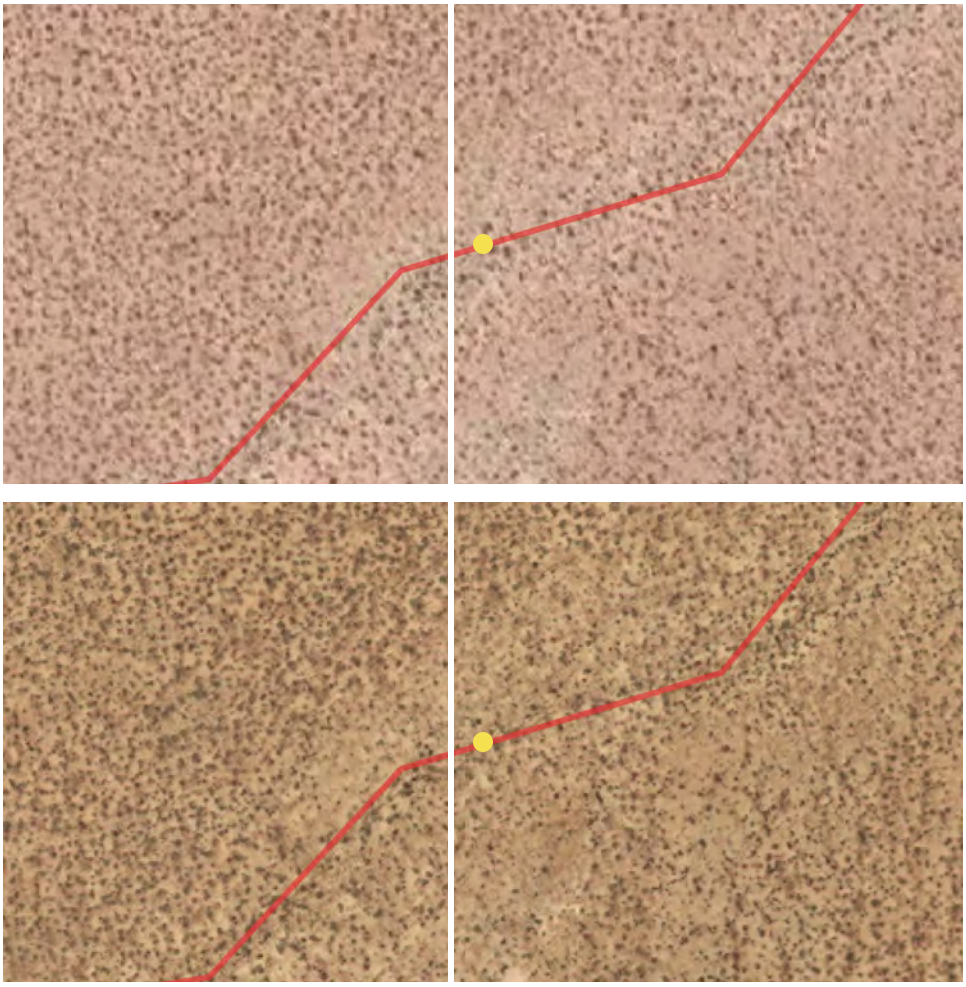
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Old scarring enters property here. Appears to connect Hoffman road and wash.

Note 6



Image, top: June 14, 2023. Source: Truecolor, Maxar WorldView (0.5m). Includes copyrighted material of Maxar Technologies Inc. 2023

Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.03388, -117.37513

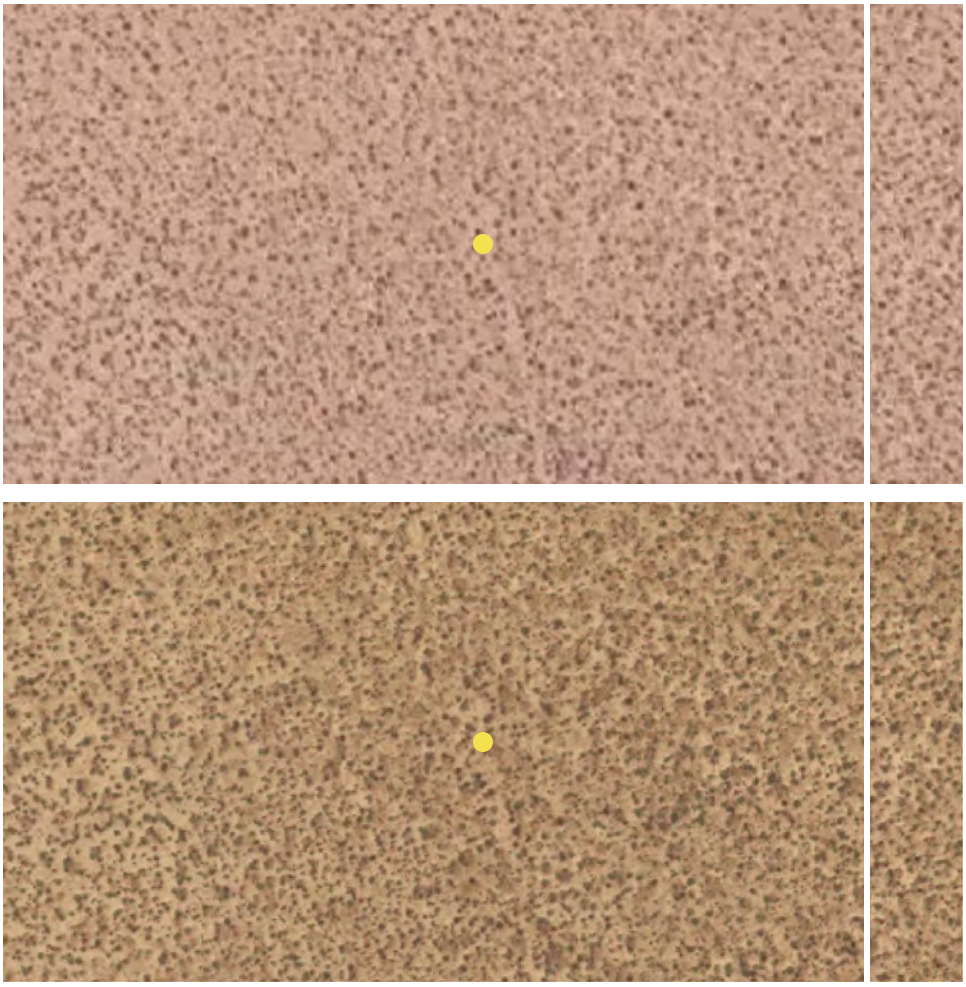
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Wash crosses through center of property, E-W

Note 7



Image, top: June 14, 2023. Source: Truecolor, Maxar WorldView (0.5m). Includes copyrighted material of Maxar Technologies Inc. 2023

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Location: 35.03859, -117.37306

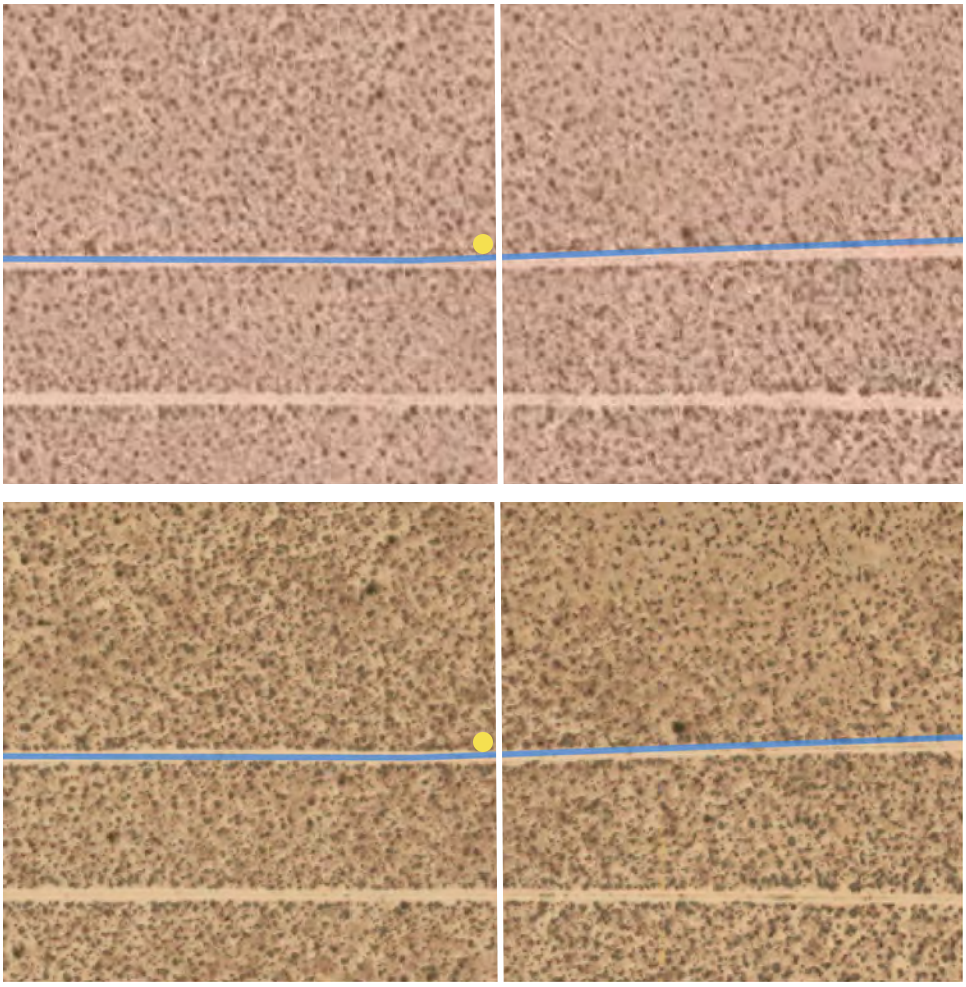
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Old route or incursion here. Last year's notes state that entry points are not visible on the ground

Note 8



Image, top: June 14, 2023. Source: Truecolor, Maxar WorldView (0.5m). Includes copyrighted material of Maxar Technologies Inc. 2023

Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.04064, -117.37208

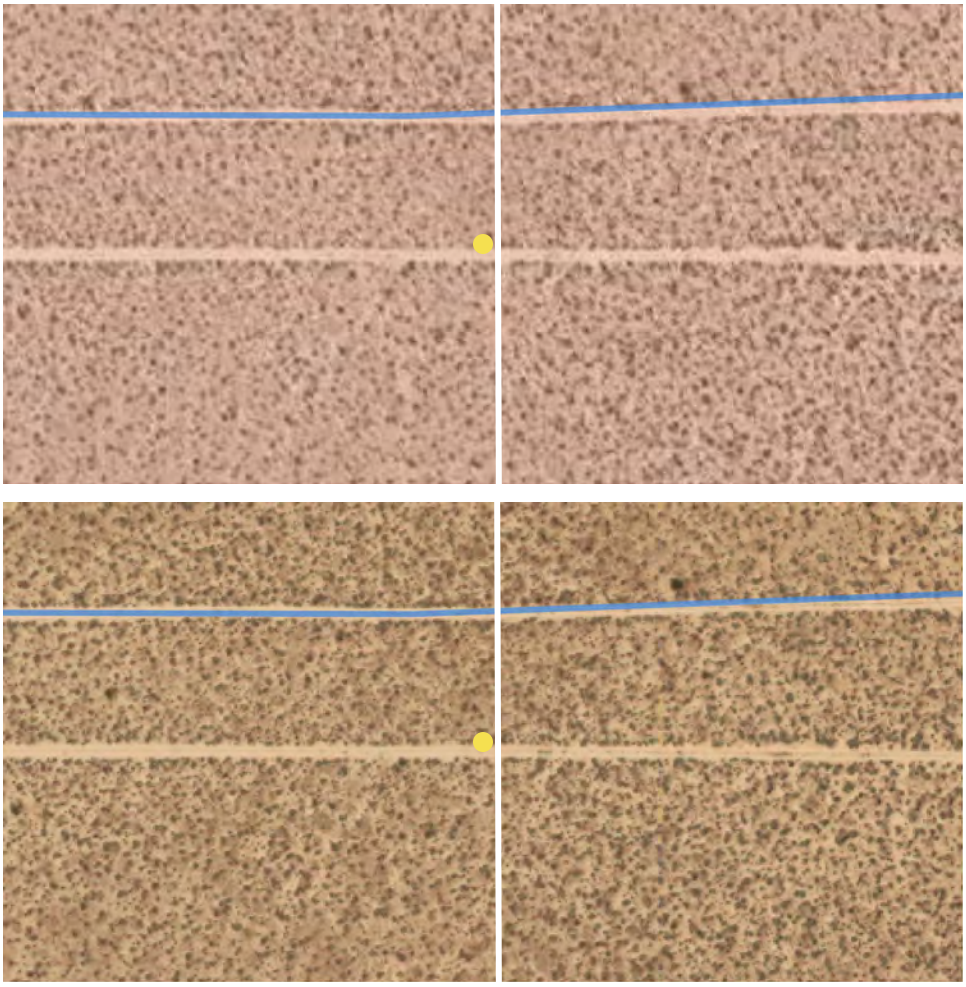
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: WEMO Safety Route FP5342 runs across property, East to West

Note 9



Image, top: June 14, 2023. Source: Truecolor, Maxar WorldView (0.5m). Includes copyrighted material of Maxar Technologies Inc. 2023

Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.04033, -117.37207

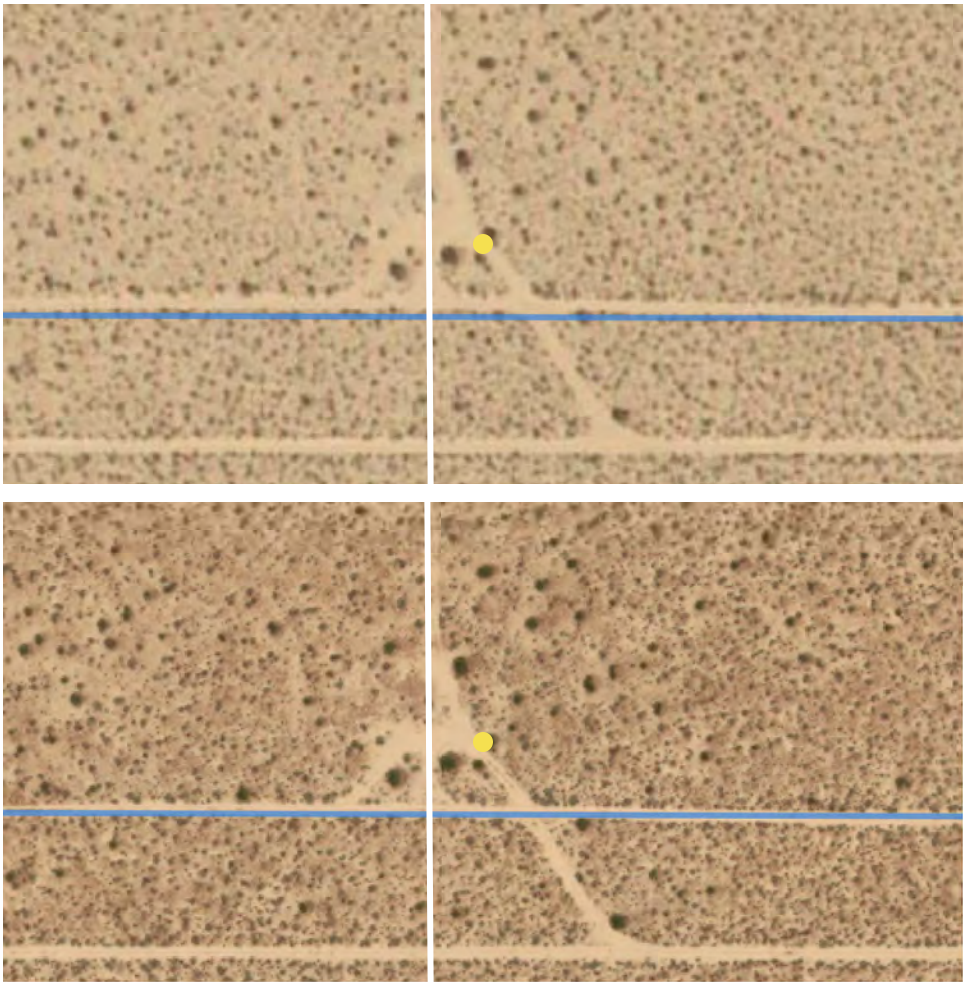
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Parallel route to WEMO Safety FP5342

Note 10



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Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.04078, -117.37507

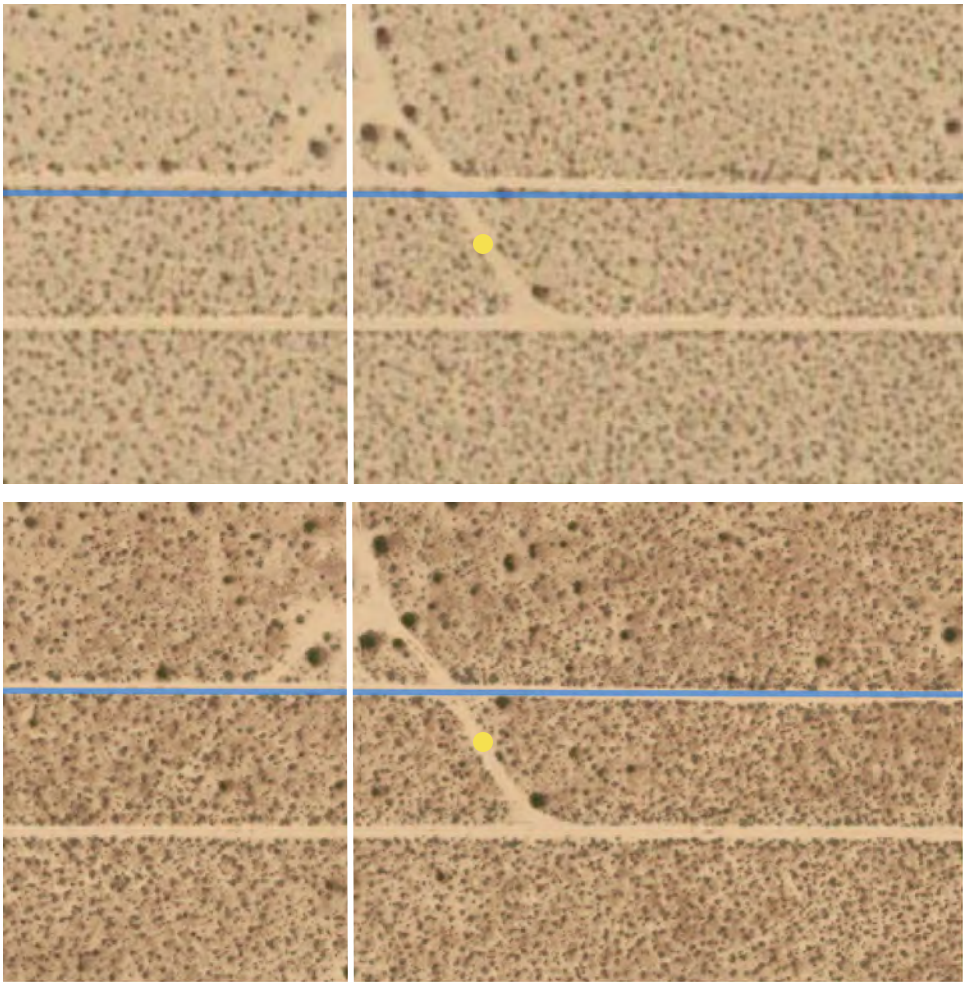
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: An old road is here, but is blocked off by rocks. A currently used parking area is here, and is utilized by THC to survey the area.

Note 11



Image, top: October 26, 2022. Source: Truecolor, Airbus Pléiades (0.5m). © CNES 2022, Distribution AIRBUS DS

Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.04051, -117.37486

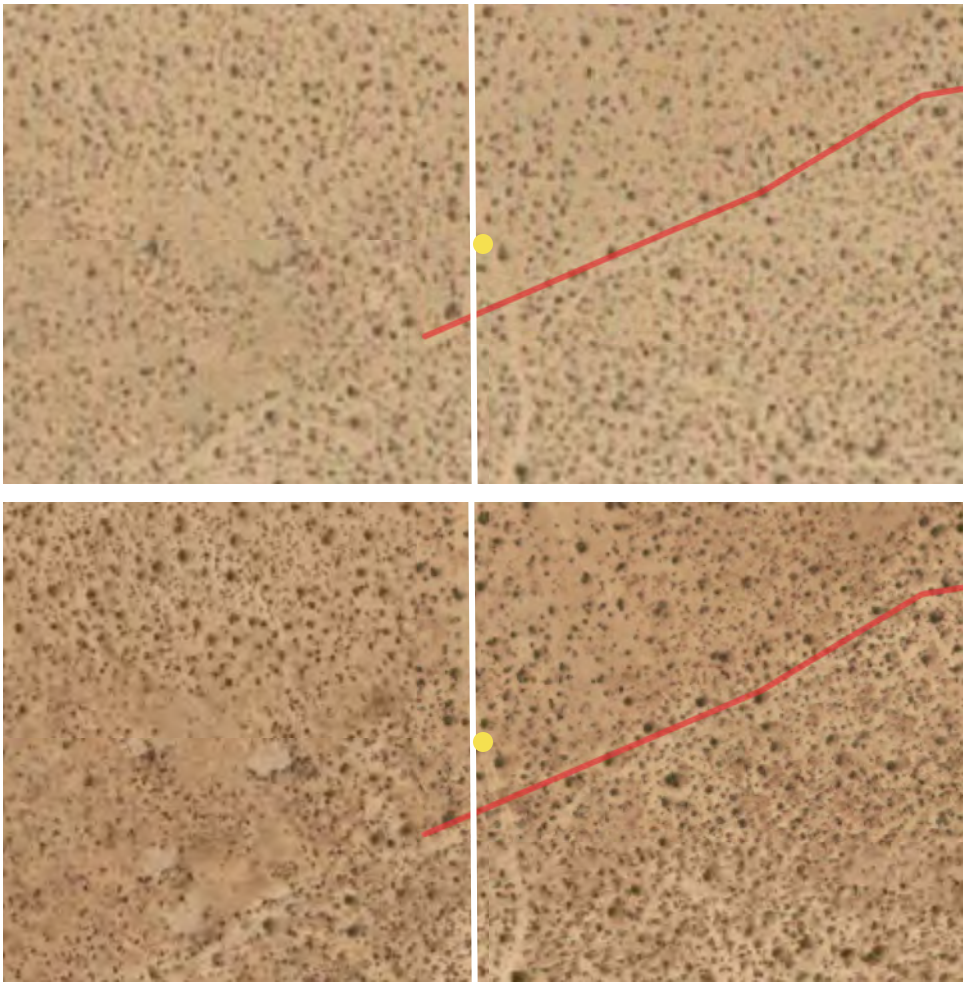
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Connector between WEMO route FP5342 and Parallel route. No current restoration sites

Note 12



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Location: 35.04235, -117.37520

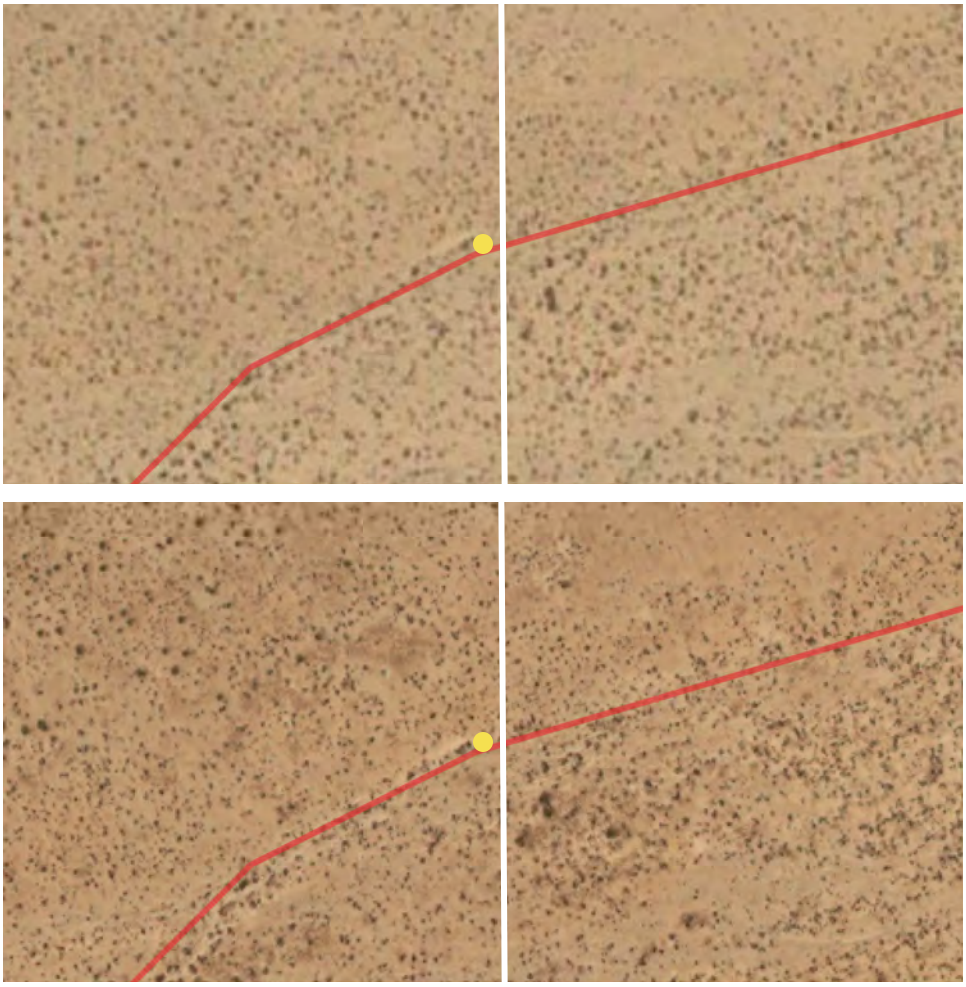
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: 4x4 incursion from WEMO route FP5342 exits property here. No current restoration sites.

Note 13



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Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.04348, -117.37212

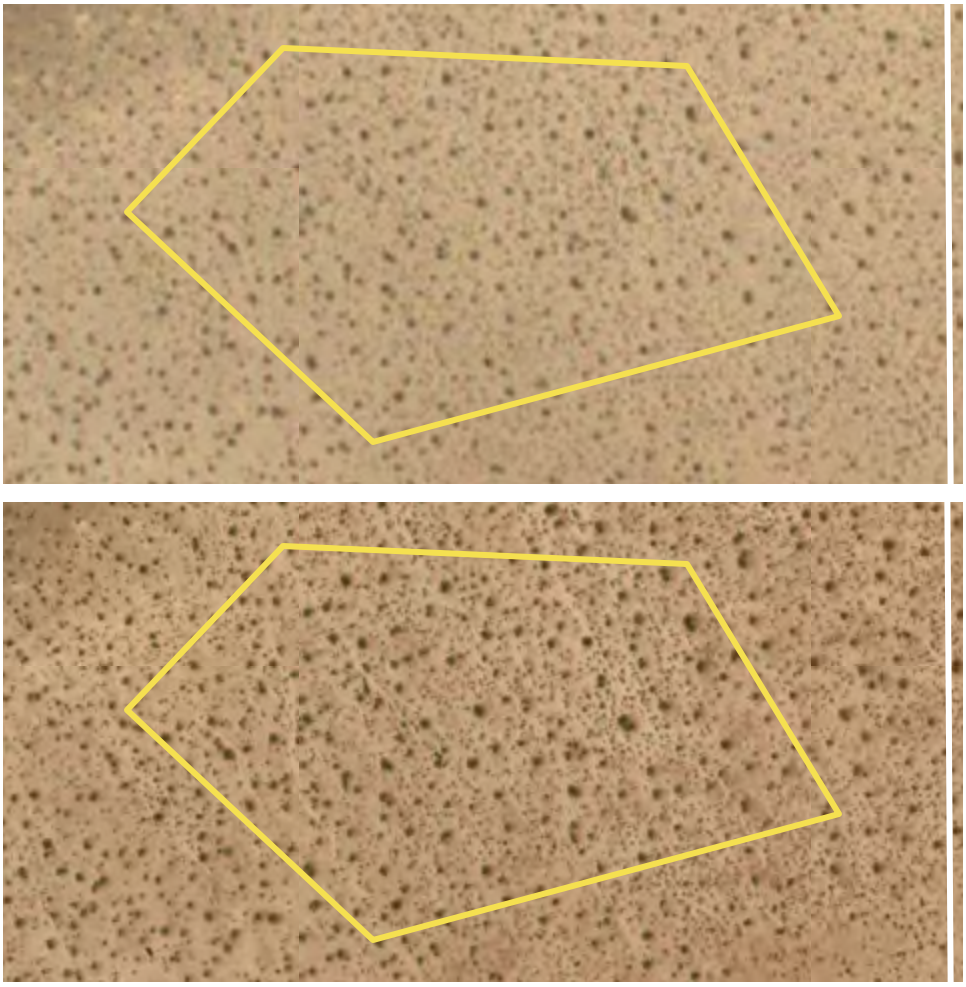
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Wash runs across property here

Note 14



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Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Center: 35.04451, -117.37337

Area: 2.72 acres

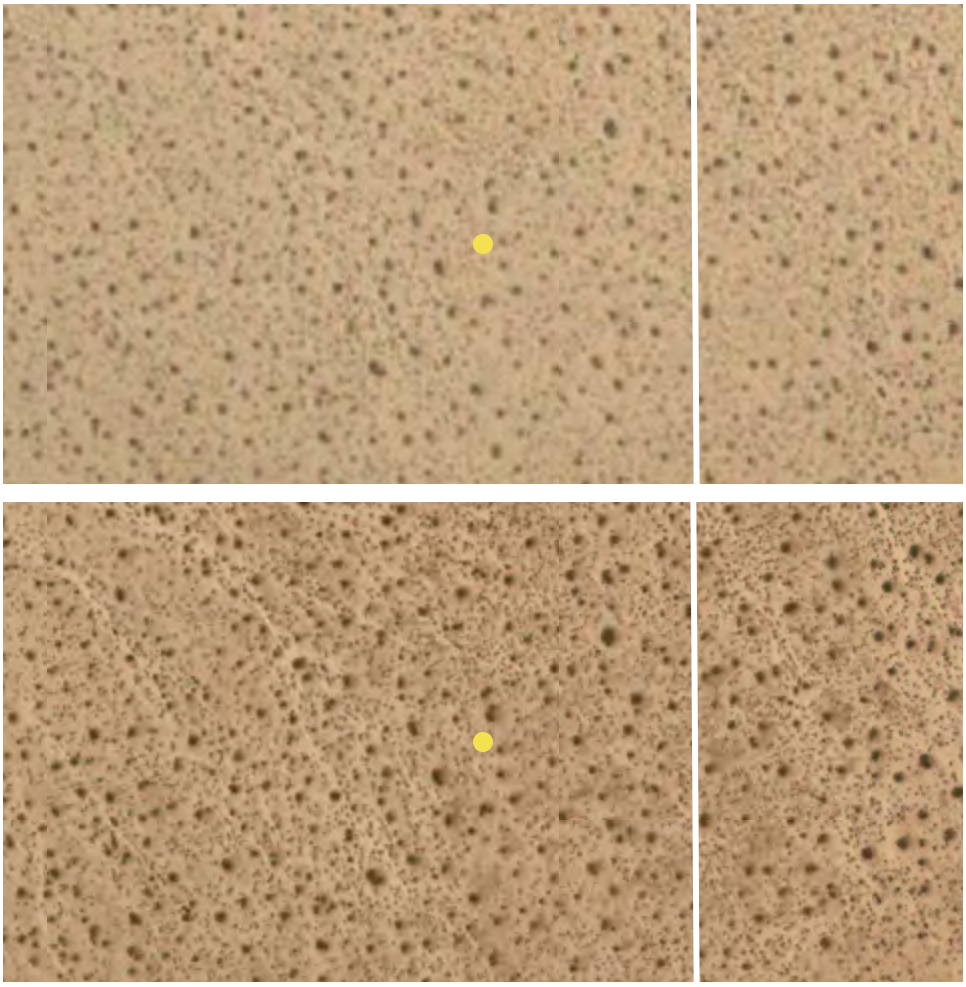
Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Last years notes state there are single and double tracks through here, but it looks more likely to be water runoff. Some are very linear and possibly incursions.

Note 15



Image, top: October 26, 2022. Source: Truecolor, Airbus Pléiades (0.5m). © CNES 2022, Distribution AIRBUS DS

Image, bottom: May 5, 2024. Source: Truecolor, Airbus Pléiades Neo (0.3m). COPYRIGHT AIRBUS DS, France, all rights reserved

Location: 35.04479, -117.37264

Interpretation: Allie Anderson on May 13, 2024

Flowlines Mines Restoration Sites WEMO ROD

WEMO Safety

Note: Very old 4x4 incursion bends here

DTCI 2024 Progress Report
11 December 2024

Introduction

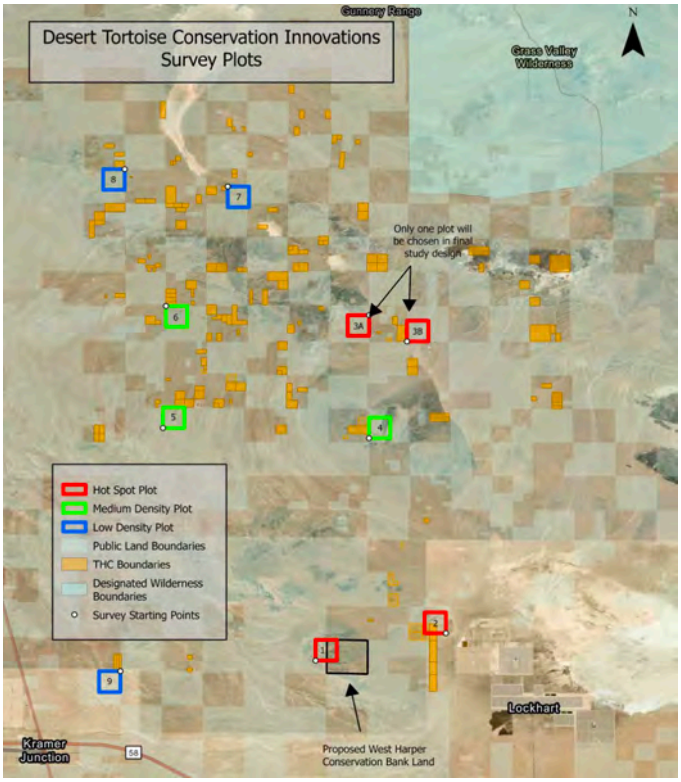
As the first year of the Desert Tortoise Conservation Innovation (DTCI) grant from WCB draws to a close, we are excited by the progress that has been made and what we have learned in the process.

Below are brief descriptions of important advances made on the project in 2024. Distribution of effort was designed to establish the basis for performing project tasks (e.g. establishment of survey plots and vegetation survey sites) and in opportunistic reaction to conditions (e.g. the emphasis on vegetation characterization work following a rainy 2023-24 winter). We are engaged in detailed planning for all tasks for the 2025 year.

Tortoise Monitoring

Plot establishment- We established plots representing the range of habitat types (and perceived quality for desert tortoises) in the vicinity of Fremont Peak. This is a foundational element of the DTCI project.

- Nine 1-square kilometer plots were established with locations based on years of prior sampling of THC parcels. Plots were chosen to represent the spectrum of tortoise habitat quality in the Fremont Peak area
- Plots are on tracks of public land (BLM) or private parcels to which we have explicit access (THC, Wildlands).
- These plots will be the locations of much of the work done on the project, especially as regards habitat characterization and tortoise monitoring.



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DTCI Survey plots. 3A was ultimately chosen as the plot location but 3B will also be sampled given the high quality and quantity of forage but dearth of tortoise sign. The lack of tortoises there may indicate that there are not enough tortoises for all the high quality habitat, thus indicating candidate areas for recolonization with head started or transplanted tortoises.

Tortoise sign transects- 10m interval parallel tortoise sign transects were walked on all 9 plots between mid-May and mid-June. A total of 900 km of transects were walked by our crew. We recorded the locations of live tortoises, carcasses, burrows and other cover sites, drinking sites and scat, as well as other data appropriate to the particular sign category (e.g. width, height and length of burrows). In all cases, Shields curated the interpretation of sign and its inclusion in the database, lending consistency. The data show that the phenomenon of tortoise hotspots appears to be real, evidenced by starkly non-homogeneous distribution of sign between plots.

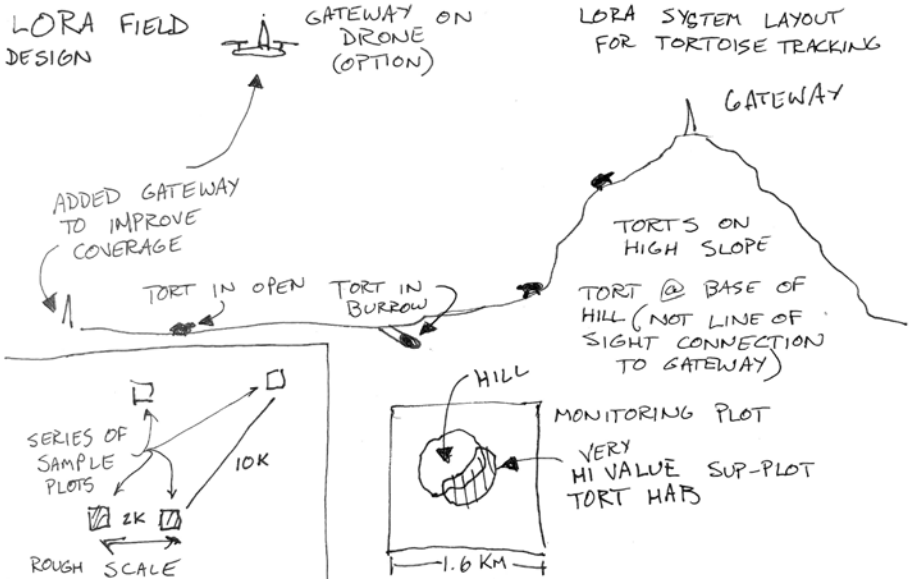
Live tortoise in open

Live tortoise in rock shelter

Likely recent mountain lion victim

Typical Gaia GPS screen view of Plot 2, one of the tortoise population hotspots. Shown are points generated during spring 2024 10m interval tortoise sign transects, coded by sign type.

LoRa tracking- Diagram below shows basic design of a LoRa system for tortoise tracking. We have just taken delivery of the first set of tracking transmitters and the associated gateway that will allow us to test the LoRa system prior to placing transmitters on live tortoises in spring 2025. The transmitters will provide GPS locations, and light intensity and temperature readings on a set schedule providing an unprecedented look at tortoise movements and behavior in response to environmental variables. We expect LoRa to be a huge improvement over current methods as a tortoise tracking system. This high resolution picture of tortoise life will yield great improvements in tortoise management.

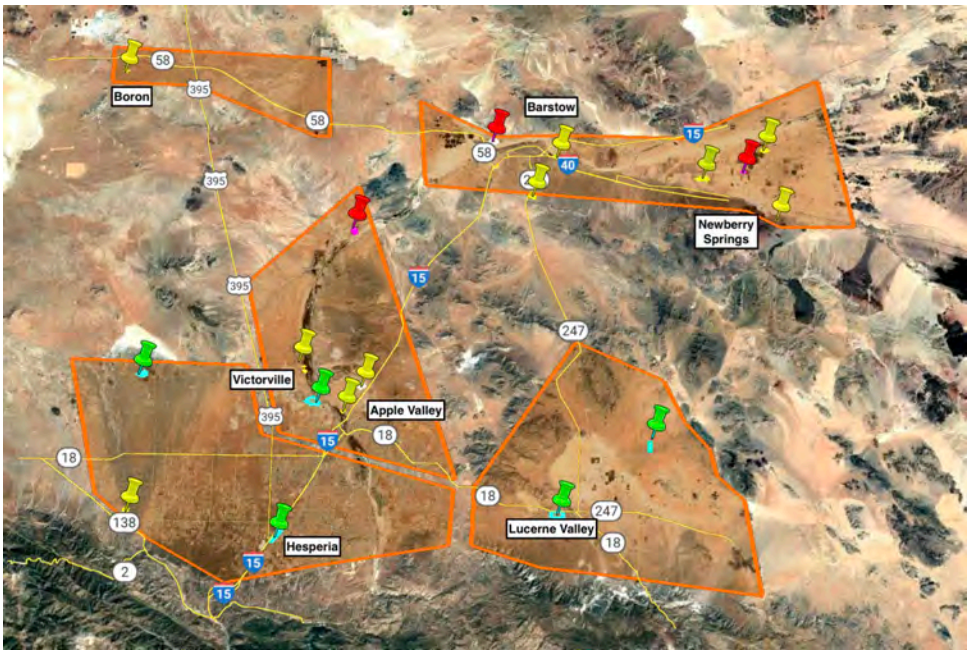


LoRa schematic showing relationship of gateway (data collecting point) and tortoises in different situations. Testing of the system to begin in December 2024.

Predator Management Actions

Remote egg oiling- This technique has proven very effective in reducing raven presence in high quality tortoise habitat . In spring 2024 we performed detailed monitoring of known raven nest sites in the vicinity of the southern hotspot plots in concert with ongoing USFWS remote egg oiling work. Project funds facilitated higher frequency nest monitoring than would otherwise be possible. We monitored three natural substrate nests at the Kramer Buttes and eight artificial substrate nests distributed between the two area solar electrical generation sites. One instance of suspected re-nesting was found due to this close monitoring and the resultant second clutch of eggs was oiled and thus failed to hatch.

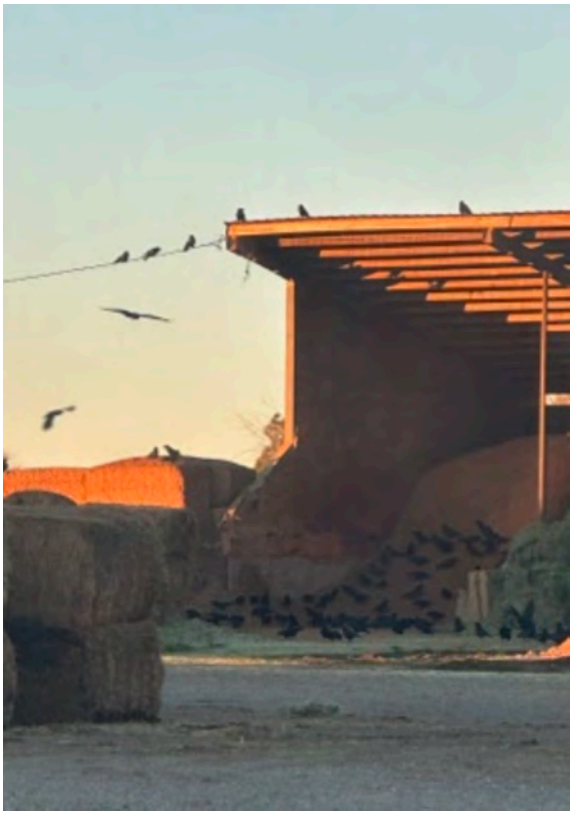
Raven roost and subsidy site mapping- In fall 2024, we embarked on an effort to thoroughly map subsidy and roost sites throughout the central Mojave Desert and to perform raven counts using driving route counts, roost counts and subsidy site counts. We have completed two monthly raven count circuits. We are establishing a baseline understanding of raven numbers and distribution that will allow us to assess the effect of hazing efforts and remote egg oiling to come.



Raven subsidy and roost sites

Key
Yellow- subsidy
Green- roost
Red- subsidy/roost Combination
Orange- raven count polygons

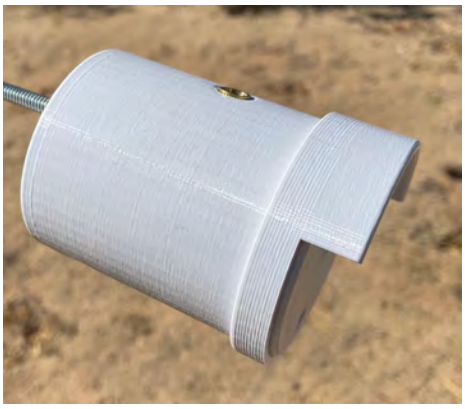
Raven hazing- We spent time surveying raven subsidy sites, part of a long-term effort to reduce access to resources by ravens and made outreach to several of the owners of these sites, informing them of our raven control efforts and offering to work with them to reduce raven numbers at their sites. All were enthusiastic about the prospect of ridding their sites of ravens. Having a comprehensive map of subsidy sites is the first step to coordinated action to reduce their effect. Additionally, we spent funds in refining our hazing tools.



Ravens eating almond hulls at a dairy in Hinkley, CA. Free access to food is a significant subsidy to ravens, enhancing their survival odds. The dairy in question is within a quarter mile of the Superior-Cronese Desert Tortoise Critical Habitat Unit.

Ravens flee laser fired at a roost.

Tech Innovations- We continue to refine devices for raven control measures. These improvements facilitate efficient raven management.



The Nest Abandonment Induction Laser (NAIL) will use motion sensing to autonomously drive ravens from nest sites in sensitive habitat. Two years of prototype testing have yielded very promising results.

Remote Egg Oiling of a utility pole raven nest, showing the Remote Fluid Application System (RFAS) in action delivering oil to the nest. This early RFAS is cumbersome and messy to operate.

A bench test set-up for an improved RFAS. This version is a great improvement over the former design and will be in use in spring 2025 on a variety of drones and ground-based options.

Habitat Characterization

Vegetation sampling- Given a winter of generous rainfall, a top priority for the season was to capture data on annual plant diversity and cover across a wide variety of habitat types. After establishing the nine survey plots we conducted two types of vegetation sampling. Three 20x50m sampling areas, called releves, were established in each plot, for a total of 27 sample sites. For each: a complete plant species list was generated and percentage cover estimated for each species. A sample of each unknown species was collected and subsequently identified. For each releve a 50m line intercept transect was established for a more precise measurement of cover and frequency.

Typical releve location. Note orange marker cap on rebar stake.

- *Analytical framework establishment*- Dr. Roger Anderson, and expert in long-term desert habitat research, is helping us design sampling protocols and a analytical framework for characterizing the nine plots
- *Soil microbiome analysis*- We are working with Yanina Aldao and Robin Kobaly, two experts on the interaction of desert soils and plant communities on analyzing samples from the nine plots, with a special emphasis on comparisons of diverse annual plant communities and *Schismus* dominated areas

Habitat Enhancement

Dandelion planting- As a first step to developing tools for habitat improvement we experimented with planting desert dandelions, an important desert tortoise food species, at six sites on Plot 2, one of the two known hotspots.

- Mojave Desert Land Trust grew approximately 800 plants we then planted and monitored them over six weeks
- we used a nested design comparing: post transplantation watering vs. non-watered; stressed in the growth period (via clipping to simulate herbivory) vs. non-stressed; and caged (to reduce herbivory by rodents and rabbits) vs. uncaged.
- motion-capture cameras to monitor visitation to the sites by wildlife.
- Periodic site visits to examine and photograph the plants in detail gave us information on the fate of the transplanted dandelions.
- gathered information on the logistics and economics of the effort, to determine the scalability of this approach to supplementing food supplies for tortoises. We will be compiling and analyzing results this summer.

Barstow Biologists carrying and planting desert dandelion seedlings

Another Barstow Biologist waters desert dandelions, shown in flower at right

Schismus management- There is clear evidence that tortoises do very poorly in areas dominated by the invasive grass and die off in, or abandon areas in which it exceeds some critical threshold.

- Assessment-
  - We are exploring options for low cost mapping of Schismus to help define the scale of the problem. Schismus favors the intershrub spaces and, as seen below, can form a carpet excluding most or all other annual species. We are looking for a method to use its visual signature to create a heat map of infestation.
  - We are in the early stages of designing a program to assess the ecological implications of this exclusion of other plants. Applying standard methods of biological assessment (vertebrate surveys, invertebrate sampling, soil biocrust analysis) will give us a way to compare relatively diverse areas to these near monotypic vegetative sta

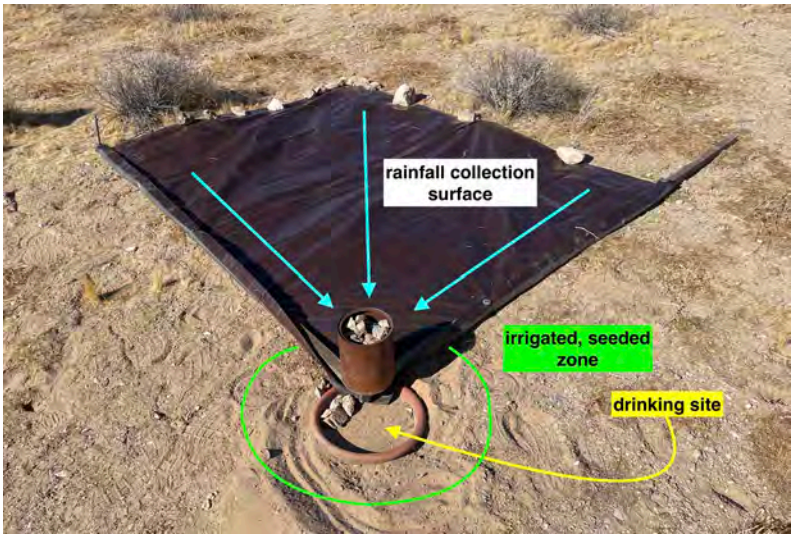
Documentation- We have collected photos and videos of badly afflicted landscapes. The vegetation sampling done in spring 2024 supplies a quantitative comparison across 27 reeves (3 per each of 9 plots) against which we can compare tortoise distribution information generated by tortoise sign transects.

A *Schismus* “desert” near Lucerne Valley, CA

- *Schismus* control measures- We are researching and experimenting with a variety of control measures. The left photo shows *Schismus* plants dying after being briefly exposed to a jet of steam. The photo on the right shows a 300 x 300 mm square in the aftermath of steam treatment, following the death of plants within the treated area.

Passive Hydration

Rainfall Concentrator monitoring- Six prototype rainfall concentrators, combined with clay plate drinking sites are being monitored using motion capture cameras. Collected rainfall will drain into plate to provide drinking water for tortoises. Any spillover will irrigate native wildflower seeds planted in the area around the plate. In the winter rainy season the devices will provide hydration for tortoises, in the spring they will provide high quality forage. Cameras will document use by tortoises and other wildlife.



A rainfall concentrator