October 9, 2015

Ms. Dilan Roe
Site Cleanup Program Manager
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94501-6577

Subject: **Dublin Apartments Pre-Construction Submittal Review for Permeable Reactive Barrier**
Former Crown Chevrolet North Parcel
7544 Dublin Boulevard
Dublin, California
Site Cleanup Program Case No. RO0003014

Dear Ms. Roe:

Enclosed please find a letter entitled *Dublin Apartments Pre-Construction Submittal Review for Permeable Reactive Barrier* for the Former Crown Chevrolet North Parcel site at 7544 Dublin Boulevard, in Dublin, California (Site Cleanup Program Case No. RO0003014, GeoTracker Global ID T10000001616). This document was prepared by Amec Foster Wheeler Environment & Infrastructure, Inc., on behalf of BWD Dublin LLC.

I declare under penalty of perjury that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Please contact me at (408) 680-4938 or Avery Whitmarsh of Amec Foster Wheeler at (510) 663-4154 if you have any questions regarding this document.

Sincerely yours,

Pete Beritzhoff
BWD Dublin LLC

Attachment: Dublin Apartments Pre-Construction Submittal Review for Permeable Reactive Barrier)

October 9, 2015

Project OD14170800.01

Ms. Dilan Roe
Site Cleanup Program Manager
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94501-6577

Subject: **Dublin Apartments Pre-Construction Submittal Review for Permeable Reactive Barrier**
Former Crown Chevrolet North Parcel
7544 Dublin Boulevard
Dublin, California
Site Cleanup Program Case No. RO0003014

Dear Ms. Roe:

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) has reviewed the pertinent pre-construction submittals related to the Dublin Apartments development project located at 7544 Dublin Boulevard, Dublin, California (the Site) that are relevant to the installation of a PRB, as described in the *Vapor Mitigation and Permeable Reactive Barrier Basis of Design Report* (Design Report).[1] This evaluation was prepared on behalf of Dublin Apartment Properties LLC and at the request of Alameda County Department of Environmental Health (ACDEH), as described in October 2015 telephone conversation between ACDEH and Amec Foster Wheeler.

The objective of the review of each submittal was to evaluate general conformance with the design concept of the project and general compliance with the information given in the contract documents. It should be noted that the Amec Foster Wheeler's review does not relieve the PRB contractor, Magnus Pacific, LLC[2], from compliance with the requirements and intent of the drawings and specifications. Magnus Pacific is responsible for confirming and correlating all quantities and dimensions, selecting methods and sequences of construction to ensure a functioning assembly, coordinating work with all other trades, and performing work in a safe and satisfactory manner.

A list of the pre-construction submittals that were reviewed by Amec Foster Wheeler for conformance with the intent of the recommendations and design requirements presented in the Design Report is included as Attachment A. Amec Foster Wheeler requested revisions to many of these documents; all recommended revisions were incorporated in a satisfactory manner.

---

[1] Amec Foster Wheeler, 2015, Permeable Reactive Barrier Basis of Design Report, Former Crown Chevrolet North Parcel, 7544 Dublin Boulevard, Dublin, California, June 11.

[2] Magnus Pacific is a Subcontractor to ZCON Builders, the General Contractor for the Dublin Apartments project.

Amec Foster Wheeler Environment & Infrastructure, Inc.
180 Grand Avenue, Suite 1100
Oakland, California 94612-3066
USA
Tel (510) 663-4100
Fax (510) 663-4141
amecfw.com

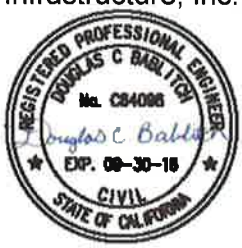
For ACDEH reference, copies of the following pre-construction submittals are enclosed:

- Attachment B – Project Execution Work Plan, Version 1.01, prepared by Magnus Pacific, dated October 5, 2015.
- Attachment C – Contractor Quality Control Plan, Verison 1.02, prepared by Magnus Pacific, dated October 8, 2015.
- Attachment D – Site Specific Health & Safety Plan (SS-HASP) (Issued for Information Only, no approval required or implied), prepared by Magnus Pacific, dated September 26, 2015.

Please feel free to contact me with questions regarding the document review process.

Sincerely yours,
Amec Foster Wheeler Environment & Infrastructure, Inc.

Douglas C. Bablitch



Douglas C. Bablitch, PE C64096
Principal Engineer
Direct Tel.: 510.663.4169
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dcb/aw/smm
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Enclosure: Attachment A – List of Plans Included in Pre-Construction Submittal Review
Attachment B – Project Execution Work Plan
Attachment C – Contractor Quality Control Plan
Attachment D – Site Specific Health & Safety Plan

cc: Pete Beritzhoff, Bay West Development

ATTACHMENT A

List of Plans Included in Pre-Construction Submittal Review

ATTACHMENT A

LIST OF PLANS INCLUDED IN PRB PRE-CONSTRUCTION SUBMITTAL REVIEW

Former Crown Chevrolet North Parcel
7544 Dublin Boulevard
Dublin, California

The following plans were included in the permeable reactive barrier (PRB) preconstruction submittal review conducted by Amec Foster Wheeler Environment & Infrastructure Inc. (Amec Foster Wheeler):

- Project Execution Work Plan, Submittal Number 025010-0001 – prepared by Magnus Pacific, LLC
    - Version 1.00, September 16, 2015
    - Version 1.01, October 5, 2015
- Contractor Quality Control Plan, Submittal Number 025010-0002 – prepared by Magnus Pacific, LLC
    - Version 1.00, September 17, 2015
    - Version 1.01, October 6, 2015
    - Version 1.02, October 8, 2015
- ZVI & Sand Pre-Construction Test Data, Submittal Number 025010-0003 – prepared by Magnus Pacific, LLC
    - Version 1.00 DRAFT, September 21, 2015
    - Version 1.01 FINAL, September 24, 2015
- Submittal Register, Submittal Number 025010-0004 – prepared by Magnus Pacific, LLC
    - Version 1.00, September 22, 2015
    - Version 1.01, October 6, 2015
- Transportation and Haul Route Plan, Submittal Number 025010-0005 – prepared by Magnus Pacific, LLC
    - Version 1.00, September 22, 2015
- Site Specific Health and Safety Plan, Submittal Number 025010-0006 – prepared by Magnus Pacific, LLC
    - Version 1.00, September 26, 2015
- Trench Stability Calculations, Submittal Number 025010-0007 – prepared by Magnus Pacific, LLC
    - Version 1.00 DRAFT, October 7, 2015
    - Version 1.01 FINAL, October 9, 2015

ATTACHMENT B

Project Execution Work Plan

Dublin Apartments

Submittal Number: 025010-0001-01
Title: REVISED PRB Project Execution Plan

7544 Dublin Boulevard
Dublin CA 94568

Project ID:
Owner: Dublin Apartment Properties, LLC
Construction Team: ZCON Builders
Design Team: BDE

Date Due: 10/08/2015
Date Issued: 10/06/2015
Substitution: No

Information

Types: Qualification Data, Product Data, Other
Trades: Environmental Consultant
Categories: N/A
Subcontractor/Manufacturer: Magnus Pacific

Stamps

ZCON Builders

This submittal has been reviewed for general compliance only as it relates to the CONTRACT DOCUMENTS. This review implies no approval of deviation from the plans and specifications, nor responsibility for errors or emissions in the submittal. The subcontractor shall remain responsible for all details required by the assembly confirmation of dimensions, fabrication and installation means and methods. This submittal shall not be used for the manufacture, assembly, fabrication, or installation with out the Architect's stamped approval.

Submittal No: 025010-0001-01 **Section No:** [none]

Date: 10/06/2015 **By:** Sean McKinley

SUBMITTAL OF PLANS, SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL, SAMPLES, OR MANUFACTURER'S CERTIFICATES

DATE: October 5, 2015

SUBMITTAL NO. 001.1

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS

TO: Mr. Sean R McKinley ZCon Builders 780 W Grand Avenue Oakland CA 94612 w: 510-444-4190 c: 510-507-3591 e: smckinley@zconbuilders.com	From: Mr. Tino B. Maestas, P.E. Magnus Pacific, LLC 6558 Lonetree Blvd Rocklin, CA 95765 Direct: 916-462-6419 Cell: 916-471-8210 email: tmaestas@magnuspacific.com	**PROJECT NO.** 150019	CHECK ONE: ☐ THIS IS A NEW SUBMITTAL ☒ THIS IS A RESUBMITTAL
SPECIFICATION SEC. NO. 025010 - Permeable Reactive Barrier	PROJECT TITLE AND LOCATION 7544 Dublin Apartments, Dublin, California		

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.)	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See Instruction on B)	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION	FOR CLIENT USE
				SPEC. PARA.NO.	DRAWING SHEET NO.			
1	Updated Permeable Reactive Barrier Project Excecution Plan		1	1.4 A.2	N/A	A		

REMARKS

I have reviewed and approved the attached submittal(s) to ensure contract compliance. All quantities, dimensions, specific performance requirements, materials, catalog numbers and similar data have been verified as complete.

10/5/2015

Tino B. Maestas, P.E.

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	Date

PROJECT EXECUTION WORK PLAN

PERMEABLE REACTIVE BARRIER (PRB)

DUBLIN APARTMENTS –

CROWN CHEVROLET NORTH PARCEL

7544 DUBLIN BLVD, DUBLIN, CALIFORNIA

OCTOBER 5, 2015 – Revision 02

Prepared for:

PRIME CONTRACTOR
Zakskorn Construction Company
Dba ZCON Builders
780 West Grand Ave.
Oakland, CA 94612

OWNER
Dublin Apartment Properties LLC
2 Henry Adams St, Ste 450
San Francisco, CA 94103

Prepared by:

Magnus Pacific, LLC.
6558 Lonetree Blvd.
Rocklin, CA 95765
Phone: (916) 462-6400

Table of Contents

1.0 INTRODUCTION 4
1.1 Site Description 4
1.2 Project Overview 4
2.0 PRE-MOBILIZATION AND ADMINISTRATION 6
2.1 Pre-Construction Submittals 6
2.2 Permits and Licenses 6
2.3 Construction Schedule 6
2.4 Project Organization 7
2.5 Equipment 7
3.0 MOBILIZATION AND SITE PREPARATION ACTIVITIES 9
3.1 Mobilization of Personnel and Equipment 9
3.2 Utility Location and Verification 9
3.3 Site Plan/Temporary Facilities 9
3.3.1 Site Zone Layout 9
3.3.2 Trailers and Facilities 10
3.3.3 Parking Areas/Transport to Work Areas 10
3.3.4 Equipment Storage/Maintenance Areas 10
3.4 Project Surveying 10
3.5 SWPPP Controls 11
3.6 Haul Routes 11
3.7 Dust Control 11
3.8 Spill Control Measures 11
3.9 Decontamination 12
4.0 PERMEABLE REACTIVE BARRIER (PRB) 13
4.1 Material Requirements 13
4.1.1 Water 13
4.1.2 Biopolymer Slurry 13
4.1.3 Enzyme Breaker 14
4.1.4 Soda Ash 14

4.1.5 Biocide Preservative 14
4.1.6 Granular Iron 14
4.1.7 Sand 15
4.2 SEQUENCE OF FIELD ACTIVITIES 15
4.2.1 Site Set-up and Work Pad Construction 15
4.2.2 Surveying 16
4.2.3 Erosion and Sediment Controls 16
4.3 ZVI PRB Wall Construction 16
4.3.1 Biopolymer Slurry Mixing 16
4.3.2 Trench Excavation 17
4.3.3 Granular Iron/Sand Mixing 17
4.3.4 ZVI/Sand Mixture Placement 18
4.3.5 Trench Flushing and Development 19
4.4 PRB Protection/Cap Construction 19
5.0 SOIL AND STOCKPILE MANAGEMENT PLAN 21
6.0 TRANSPORATION AND DISPOSAL 22
7.0 SITE RESTORATION AND DEMOBILIZATION 23

Figure 1 – Site Layout

Appendix A – Construction Schedule
Appendix B – Personnel Resumes
Appendix C – Biopolymer Tech Data Sheet
Appendix D – Enzyme Breaker Tech Data Sheet
Appendix E – Biocide Tech Data Sheet
Appendix F – Zero Valent Iron Tech Data Sheet
Appendix G – Sand Gradations
Appendix H – Subcontractor Daily Quality Control Report Form
Appendix I – Magnetic Separation Test Procedure

1.0 INTRODUCTION

Magnus Pacific, LLC (Magnus) has prepared this Project Execution Plan (PEP) for the Permeable Reactive Barrier (PRB) on behalf of Dublin Apartment Properties LLC for the former Crown Chevrolet North Parcel located at 7544 Dublin Boulevard, Dublin, California (the "Site"; Figure 1). Magnus Pacific has been subcontracted by ZCON Builders to install the permeable reactive barrier (PRB) along the western edge of the property as designed by Amec Foster Wheeler Environment & Infrastructure, Inc. ("Amec Foster Wheeler"; formerly AMEC Environment & Infrastructure, Inc.) and described in the Vapor Mitigation and Permeable Reactive Barrier Basis of Design Report ("Design Report") dated 11th June 2015. This PEP describes the materials, equipment, and construction means and methods for performing the work in accordance with Specification 02 50 10.

1.1 Site Description

The Site was developed in 1968 as Crown Chevrolet, a car dealership with auto body shops, on land that appears to have been previously used for agricultural purposes. Operations as a car dealership and auto body shop continued from 1968 through 2013. The property was sold to BWD Dublin in the fall of 2014, and the site buildings were demolished in December 2014 in preparation for redevelopment.

The Site is located in the northwest corner of the intersection of Highway 680 and Highway 580 in Dublin, California bordered to the north by Dublin Boulevard, to the West by Golden Gate Drive, and to the South by St Patrick Way.

1.2 Project Overview

Site redevelopment is scheduled to begin in summer 2015. The redevelopment will include mixed residential/commercial buildings at the site, comprising 313 apartments (a total of approximately 323,000 gross square feet in multi-unit structures) and 17,000 square feet of retail space at ground level along Dublin Boulevard; some of the apartments will be located above the retail space. An approximately 230,000-square-foot parking garage is planned for the eastern central portion of the site

The absolute and functional corrective action objectives (CAOs) for the site were established in the approved FS/CAP for the protection of human health and the environment and are listed in Section 2.2 of the Amec Foster Wheeler Design Report. To address the first CAO and mitigate the risk to future site residents from potential vapor intrusion of VOCs in soil vapor to indoor air,

the FS/CAP recommended the installation of a PRB to treat impacted groundwater migrating onto the site.

The PRB will consist of a trench installed along the up-gradient site boundary that will be backfilled with a mixture of granular Zero Valent Iron (ZVI) and sand where natural hydraulic gradients adjacent to and beneath the site will cause PCE-affected groundwater to flow through the PRB to reduce Volatile Organic Compounds (VOC) concentrations.

The PRB design consists of the following elements:

- A 2-foot-wide, 146-foot-long continuous trench that is backfilled with ZVI/sand treatment media located near the upgradient site boundary along Golden Gate Drive.
- The PRB will be installed to approximately 29 feet bgs, including a 1-foot key into an existing clay layer observed from approximately 28 to 30 feet bgs.
- The treatment media will be prepared in a 55%/45% ZVI/sand ratio by volume, creating an equivalent 1.1-foot-thick treatment zone of 100% ZVI.

2.0 PRE-MOBILIZATION AND ADMINISTRATION

2.1 Pre-Construction Submittals

Magnus will prepare and submit the required pre-construction submittals for review and approval prior to mobilization, procurement and commencement of work.

The list of plans for the project includes, but is not limited to, the following documents:

- Site-Specific Health and Safety Plan (submitted under separate cover);
- Waste Management Plan (submitted under separate cover);
- Permeable Reactive Barrier PEP
  - Key Personnel
  - Company Qualifications
  - PRB Work Plan
  - Construction Quality Control Plan (submitted under separate cover)
  - Trench stability calculations certified by a CA Geotechnical Engineer (submitted under separate cover)
  - Pre-Construction Testing of ZVI/Sand media (submitted under separate cover)
  - Controlled Density Fill (CDF) and geotextile material certifications (submitted under separate cover)
- Soil and Stockpile Management Plan for Remediation
- Other Plans Required by the Engineer/Owner.

2.2 Permits and Licenses

Magnus understands that the Owner has secured the necessary permits for land access and potential easements including the City of Dublin Grading Permit. Magnus will comply with of the existing facility permits and with applicable Federal, State, and local regulations.

2.3 Construction Schedule

The Magnus construction schedule, including Site specific tasks, is included in *Appendix A* of this PEP and is based on a six-day workweek schedule at 10-hours per day. The project schedule is approximate and subject to change due to Owner approval, neighboring vendors, weather, and/or schedule constraints for cultural or biological restrictions.

2.4 Project Organization

Listed below is the proposed team for the Dublin Apartments PRB. This Magnus team has the necessary qualifications to meet the requirements of the project and have proven themselves on similar geotechnical and environmental remediation projects. Both Tino and James have experience with PRB wall construction using the proposed methods detailed in this Project Execution Plan.

Position	Personnel
Project Manager/Quality Control Manager	Tino Maestas, P.E.
Construction Manager/Superintendent	James Dodd
Quality Control Engineer	TBD

Reference *Appendix B* for personnel resumes and experience.

2.5 Equipment

Equipment mobilized to perform work at the Dublin Apartments PRB Project will arrive at the Site clean and well maintained free of any contaminants including soil or deleterious material. At arrival to the Site, Magnus Pacific performs an initial equipment inspection of all equipment received from either our own fleet or from local vendors. Magnus will mobilize the following equipment:

Equipment Description	Quantity
Komatsu PC400 Excavator or equivalent	1
Specialty Configured Long Stick (depth capability of 35 feet)	1
24-inch Digging Bucket	1
High Shear Mixer	1
6.5-CY Agitation Tank w/ circulation jets	1
4”x3” 50 HP Electric Centrifugal Mixing Pump	1
21,000-GAL Frac Tank	1
4,000-GAL Water Truck	1
RT 10k-lb Forklift	1
John Deere 160 Excavator or equivalent	1
Miscellaneous - Generator 75 KW	1
Miscellaneous - Pump 4"	1

3.0 MOBILIZATION AND SITE PREPARATION ACTIVITIES

During mobilization, Magnus will transport all equipment, materials and supplies to their designated staging area. The HASP will be available on site, reviewed and signed by all persons working on the project prior to set-up and preparation activities. ZCON will be kept informed of the Magnus mobilization and site preparation activities and progress.

3.1 Mobilization of Personnel and Equipment

All equipment delivered to the site will be inspected for cleanliness and pre-existing damage. Delivery and service vehicles, as well as all tools and equipment entering the site, are subject to the same inspection requirements. The objective of the inspection is to prevent the entry of dirty or contaminated equipment that could introduce or further spread contaminants.

All equipment delivered to the site will have up-to-date maintenance logs and will be in new or like new condition. Equipment not suitable for delivery will be rejected until the noted deficiencies are corrected. All deliveries will occur during normally scheduled working hours, Monday through Friday.

3.2 Utility Location and Verification

Prior to any subsurface intrusion, Magnus will contact USA North 811 to submit an on-line ticket for the PRB work at http://usanorth811.org/excavators/ a minimum of 48 hours prior to planned excavation. Magnus will pothole areas where suspect utilities have been identified within the limits of excavation activities for verification purposes if required and notify the Owner of the unknown utility.

3.3 Site Plan/Temporary Facilities

3.3.1 Site Zone Layout

Magnus will establish a site zone layout which will include a clear delineation of the work areas including excavation of waste Sites, environmentally sensitive areas, and the Contractor Staging Area & Support Zone in accordance with the HASP. Orange construction fence with appropriate signage will be installed along all zone boundaries to assure isolation of the work area from support areas. Personnel not directly involved with the project will not be allowed to enter the work areas. Crew break trailer or similar, sanitation facilities, parking area, medical

station, equipment supply will be coordinated with ZCON and shared facilities may be utilized in coordination with other Site activities.

3.3.2 Trailers and Facilities

Magnus will mobilize a Mobile Mini field office trailer that will be utilized by management personnel and also as a field break trailer for Site personnel. The field trailer will be powered by a portable generator. Good housekeeping practices shall be employed and established as the standard policy. A 10-foot x 20-foot Conex box will be mobilized and utilized for the storage of small tools, equipment, supplies and PPE.

3.3.3 Parking Areas/Transport to Work Areas

Magnus personnel will coordinate personnel parking at an off-site location and personnel will carpool with the Site Superintendent or QC technician. All deliveries and equipment that enter the worksite will be coordinated accordingly. Privately owned vehicles will not be permitted with the Project Site.

3.3.4 Equipment Storage/Maintenance Areas

Equipment maintenance will be performed within the designated staging area(s). If equipment requires major repair and can be moved, the equipment will be decontaminated and removed from the Site to perform the needed repair. If equipment requires a major repair and cannot be moved prior to repair, an additional exclusion zone will be set up around the equipment for the safety of maintenance personnel. The equipment will be gross decontaminated, moved (if possible) and repaired in the equipment maintenance exclusion zone.

Equipment and maintenance areas will be managed to minimize stormwater run-off. To prevent soil contamination from fluids dripping from equipment, plastic liners or containers will be placed under equipment requiring maintenance. Hazardous materials will be stored per manufacturer's requirements and flammable material will be stored in flammable material storage cabinets.

3.4 Project Surveying

Magnus has excluded surveying from our work. Horizontal alignment and benchmarks shall be coordinated by ZCON Builders. Magnus will verify vertical control of the excavation throughout excavation using laser levels or a transit referencing the benchmarks as vertical control.

3.5 SWPPP Controls

Magnus will utilize best management practices (BMPs) that will be used to prevent or minimize storm water from being exposed to pollutants from spills, cleaning and maintenance activities, and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery as well as debris, leftover paints, solvents, and glues from construction operations. Best management practices include, but not limited to silt fence, straw wattles, straw bales, inlet protection, existing vegetation, stabilized construction entrance/exit, and decontamination procedures to ensure that sediment transport is minimized where any Site disturbance occurs. The approved Site specific Stormwater Pollution Prevention Plan (SWPPP) will be adhered to and communicated to all Site personnel prior to commencing work.

The following controls will be implemented to prevent the off-site tracking of impacted soil from the Site:

1. Construction of a stabilized construction entrance/exit
2. Decontamination (wet or dry methods as detailed by the Specifications)
3. Street Sweeping during off-site transport of impacted soils

3.6 Haul Routes

Magnus submitted a Transportation and Haul Route Plan under separate cover to identify the various materials that will be imported to the Site and the to delineate Site access for all material and equipment deliveries.

Magnus will also coordinate with other trade specialties and on-site activities to limit construction access on the established internal routes to access the location where the PRB is to be installed in the Northwest corner of the property.

Internal haul route speed limits will be thoroughly discussed with Magnus truck drivers and operators and will be location dependent for site conditions and specific roadway features. An on-site traffic control plan will be written and submitted for approval during the pre-mobilization activities to detail communication protocols observed by ALL operators when traversing the Site.

3.7 Dust Control

Magnus does not anticipate dust control practices associated with the construction of the PRB.

3.8 Spill Control Measures

Magnus will comply with industry standard Spill Prevention administrative and engineering controls. The following represents some of the spill control measures that will be implemented by Magnus:

- Fueling operations will not use nozzles that can be locked in the “on” position;
- Drips and minor spills from process equipment will be controlled by drip trays, absorbent granules, socks, pads, etc.
- Oil in equipment will be contained by integrated vessels such as gearboxes and oil reservoirs;
- Operators will be in attendance of equipment when in operation and will respond to any developing oil leaks; and
- Absorbent pads will be readily available for minor spills.
- Spill containment including a lined area will be constructed for staging of the Busan biocide.

3.9 Decontamination

Magnus will establish a decontamination area for personnel and equipment. Personnel and equipment will be decontaminated before leaving the site and prior to demobilization.

All equipment leaving the project site or entering a public highway will be visually inspected for cleanliness prior to release. A pressure-washer may be employed to remove residual soil or waste materials before leaving the site as necessary, however, dry decontamination procedures will be employed throughout the term of the project. Equipment moving between work areas within the project site and requiring decontamination will be dry decontaminated. Trucks and equipment will be dry brushed and rumble/shaker plates may be placed at the exit points, as required, to assist with the removal of any residual soil from tires and tracks. All equipment operating in the exclusion zone will be wet decontaminated at the end of the project. Decontamination water will be collected and a vacuum truck will remove the rinsate water for off-site disposal. Sludge that accumulates from decontamination water will be disposed of off-site at appropriate permitted facility.

Excess PPE, disposable field equipment and contact debris will be placed in trash bags and disposed of at the local sanitary disposal facility.

4.0 PERMEABLE REACTIVE BARRIER (PRB)

Biopolymer slurry methods will be used for the installation of a permeable reactive barrier (PRB) wall. The design volume of the trench is approximately 146 feet long, 30 feet deep and 2 feet wide with porosity of 40%. The biopolymer slurry will use a biopolymer such as guar gum to stabilize the open trench and prevent migration of fluids within the trench to the surrounding formation. Several constituents associated with maintaining the stability of the biopolymer slurry include the biopolymer, soda ash, a biostat, and a breaker agent. The following sections details the constituents associated with the biopolymer slurry process and sequence of construction activities.

4.1 Material Requirements

The following material will be utilized during the Permeable Reactive Barrier construction. SDS sheets of all materials will be kept at the project site office and are enclosed at attachments to the Project Execution Plan.

4.1.1 Water

In accordance with the manufacturer recommendation for biopolymer slurry mixing, Magnus will use potable water provide by the City of Dublin. The mixer operator, who is trained in slurry mixing and associated water connections, will control the flow of water as needed. The water shall be tested in accordance with the Construction Quality Control Plan (CQCP) for hardness, pH, and total dissolved solids at the frequency of once per water source.

4.1.2 Biopolymer Slurry

Magnus will use Rantec G150 Biopolymer. G150 is Rantec's guar gum-based natural polymer (galacto-mannan) for biopolymer liquid shoring fluids (BLSF) and drilling muds. Molecular weight is in the range of 1.5 to 2.0 million. G150 BLSF has been used extensively for geo-technical stabilization of extraction trenches during excavation and construction and well bores during drilling. G150 is biodegradable and can be broken down completely thus maintaining the permeability of those soils and producing formations. Rantec has more than 16 years of experience in supplying G150 for use in liquid shoring and drilling applications. As part of Rantec's continued improvement program G150 in now easier to mix, less dusty and pro-duces more viscosity per pound. Guar bags will be packaged in 50-lb multi-wall paper bags and arranged on a wood pallet for localized movement on-site. Technical data sheets for the G150 guar is enclosed in *Appendix C*.

4.1.3 Enzyme Breaker

Magnus will use LEB-H™ which is an enzyme breaker supplied by Rantec. LEB-H™ is a high pH stable enzyme breaker. LEB-H™ is the breaker of choice for fluids having a pH of 6.0 or higher. Conventional enzyme breakers exhibit maximum enzyme activity at a pH of 5 to 6 and are less than 50% active at pH 7. In contrast, LEB-H™ has maximum activity at pH 7-8 and greater than 80% activity at pH 10. This makes LEB-H™ ideally suited for the high pH of preserved biopolymer systems and reactive systems that become alkaline in pH level. LEB-H™ is a freeze-proofed suspension of active enzymes in carrier liquid. Technical data sheets for the LEB-H™ is enclosed in *Appendix D*.

4.1.4 Soda Ash

Magnus will add soda ash to the mixture of water and guar in the mixer at the rate of 6-10 lb. per 1,000 gallons of water. The soda ash will be required to maintain the slurry pH between 10 and 11.5. Soda ash bags weigh 50-lbs, and it will be stored at the staging areas of the noted sites. Soda ash bags will be placed on wood pallets, and transported from the staging area to the mixer with a long reach forklift.

4.1.5 Biocide Preservative

A biostat, Busan 1202, will be added to the biopolymer slurry to slow the slurry degradation process expected from naturally occurring microbes. Busan 1202 is comprised of 50% glutaraldehyde. Busan 1202 will be added at the rate of approximately 1.0 quart/1000 gallons in order to achieve a concentration of 50 - 1000 parts per million in the slurry. Based on our discussions with Rantec Corporation, it is our understanding that the use of this material is registered in the State of California. Busan is packaged in 55 gallon drums. Magnus has procured 2 drums of Busan for use on this project. The MSDS for Busan 1202 and statement of certification are enclosed in *Appendix E*.

4.1.6 Granular Iron

The Zero Valent Granular Iron (ZVI) specified for this project is the Iron Aggregate product number ETI CC-1004 supplied by Connelly-GPM Inc based in Chicago, IL meeting the following gradation:

US Standard Sieve Size	Percent Passing by Weight
Number 8	95-100
Number 16	75-90
Number 30	25-45
Number 50	0-10
Number 100	0-5

The granular iron will be transported to the site in 3,000-lb bulk bags and in accordance with contract specifications. The granular iron shall be staged on wooden pallets and protected from moisture and contamination using impermeable covers. Magnus Pacific's CQC Manager will inspect the granular iron and receive a certificate of compliance for each truck load delivered to the site. Technical data sheets for the granular iron is enclosed in *Appendix F*.

4.1.7 Sand

Sand shall consist of clean sand (free of stones, clay, debris, organic material) and have a grain size distribution relatively similar to the zero-valent granular iron. The sand will be concrete sand supplied by one of two commercial suppliers yet to be determined. Concrete sand has been the primary filler material used for similar PRB installations for the following reasons: due to its similar grain size to the ZVI; concrete sand is a locally available product typically similar to site soils; and the sand can be bagged in 3,000-lb bulk bags for easy loading into the ready mix trucks for mixing.

Calculations for the exact sand and iron mixing ratios need to be field determined between Magnus Pacific and AMEC Foster Wheeler field representatives.

Magnus has sampled sand from Silica Resources Inc. in Marysville, California and Brown Sand Inc. in Lathrop, California. Since the initial submittal of this Project Execution Plan, the pre-construction testing has been complete and Magnus has selected the sand produced by Silica Resources with an initial moisture content of 0.2%. Gradations for both sand sources were performed by Geo-Logic Associates and are enclosed in *Appendix G*.

4.2 SEQUENCE OF FIELD ACTIVITIES

Magnus Pacific will complete field activities in accordance with the Contract scope of work and Technical Specifications. The following sections describe field activities. All activities will be documented and submitted on Magnus Pacific Subcontractor Daily Quality Control Report (SDQCR) in accordance with the CQCP (to be submitted under separate cover). A sample copy of the SDQCR is enclosed in *Appendix H*.

4.2.1 Site Set-up and Work Pad Construction

Workpad construction is performed by others and includes the over-excavation and re-compaction of a minimum 20-foot wide strip along the centerline of the PRB alignment. A well compacted workpad will be non-yielding under a static load and will help ensure vertical sidewalls during excavation.

Magnus will mobilize and setup the high shear colloidal mixer and batch plant assembly for manufacturing biopolymer slurry that includes a 6.5-CY agitator tank. The batch plant and 21,000-GAL frac tank will be setup outside of the exclusion zone as shown on Figure 1.

4.2.2 Surveying

The alignment stake-out of the PRB will be surveyed by performed by others. Magnus will construct the PRB to design depth indicated on the Drawing at approximately 30 feet deep. Following completion of work pad construction, a California licensed Professional Land Surveyor will survey the elevation of the work pad at the proposed PRB alignment, and provide off-set control points. The CQC Manager will provide an excavation cut sheet and stake out the proposed trench alignment at 10-foot intervals. The stakes/survey flags will include station number and the design depth.

4.2.3 Erosion and Sediment Controls

Magnus will install erosion control measures such as silt fence, run-off containment berms, drainage inlet protection, covering material supplies (i.e. G150 guar gum, ZVI, sand) with impermeable geomembrane, etc in accordance with the Site Specific Storm Water Pollution Prevention Plan. BMP locations and use are further discussed in the subsequent section under the Soil and Stockpile Management Plan.

4.3 ZVI PRB Wall Construction

The ZVI PRB wall will be constructed by excavating a 2-foot wide trench along the alignment of the PRB to a design depth of 30 feet bgs. Biopolymer slurry will be pumped in the trench as the excavation progresses to stabilize the trench excavation. The trench is keyed no more than 0.5-foot into the underlying clay stratum which occurs at an average elevation between 312 and 313 FT (NAVD29). The trench is then backfilled with a proportionate mixture of granular iron and sand to construct the ZVI PRB wall. Magnus Pacific will construct the ZVI PRB wall in accordance with Technical Specifications and Drawings.

4.3.1 Biopolymer Slurry Mixing

Magnus Pacific will mix the biopolymer slurry in a custom-designed, high-speed colloidal mixer. This 6.5-cy mixer has the capability to produce up to 500 gallons of hydrated biopolymer slurry per minute. The plant uses a multiple blade vertical mixing arm inside a baffled tank in combination with a six-inch trash pump to mix and circulate the biopolymer slurry.

Water will be added to the mixer via a pump and a pipe from the 21,000-GAL frac tank. G150 guar gum will be added at a rate of 60-lbs per 1000-GAL of water. Busan 1202 and soda ash will also be incorporated into each batch mix at a rate of 1.25-lbs and 3-lbs per 1000-GAL of water, respectively. This mix design is suggested as a starting point by the manufacturer

whereby the controlling factors for biopolymer slurry production is viscosity and pH which will dictate actual material usage which may vary depending upon Site water, groundwater inclusion, and or Site soils suspension and chemistry. The biopolymer slurry will be held in the agitator tank until the slurry is transferred into the trench through a 4-inch HDPE pipe or layflat hose. The biopolymer slurry will be tested twice daily for unit weight, viscosity, and pH in accordance with the CQCP.

4.3.2 Trench Excavation

Magnus Pacific will excavate the trench through the working pad to the depth required by the Drawings or to a minimum depth of practical refusal. Practical "refusal" will be defined as not being able to penetrate the key material at a minimum rate of 1-ft per half-hour per a 30 -foot horizontal "cut".

Magnus Pacific will perform trench excavation with a PC400 excavator equipped with long stick and a digging bucket which is capable of excavating to a depth of 35 feet. Magnus will introduce biopolymer slurry in the trench upon excavation and maintain biopolymer slurry level between 6 inches and 18 inches of the working pad elevation to maintain trench stability. The depth of the excavation will be measured and recorded every 10 feet along the length of the wall centerline following trench clearing to verify actual depth. Magnus will coordinate with the on-site Engineer representative to verify depth to top-of-clay and to ensure a no more than 0.5-foot embedment into the clay stratum. The trench bottom will be cleaned with the excavator bucket after establishing the key-in into the clay layer. Care will be taken not to over excavate into the clay beyond the design limit. Once each cut has been excavated and the soil has been removed, the excavator bucket will be passed across the trench bottom to remove the final soil particles. The trench will then be sounded to verify excavation depth.

The biopolymer slurry in the trench will be tested twice daily for unit weight, viscosity, and pH in accordance with the CQCP. Magnus will place excavated soils alongside the work pad or loaded directly into trucks for disposal at the designated on-site location. Reference Section 5.0 below for detailed review of the trench spoil management.

Magnus will prepare trench stability calculations for submittal under separate cover.

4.3.3 Granular Iron/Sand Mixing

Magnus Pacific will mix the granular iron and sand using commercially available ready-mix trucks to ensure a homogenous mix is achieved. The mixing equipment shall be clean upon its arrival to the site of deleterious material and/or debris. The granular iron and sand will both be shipped in 3,000-lb bulk bags and the mixing ratios will be established such as to ensure usage of one whole bag so that mixing proportions by weight are known based on a pre-determined ratio of bags of iron to bags of sand. The iron/sand ratio shall be determined prior to construction using actual bulk densities of the materials and will be submitted as an amendment

to the Project Execution Plan. Based on prior experience, ZVI/sand are mixed in 5-7 cubic yard batches which is based on the maximum weight capacity of the drum mixing unit.

The CQC Manager will test the iron/sand mixture percentages before placement in the trench for magnetic separation in accordance with the CQCP. Magnetic separation tests will be documented and immediately available for Engineer review. Testing results will be documented on the daily SDQCR, however, the magnetic separation test is a real-time test to ensure consistency in mixing and verify compliance with the basis of design. Any deficiency outside of the acceptable tolerance for material percentage will not be permitted for placement and corrective actions will include adding sand or iron or retesting or both to ensure compliance with the mix design. Deficiencies and corrective actions will be noted in the SDQCR. Reference *Appendix I* for the Magnetic Separation Test Procedure.

4.3.4 ZVI/Sand Mixture Placement

An 18-inch tremie pipe will be used to minimize the potential for segregation of the iron/sand mixture and to minimize the contact of the ZVI/sand media with the trench sidewalls during placement. The tremie will consist of a small hopper at the surface with steel/PVC tube in the trench. The ready mix trucks will transport the ZVI/Sand media to the trench where it will be dumped into the hopper of the tremie pipe and allowed to gravity flow down into the pipe. Holes in the pipe at various heights will allow the backfill to flow out of the pipe and form its natural angle of repose in the trench. Magnus will Partially saturate the PRB Media with water immediately prior to installation in the trench in order to minimize biopolymer slurry infiltration into the PRB Media in accordance with Item 3.4.D.1 of the specifications.

The base of the tremie pipe shall be maintained a distance of not more than 4 feet above the top of the placed mixture. Placement via the tremie pipe will cease upon establishing the ZVI/sand to elevation 331 FT (NGVD 92). Subsequent placement will continue from one end of the trench to the other and proceed by relocating the tremie pipe assembly approximately every 50 linear feet along the trench alignment. The lateral placement distance of the tremie pipe may be modified in the field based on soundings in the trench and lateral dissipation of the PRB backfill. PRB backfill shall be placed up to 10 feet below ground surface for the full length of the trench and a concrete vibrator may be sparingly and intermittently used to evenly distribute the PRB backfill to a flat surface elevation. Samples of the PRB backfill may be collected from the approximate mid depth of the trench a minimum every 20 feet along the trench as directed by the Engineer. The CQC Manager will test the in-place ZVI/sand backfill using the magnetic separation test to verify compliance with the specifications if required.

As PRB media is being placed, excess biopolymer shall be pumped out of the trench into a frac tank or other Engineer-approved storage container for sampling and disposal in accordance with Item 3.4.D.2 of the specifications. Recirculation wells will be installed in the trench as PRB placement occurs. The recirculation wells will be 4-inch diameter HDPE pipes evenly spaced every 25 feet in the trench and within 5 feet of the ends of the trench to capture the entire trench

length. The screen intervals of the wells shall be designed to maximize the circulation of the biopolymer breaking solution throughout the entire trench.

Magnus will install the conductor casings within the trench to facilitate future monitoring well installation (to be performed by others) as shown on the Drawings. The conductor casings will not be used for recirculation points without written approval from the Engineer.

4.3.5 Trench Flushing and Development

Following completion of ZVI/sand backfill placement and during PRB cap construction, Magnus Pacific will attempt to begin breaking the slurry while placing the CDF and as CDF placement occurs, excess biopolymer shall be pumped out of the trench into a frac tank or other Engineer-approved storage container for sampling and disposal in accordance with Item 3.4.D.2 of the specifications. This will allow the broken slurry level to drop to groundwater levels rather than having to deal with excess unbroken slurry.

The slurry will be degraded to water and residual material. Liquid enzyme breaker, LEB-H as supplied by Rantec, will be added as necessary to destroy the viscosity and filtrate properties of the slurry. The broken slurry may be pH adjusted to promote slurry degradation. The enzyme breaker is anticipated to be added at 2.5 to 7 pints per 1,000 gallons of slurry. The breaker is supplied in liquid form and weighs approximately 10 pounds per gallon. The gallon bottles are mixed with water to dilute the concentrated breaker and allow for better mixing/infiltration of the breaker throughout the backfilled trench.

Flushing shall be performed through the trench backfill material in order to remove residual material and to insure satisfactory hydraulic conductivity through the trench media. The flushing/breaking process will be performed using temporary wells that will be placed every 25 linear feet of the PRB. The wells will be slotted HDPE to allow the slurry or broken slurry into the wells. The wells will be placed in the trench following excavation and prior to backfilling. The wells will be held in place at the surface and be seated at the bottom of the trench into the underlying clay layer. Development wells will be left in the trench, filled with ZVI backfill in the PRB zone, and cut-off below ground surface.

Pumps will be used to circulate the trench fluids from each of these temporary wells while enzyme breaker is added to the trench at the surface and into the wells. Potable water may be flushed down the wells to assist with flushing the trench. The trench fluids will be circulated for two pore volumes and until the viscosity returns to less than 30 seconds on a marsh funnel viscometer (clean water is approximately 27 seconds and groundwater can be slightly higher). Viscosity will be monitored throughout the flushing period to determine the state of the broken slurry until it reverts back to water. The pH will be monitored basically for information purposes and to determine if pH adjustments are necessary to facilitate the breaking process.

4.4 PRB Protection/Cap Construction

Upon completion of backfill placement of ZVI/Sand and leveling of the backfill to elevation 331 FT (NGVD29), a geotextile fabric will be placed on top of the PRB wall. At this time, biopolymer slurry is still being maintained in the trench for trench stability throughout construction. The geotextile fabric will be rolled out adjacent to the trench excavation and grommets will be installed along the length of the geotextile (both sides). Strings will be tied off at the end of each grommet and as the geotextile is lowered into the trench, a 2-inch by 4-inch wooden stud will be used to gently seat the fabric flush on the PRB backfill and the sidewalls of the trench. The strings are used to help ensure that the geotextile is flush against the sidewalls of the trench and not balled up on top of the PRB backfill. Most common rolls of geotextile are15 feet wide and based on a 2-foot wide trench, 6.5-feet of geotextile will extend up the trench sidewalls from the top of the PRB backfill. Further, slits will be cut in the geotextile to ensure that the recirculation wells and monitor well casings are easily passed through the geotextile during deployment of the geotextile.

Magnus has coordinated with Pleasanton Ready Mix to provide the Controlled Density Fill backfill. Magnus will provide a mix design for the CDF at least 5 days prior to placement. The design parameters indicated in the specification include a compressive strength of minimum of 30 psi and maximum of 100 psi at 28 days and SDF shall have a final bleeding of less than 2.0 percent (retains 98.0 percent of the original height after placement, approximately ¼-inch per foot of depth). Ready mix trucks will arrive to the Site from the mixing plant with 10-cubic yard batches for immediate placement into the trench. CDF will be placed directly by the ready-mix truck by tremie pipe hung off of the tail of the chutes that extend into the biopolymer filled trench to minimize the drop height of the CDF on top of the PRB backfill. CDF batches will be placed in even lifts for the entire length of the trench up to existing grade. As ZVI media and CDF placement occurs, excess biopolymer shall be pumped out of the trench into a frac tank or other Engineer-approved storage container for sampling and disposal in accordance with Item 3.4.D.2 of the specifications.

5.0 SOIL AND STOCKPILE MANAGEMENT PLAN

Excavated trench soil and stockpile management will include the following steps:

1. The method for slurry trench excavation is performed by constructing a series of panels that are each excavated to depth before proceeding to the next panel. A panel may be 25 feet in length (as measured along the wall alignment) and will be excavated to the design depth under a biopolymer slurry.

2. Trench spoils will be windrowed alongside of the trench excavation promoting drainage of biopolymer slurry back into the trench. This windrow will be managed on a shift-per-shift basis and will be allowed 1-day to decant and drain residual slurry. Note the area in green hatching below located within the exclusion zone. All BMPs will be installed and in-place to prevent material and slurry from migrating outside of the designated area.

3. As the excavation progresses, the decanted trench spoils from the prior day will be loaded into a 10-CY haul truck and placed within the Stockpile and Staging Area shown in Figure 1 located within the exclusion zone. The Stockpile and Staging Area will be constructed with earthen berms at 3-ft tall around the perimeter of the area using fill borrowed from the within the footprint of the Stockpile and Staging Area. A 40-mil HDPE liner will be deployed on the bottom of Stockpile and Staging Area and wrapped up and over the perimeter berms to fully contain and segregate impacted trench spoils from non-impacted areas. Seams of geomembrane liner will be overlapped and taped with double-sided tape and a top-treatment tape. Stockpiles of trench spoils will be covered daily with visqueen and sand bags to prevent storm water from contact with trench spoils.

4. Stockpile trench spoils will remain within the Staging and Stockpile Area for a period of 7 to 14 days or until the material has been profiled and accepted for disposal at a Class II Non-hazardous waste facility. Upon acceptance, impacted trench spoils will be loaded into haul trucks for transportation to the disposal facility. The beds of the trucks will be tarped before leaving the site and the truck tires will be decontaminated using dry decon methods before the trucks are permitted to leave the Site.

6.0 TRANSPORATION AND DISPOSAL

Stockpiled soil will be staged within the Stockpile and staging area until confirmation of acceptance by the disposal facility. Stockpiled soil will be transported and disposed of as non-hazardous at a permitted disposal facility. Magnus has identified BTI as the transporter of the soil who is also coordinating disposal on behalf of Magnus. BTI has identified either Keller Canyon Landfill or Hay Road Landfill for disposal as alternate daily cover depending upon the concentration of Total Petroleum Hydrocarbon Gasoline/VOCs. Sampling and analysis of the excavation soil will be performed by Magnus Pacific and coordinate the profiling effort and communication with the disposal facility.

Disposal trucks will be truck plus trailer combo with a minimum capacity of 30-TN per truckload and Magnus will line each truck bed with a fitted liner, if required, prior to loading material into the trucks.

Trucks exiting the exclusion zone will drive over a set of rumble strips to shake off dirt that may be adhered to the truck tires and fallen on the edges of the truck bed. Further a laborer will stationed at the exit to sign out each truck and perform a dry decon of the truck using a broom to remove dirt that may be adhered to the outside of the trailer and tires. This laborer will perform a checklist of responsibilities to ensure that excavated material is not tracked onto public roadways

Magnus is committed to prevent the off-site tracking of impacted soil to public roadways that all controls specified will be employed, specifically:

A. Line trucks with plastic sheeting prior to filling.

B. During loading, use methods that minimize spillage of soil on the exterior of the trucks or ground surface.

C. Remove visible soil from the truck exterior prior to leaving the loading area.

D. If dry soil is present in the truck, wet the load prior to departure.

E. Trucks shall be tightly covered prior to departing the site.

F. Trucks must not leave the site if liquids are draining from the load.

G. Inspect each vehicle prior to leaving the removal area to ensure no soil is present or adhering to the exterior of the vehicle.

H. Exiting trucks must pass through a wheel wash and rock construction entrance prior to leaving the site. All vehicles exiting the wheel wash must stop on the Run Out Area. Magnus Pacific will inspect each vehicle to verify conformance with these specifications. Trucks not meeting these specifications will not be allowed to leave the site

7.0 SITE RESTORATION AND DEMOBILIZATION

Upon placement of CDF to existing grades, Magnus will place a steel plate over the conductor casing (8-inch diameter sonotubes) as shown in Detail 3 of Drawing 7 of the Project Drawings.

Site clean-up will be performed throughout the project and prior to demobilization. Site clean-up activities include, but are not limited to, the following:

- Removal of refuse/trash;
- Removal of temporary fencing, barriers, barricades and signage; and
- Removal of materials, equipment and supplies.

Upon completion of the work, Magnus will restore the site as required. This will include the removal of temporary facilities and utilities, decontamination of all equipment, removal of any unused materials and demobilization of equipment and personnel.

Magnus and ZCON will participate in a final walk-through inspection. Any deficiencies that are identified will be remedied accordingly.

Magnus will prepare and submit the required project close-out submittals within a reasonable time frame after demobilization activities.

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FIGURES

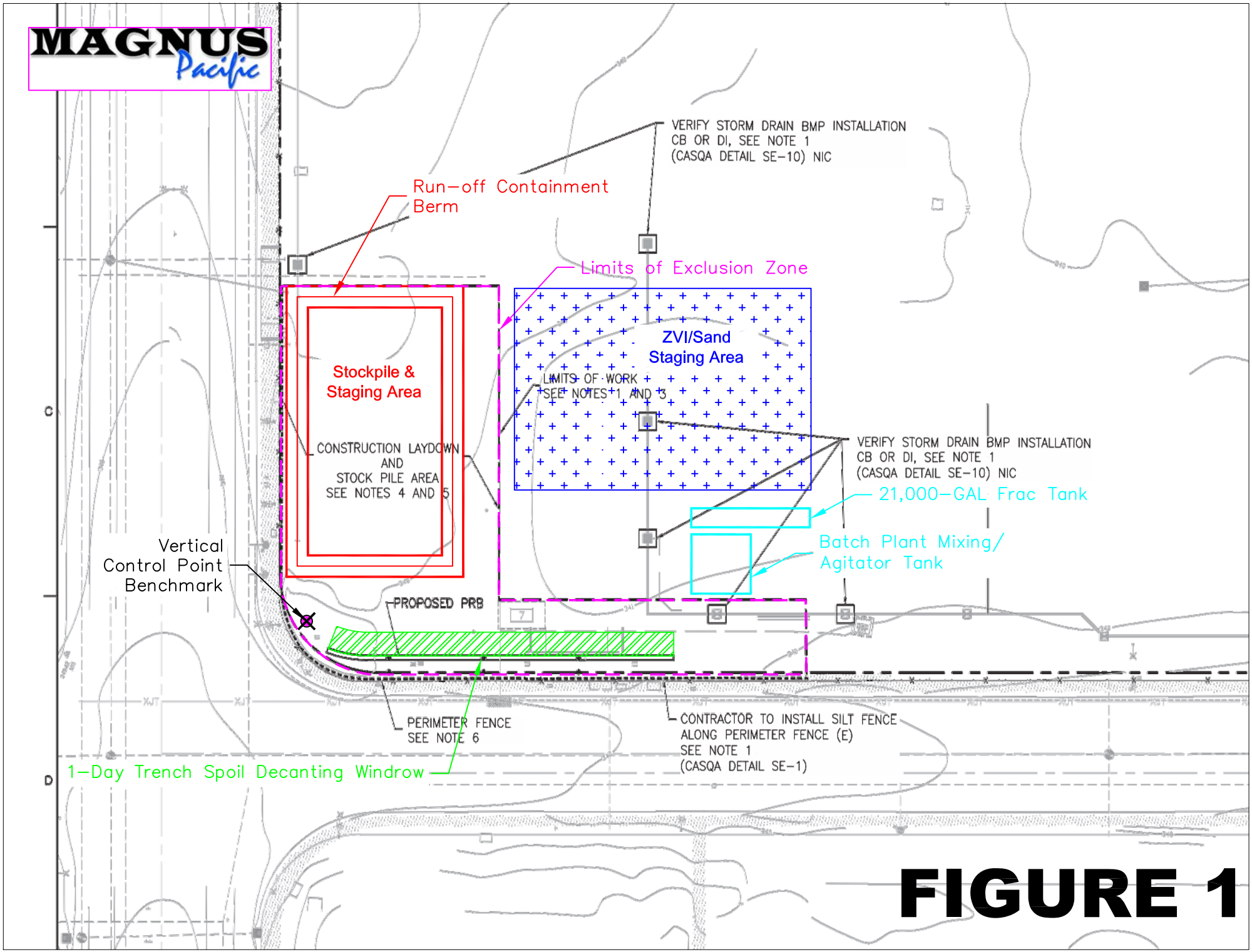
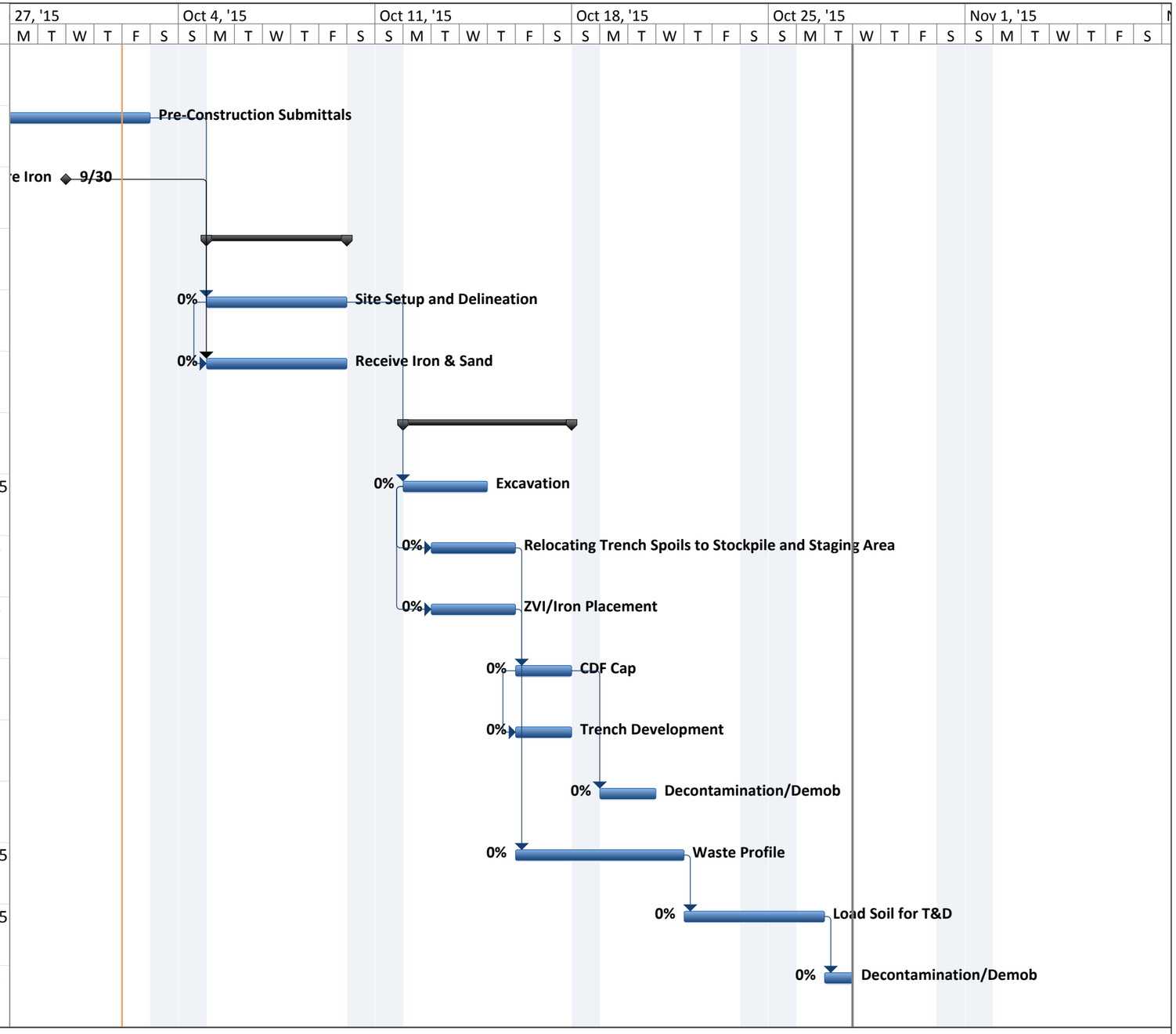

MAGNUS Pacific
VERIFY STORM DRAIN BMP INSTALLATION
CB OR DI, SEE NOTE 1
(CASQA DETAIL SE-10) NIC
Run-off Containment Berm
Limits of Exclusion Zone
Stockpile & Staging Area
CONSTRUCTION LAYDOWN AND STOCK PILE AREA SEE NOTES 4 AND 5
ZVI/Sand Staging Area
LIMITS OF WORK SEE NOTES 1 AND 3
VERIFY STORM DRAIN BMP INSTALLATION
CB OR DI, SEE NOTE 1
(CASQA DETAIL SE-10) NIC
21,000-GAL Frac Tank
Batch Plant Mixing/ Agitator Tank
Vertical Control Point Benchmark
PROPOSED PRB
PERIMETER FENCE SEE NOTE 6
CONTRACTOR TO INSTALL SILT FENCE ALONG PERIMETER FENCE (E) SEE NOTE 1 (CASQA DETAIL SE-1)
1-Day Trench Spoil Decanting Windrow
C
D

FIGURE 1

MAGNUS Pacific

APPENDIX A – CONSTRUCTION SCHEDULE

ID	Task Mode	Task Name	Duration	Start	Finish
1		Notice to Proceed	0 days	Thu 8/27/15	Thu 8/27/15
2		Pre-Construction Submittals	27 days	Thu 8/27/15	Fri 10/2/15
3		Procure Iron	0 days	Wed 9/30/15	Wed 9/30/15
4		**Mobilization**	**5 days**	**Mon 10/5/15**	**Fri 10/9/15**
5		Site Setup and Delineation	5 days	Mon 10/5/15	Fri 10/9/15
6		Receive Iron & Sand	5 days	Mon 10/5/15	Fri 10/9/15
7		**Permeable Reactive Barrier**	**6 days**	**Mon 10/12/15**	**Sat 10/17/15**
8		Excavation	3 days	Mon 10/12/15	Wed 10/14/15
9		Relocating Trench Spoils to Stockpile and Staging Area	3 days	Tue 10/13/15	Thu 10/15/15
10		ZVI/Iron Placement	3 days	Tue 10/13/15	Thu 10/15/15
11		CDF Cap	2 days	Fri 10/16/15	Sat 10/17/15
12		Trench Development	2 days	Fri 10/16/15	Sat 10/17/15
13		Decontamination/Demob	2 days	Mon 10/19/15	Tue 10/20/15
14		Waste Profile	5 days	Fri 10/16/15	Wed 10/21/15
15		Load Soil for T&D	3 days	Thu 10/22/15	Mon 10/26/15
16		Decontamination/Demob	1 day	Tue 10/27/15	Tue 10/27/15



Project: Dublin Apt Schedule 10-2
Date: Fri 10/2/15

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline
Split	External Tasks	Inactive Summary	Manual Summary	Progress
Milestone	External Milestone	Manual Task	Start-only	
Summary	Inactive Task	Duration-only	Finish-only	

APPENDIX B – PERSONNEL RESUMES

FLORENTINO MAESTAS, P.E.

Project Manager

Mr. Maestas has over 15 years of successful problem-solving expertise in construction engineering, project and cost administration, construction safety and environmental remediation challenges. Demonstrated project responsibility through various contract mechanisms and projects ranging in size from $500k to over $21,000,000.

EDUCATION AND TRAINING

- Graduate studies in Applied Mathematics specializing in numeric modeling - University of Colorado at Denver, 1999-2000
- Bachelor of Science, Civil Engineering with minor in Applied Mathematics - University of Colorado at Denver, 1995-1999
- Registered Professional Engineer (CA#71624), CA State License
- Qualified SWPPP Developer/Practitioner (QSD/QSP), CA State Certification
- OSHA 29 CFR 1910.120- OSHA 40-hr Hazardous Waste Operations training
- OSHA 29 CFR 1910.120- OSHA 8-hr Hazardous Waste Supervisor training
- US Army Corp of Engineers Construction Quality Management training

TECHNICAL EXPERTISE

- Slurry Trench Method Specialist
- Soil-Bentonite Slurry Trench Installation
- Cement-Bentonite Slurry Trench Installation
- Bio-Polymer Slurry Trench Installation
- Composite Wall Installation
- Develop Quality Management Systems
- Survey Coordination
- Design-Build Contracts
- Active Water Treatment Design & Const.
- Preparation of Regulator-Reviewed Plans
- Stormwater and Drainage Facility Design
- Environmental Sampling & Testing Methods
- Geotechnical Material Testing Methods

PROJECT EXPERIENCE

Sutter Butte Flood Control Agency, Feather River West Levee Project, Phase I – Yuba City, California. Construction of a soil bentonite cut-off wall along 7,500 linear feet of Feather River levee in Yuba City, California. The cut-off wall consisted of 500,000 SF using the single pass Deep Soil Mixing (DSM) method and 150,000 SF of conventional open trench method. Preparatory work included demolition, clearing, grubbing, stripping, utility removal / relocation, and levee degrade to facilitate cutoff wall construction. Once the wall was installed, the levee embankment was rebuilt from suitable levee fill. Additional work included a cement bentonite slurry wall that was constructed to close a gap left around a PG&E utility.

Santa Ana Levee Improvement Project – Huntington Beach, California. The Santa Ana Levee Improvement Project included in-situ stabilization of approximately 9,000 CY of soil. Magnus Pacific was contracted by the Orange County Sanitation District (OCSD) to repair the levees which were damaged under a separate contract to install a micro tunnel. Magnus Pacific developed a mix design that achieved a minimum of 250 psi in 28 days with a minimum 85% core recovery. All deep soil mixing was performed within 1 ft of the micro-tunnel utilizing a 6 ft auger. Other portions of work included: 5000 cubic yards of Jet Grouting, 699 compaction grout holes to stabilize material in the site utility corridor, 600 LF of cofferdam to create work area in the Santa Ana River, installation of a 1200 gpm dewatering and treatment system to dewater the work area.

Western Zirconium Subsurface Barrier Wall, Work Pad Construction and Soil Stabilization - Ogden, Utah. Construction of a 10,000 linear foot subsurface barrier wall, dike, working pad and access road around multiple wastewater evaporation ponds in order to satisfy requirements of the RCRA corrective action process for the State of Utah. The workpad was stabilized by soil-cement mixing 30% of the subsurface soils to a maximum depth of 5 feet using a cutter wheel. Grout mix design proportions had to be continually monitored and adjusted when necessary to account for soil contaminants, which affected the unconfined compressive strength of the in-situ soilcrete mixture. The project also included accommodation of existing underground utilities which required coordination not to avoid service interuption for more than 3 hours.

West Sacramento Levee Improvement Program – The Rivers Phase 1 – West Sacramento, California. Construction of a soil cement-bentonite cut-off wall along 2,950 linear feet of Sacramento River levee in West Sacramento, California. The wall had a surface area of approximately 372,000 square feet and was constructed to depths between 90 - 135 feet, a deep soil mixing method utilizing a multi-flight auger system. Preparatory work included demolition, clearing, grubbing and stripping of the 10-acre work area and degrading of the levee by 66,868 cubic yards to facilitate cutoff wall construction. Once the wall was installed, the levee embankment was rebuilt with 50,399 CY of suitable fill. Additional work included flattening the levee slopes and construction of other levee features including: a paved patrol road, river overlook, a paved bicycle path, an aggregate maintenance road, and several access ramps.

Upper NW Interceptor Sections 1 and 2 – Ground Improvements - Sacramento, California. The Upper Northwest Interceptor Ground Improvement Project included in-situ stabilization of approximately 650 CY of soil. Magnus Pacific was contracted by the Sacramento Regional County Sanitation District (SRCSD) to remediate sinkholes which had formed during the micro-tunneling installation of a 12 ft. diameter sewer line. Magnus Pacific developed a mix design that was to achieve a minimum of 20 psi in 28 days with a minimum 90% core recovery. All deep soil mixing was performed within 1 ft. of live underground utilities including a pressurized 36 inch water line and a 12 ft. diameter sewer line. Work was completed within a strict environmentally sensitive work window / location ahead of schedule and under budget.

Boeing - Plant 2, Seattle, Washington. Designed and assembled an active water treatment system to manage and treat dredge return water based for a nominal flowrate of 250k GPD. Active treatment components integrated mechanical separation techniques with electro-coagulation technology to return dredge return water in “excellent” clean water standards.

Former Paint and Pesticides Manufacturing Facility Remediation - Emeryville, California. Geotechnical Project Manager for a project that included installation and operation of an SVE system and water treatment plant to remove VOCs, construction of a rail road spur and a plate and pile tie back wall along a city street, precision block-by-block excavation of 147,000 tons of contaminated soil to below sea level, placement and compaction of 130,000 tons of clean fill material, installation of 500 If x 30-feet deep soil bentonite slurry wall, construction of three breaches in existing slurry wall, installation of 250 If x 30-feet deep HOPE interceptor trench, and final grading.

Whitefish River - Lower Reach Remedial Action - Whitefish, Montana. Project Manager for a river channel remediation and restoration project. The scope of work includes: the dredge removal of over 16,000 cubic yards of petroleum impacted sediment from the bed of the river and construction and operation of dewatering cells, drying, and shipping material off-site for disposal. Upon completion, the river bed will be backfilled with native river cobbles and the banks will be restored and re-vegetated.

Slurry Wall Construction at 5270 Lift of the Lined Ash Impoundment (LAI) - Fruitland, New Mexico. Project consists of constructing approximately 2000 lineal feet of 3-feet wide x 25-feet deep cement bentonite self-hardening slurry wall.

AREA 1501/1602 Strain-Relief Trench Installation- DUNDALK Marine Terminal, Baltimore, MD. Project Manager for construction of a 355 If x 15 feet deep Strain Relief Trench (SRT) using the slurry trench Method. The SRT incorporated peat at prescribed ratios with the soil-bentonite backfill to promote compression of the backfill and relieve stress induced by the formation onto existing infrastructure.

Former Refinery Slurry Wall Construction- Kenai, Alaska. Project Manager for the installation of a 470-foot long attapulgite clay and slag cement self-hardening slurry cutoff wall in conjunction with on-going construction activities at the Former Kenai Refinery in Nikiski, Alaska.

Pinto Creek Diversion Street - Miami, Arizona. Project Manager for the installation of two (2) soil bentonite cutoff walls at the up-gradient (3,705 SF) and down-gradient (3,611 SF) locations of the Pinto Creek Diversion Channel (PCDC) using the conventional Slurry Trench technique up to 21 feet bgs.

Refinery Oxidation Pond No. 1 Closure - Richmond, California. Project Manager for the stabilization of impacted sediments at the No. 1 Oxidation Pond with incorporation of dry amendments and general fill material. Amendments included Portland cement and/ or fly ash. The sediments were mixed with power mixers and excavator buckets equipped with machine grade control to ensure design mixing depth and area. Project also consisted of construction of the Pass 2 Laydown Area Expansion consisting of a minimum 3-foot thick stabilized layer, triple lined geosynthetic system with drainage features installed above and below the lined systems.

NTC Landfill Remediation Phase 1 - San Diego, California. Project Manager for the installation an SDG&E 12 KV electrical conduit into a new utility easement located through the former Naval Training Center (NTC) Landfill Site, the San Diego International Airport (SDIA) Taxi Staging Area and Long Term Parking Lot, and into the Navy Property of FITCPAC. Work required excavation and disposal of waste materials, characterized as burn ash, municipal solid waste (MSW), and construction and demolition debris (C&D) and dispose these materials at approximate offsite landfills.

Natomas Cross Canal South Levee Phase 1 Improvement Project, Sutter County, California. Project Manager for the construction of a 10,200 lineal feet of soil-cement-bentonite cutoff wall to depth ranging from 70 feet to 75 feet (after degrading the levee) using the DSM (Deep Soil Mixed) wall method and incorporating a test section using the Slurry Trenching technique.

Soil Bentonite Cutoff Wall and Zero Valent Iron Permeable Reactive Barrier Wall - Beale AFB, Marysville, California. Implementation of the remedial action plan employing a funnel and gate system that consisted of soil-bentonite cutoff walls and a zero valent iron (ZVI) permeable reactive barrier (PRB). Installed 1,500 lf of soil-bentonite (SB) cutoff walls, 30 feet deep using the SB Slurry Trench technique. Installed 650 square feet of a soil-cement-bentonite (SCB) plug on the bottom of the ZVI PRB and the construction of approximately 2,700 square feet of a ZVI PRB wall using the Bio-Polymer Slurry Trenching technique.

Portola Railyard Cutoff Wall and Extraction Treatment System - Portola, California. Project Engineer for the construction of a collection treatment system for removal and treatment of contaminated groundwater at an active railyard. Components of the treatment system included a 500-lf x 30-feet deep HDPE interceptor trench and five (5) 36-inch extraction wells. The project also included installation of temporary sheet pile walls for excavation and off-site disposal of 13,000 CY petroleum contaminated soil.

PSSC Plant Site Remediation - Union City, California. Resident Engineer responsible for managing soil, water, and air sampling, project surveying, quality control/quality assurance, and daily operations. Designed the grading, stormwater run-off controls, and closure cover of the on-site Waste Consolidation Area (WCA) to accommodate increases in wastes generated at the site. Placed over 400,000 bank cubic yards of "In-Place" solid waste containing mostly slag and metal-impacted soils in the WCA, excavated and stabilized over 42,000 bank cubic yards of total petroleum hydrocarbon impacted soils, and treated over 1,000,000 gallons of ground water and surface water.

Rocky Mountain Arsenal - Basin A Waste Consolidation Area (WCA) and the Hazardous Waste Landfill (HWL) - Commerce City, Colorado. Project Engineer responsible for the engineering and quality control for operations at both of the latter facilities. Worked with site employees and the client to provide documentation of activities. Field engineering duties included design implementation, survey coordination, working interactively with the client and consulting engineers to incorporate design changes. Responsible for the preparation and submittal of regulator reviewed plans and procedures. Excavated and hauled over 1,748,000 bank cubic yards of clean soil to the Basin A WCA and the HWL and placed over 1,678,000 back cubic yards of "In-Place" solid waste at Basin A.

JAMES DODD
Construction Manager

James Dodd serves as a Construction Manager for Magnus Pacific and is based in Sacramento, California. He has over 15 years of experience in the construction industry, including earthwork, levee construction, site remediation, slurry cut-off walls, bio-polymer drains, soil stabilization, and HDPE liner installation. Dodd's responsibilities include supervision of field operations, and implementing quality control and health and safety programs.

EDUCATION AND TRAINING

- 40-Hour HAZWOPER
- 8-Hour HAZWOPER Refresher (current)
- 8-Hour Supervisory
- USACE-CQM course
- CPR First Aid Training (current)

TECHNICAL EXPERTISE

- Slurry Wall Construction Specialist
- Soil Mixing
- Bio-polymer Slurry Trenching
- Earthwork and General Construction
- Hazardous Waste Remediation

KEY PROJECTS

Western Zirconium Subsurface Barrier Wall, Work Pad Construction and Soil Stabilization - Ogden, Utah. This project involved the construction of a 10,000 linear foot subsurface barrier wall, dike, working pad and access road around multiple wastewater evaporation ponds in order to satisfy the requirements of the RCRA corrective action process for the State of Utah. The workpad was stabilized by soil-cement mixing 30% of the subsurface soils to a maximum depth of 5 feet using a cutter wheel. Grout mix design proportions had to be continually monitored and adjusted when necessary to account for soil contaminants, which affected the unconfined compressive strength of the in-situ soilcrete mixture. The project also accommodated existing underground utilities, which required coordination not to avoid service interuption for more than 3 hours.

Red Dog Mine Raise Main Tailings Dam Stage IX Slurry Wall – Red Dog Mine, AK. This project was located in northern Alaska, approximately 90 miles north of the Arctic Circle and involved the construction of an 18,000 sf soil-attapulgite slurry wall along the wing wall of the main tailings dam. The slurry wall was keyed into a layer of moderately weathered bedrock at a depth of up to 33 feet below the work pad surface. The soil-attapulgite backfill was blended with dry kaolin clay to meet a minimum permeability of 1 x 10-7 cm/sec. The top 2 feet of the wall was capped with a soil-slag-cement backfill which also served as an anchor trench for a 100 mil HDPE liner for the continuing dam raise project.

West Sacramento Levee Improvement Program – The Rivers Phase 1 – West Sacramento, California. This project involved construction of a soil cement-bentonite cut-off wall along 2,950 linear feet of the Sacramento River levee in West Sacramento, California. The wall had a surface area of approximately 372,000 square feet and was constructed to depths between 90 - 135 feet, using a

deep soil mixing method with a multi-flight auger system. Preparatory work included demolition, clearing, grubbing and stripping of the 10-acre work area and degrading the levee by 66,868 cubic yards to facilitate cutoff wall construction. Once the wall was installed, the levee embankment was rebuilt with 50,399 CY of suitable fill. Additional work included flattening the levee slopes and construction of other levee features including: a paved patrol road, river overlook, a paved bicycle path, an aggregate maintenance road, and several access ramps.

West Sacramento Levee Improvement Program, CHP Academy – West Sacramento, California. This project involved the installation of a 2,100 linear-foot long soil bentonite cut-off wall along the Sacramento River. The wall had a surface area of approximately 219,000 square feet. The slurry wall specifications required a maximum permeability of 5x10-6 cm/ sec for the backfill material. Magnus Pacific was able to exceed those limits and achieved ideal permeability results of 1X10-8 cm/sec. The cutoff wall was constructed with a PC 1250 excavator capable of reaching depths of 85 feet. A D6N LGP Dozer and a PC200 Excavator were used for backfill.

Sacramento Area Flood Control Agency (SAFCA) - Natomas Cross Canal Phase 3B - Sacramento, California. This project required construction of an approximately 473,000 sf soil-bentonite cutoff wall to depths ranging between 28 to 45 feet. The soil-bentonite backfill was blended with import sand material to meet the backfill gradation of 20 to 60 percent passing the No. 200 sieve. The project specifications required the soil-bentonite backfill to have a maximum permeability of 5 x 10-7 cm/sec. The cutoff wall was constructed as part of the ongoing Natomas Levee Improvement Program for the Sacramento Area Flood Control Agency.

DTSC Sellars Brothers Former Radiator Shop Remediation - Burney, California. Magnus Pacific performed this project under contract with the California DTSC. The objective was to remediate the Sellars Brothers site located in Burney, California. A former radiator repair shop, the property was impacted with lead. A total of 727 tons of soil were excavated, stockpiled, and disposed of off-site as California Hazardous Waste. Work was performed in level C Personal Protective Equipment (PPE). Clean backfill was imported, placed, and compacted in accordance with project specifications. Slot trenching and hand digging were utilized near the adjacent property owner's buildings, fencing, and electrical utility lines to limit potential structural damage. All work was conducted safely, on schedule, and within budget with no negative feedback from the community or regulators.

Red Dog Mine Tailings Dam, Stage VIII Raise, Slurry Wall Construction - Red Dog Mine, Alaska. This project involved the construction of an 18,684 SF soil-clay (attapulgite and kaolin) cutoff wall as part of the Stage VIII raise of the main tailings dam, at the Red Dog Mine in northwestern Alaska. The cutoff wall was 558 feet long with a maximum depth of 34 feet and was keyed into competent bedrock. The northern end of the alignment was tied into an existing geomembrane curtain wall. An additional geomembrane panel was inserted into the top 4 ft of the cutoff for future extension of the liner over the face of the dam. The cutoff wall was constructed over a period of l5 weeks during July and August 2011.

Mare Island - Building 84 UST Removal Project - Vallejo, California. This project involved the excavation and removal of an abandoned underground storage tank (UST) located inside the historic Building 84 on Mare Island. Prior to removal activities, a shoring design plan was completed by a structural engineer to support an adjacent wall and other historic structures inside

Building 84. In addition, approximately 20 survey markers were placed on the adjacent wall and other areas within the building to monitor movement during the excavation and removal of the UST. The shoring system included the installation of light duty sheet piling to a depth of 11 feet below ground surface. Internal hydraulic bracing was installed as the excavation proceeded with depth. Magnus Pacific cut the UST into 3 sections and placed them into soil bins for offsite disposal. The excavated area was backfilled using onsite soil material. Site specific Chemicals of Concern (COC's) included TPH and lead. All work activities were performed in Level C and Level D protection.

Department of Toxic Substances Control, Wickes Site Remediation - Elmira, California. Working under contract for the DTSC, Magnus Pacific completed the remediation of the Wickes Forest Industries facility. More than 1,558 tons of arsenic, chromium, and copper contaminated soils were removed from inside the building. The remaining concrete pads were demolished and found to be highly contaminated, requiring disposal as RCRA debris and encapsulation. Excavations were backfilled with clean soil, compacted, and capped with aggregate base per the Operations and Maintenance Plan. All work was completed safely and without complaint from the surrounding community.

Mare Island - IR15 PRB Wall and Building 225 Remediation Project - Vallejo, California. This project involved the installation of a 3,000 square foot zero valent iron (ZVI) permeable reactive barrier (PRB) wall to a depth of approximately 30 feet below ground surface. The wall was located parallel to Mare Island Strait and adjacent to an existing quay wall. A total of three tie backs for the existing quay wall crossed the alignment of the trench and had to be protected in place during excavation and backfilling. The trench was excavated using the bio-polymer slurry trench technique. The ZVI was blended with import sand using concrete ready mix trucks. Once the desired mixture was achieved (approximately 40% iron by volume), the mixture was placed in the trench using the drop chute on the back of the ready mix truck and into a tremie pipe to minimize segregation during placement. The trench was backfilled up to 2.5 feet below ground surface and capped with CLSM. Other work included excavation and removal of contaminated soil inside Building 225. Excavated soils from Building 225 and the PRB trench were characterized for offsite disposal as Class II non-hazardous, Class I Cal Hazardous and Class I RCRA waste. Site specific chemicals of concern (COC's) included PCE, TCE and vinyl chloride. All work activities were performed in Level C and Level D protection.

Mare Island Crane Test Area Remediation - Vallejo, California. This project involved the remediation of a 4-acre site known as the Crane Test Area on the former Mare Island Naval Station in Vallejo, CA. The multifaceted scope of work included clearing and grubbing, removal of site debris, construction of a HDPE lined stockpile/screening area, excavation, screening and offsite disposal of soil waste, removal and replacement of existing site utilities, backfilling with onsite/import soil fill, placement of a clay cap, and site restoration. The project also involved heavy truck traffic, including export of approximately 10,000 tons of RCRA hazardous waste requiring stabilization and import of 20,000 CY of clay fill material, which required coordination and approval of traffic control plans with the City of Vallejo.

Eastern Drainage Swale Remediation - Eureka, California. The project work scope included Excavation and off-site disposal of dioxin contaminated soil, installation of an HDPE/bentonite composite liner, installation of geocell for slope stabilization, placement of wetland soil and treatment of 500,000 gallons of dioxin contaminated groundwater and rainwater. The water treatment system successfully treated over 500,000 gallons of water to below the detection limit for

dioxin. The project removed contaminants and reestablished tidal and upland wetlands.

Sacramento Area Flood Control Agency (SAFCA) Natomas Cross Canal South Levee Phase 2, Sacramento, California. This project involved the construction of 547,500 square-foot soil-bentonite cutoff wall to a depth of 75 feet below the crown of the levee. The cutoff wall was constructed along 7,300 linear feet of the levee with a maximum specified permeability of 1x10-7 cm/sec utilizing excavated soils and imported sand to meet the required maximum fine content of 60%. The cutoff wall was constructed using a Komatsu PC 1250 excavator equipped with a custom built boom and stick, capable of excavating to a depth of 85 feet.

U. S. Army Corps of Engineers – Levee Rehabilitation Repairs, Chowchilla, California. The work scope involved the construction of a 400,000 sf cement-bentonite cutoff wall to a depth of 25 feet. Due to unstable soil conditions in the levee, the cutoff wall was constructed using self-hardening slurry, composed of Portland cement, slag cement and bentonite. Other work tasks included levee degrade and reconstruction, accommodating underground utilities (gas and drainage), constructing aggregate base roads and grading, and erosion control.

Sacramento Area Flood Control Agency – Natomas Cross Canal Levee, Sacramento, California. This project involved the excavation and replacement of 100,000 CY of levee material, and construction of a 420,000 sf. deep soil mixing cutoff wall to a maximum depth of 80 feet. The cutoff wall with a maximum permeability of 5 x 10-7 cm/sec. and a minimum unconfined compressive strength of 40 psi provides isolation of potential flood water and protects the stability of the Cross Canal Levee in the event of 200 year flood event. The work was completed in six weeks utilizing four (4) crews working twenty four hours per day to meet the completion date.

US Army Corps of Engineers - American River Levee Contract 2, Sacramento, California. This project involved the construction of 2,000,000 square feet of soil-cement-bentonite cutoff wall to a maximum depth of 79 feet. The cutoff wall, with a maximum permeability of 5x10-7 cm/sec and an average unconfined compressive strength of 75 psi, protects the stability of an existing levee by providing isolation of river water seeping into the levee and its foundation soil. Five large excavators capable of excavating to a depth of 82 feet were utilized, working six days per week to complete the six (6) mile cutoff wall before the mandatory completion date of September 28, 2001. In order to meet the tight schedule and performance requirements, a backfill mix was designed that met the specified 28-day permeability requirement after only 14 days. The project included the completion of emergency work that consisted of excavation and replacement of a 400 foot and 2000 foot section of the levee that contained fractures and/or unsuitable material.

Lava Cap Mine Superfund Site – CH2M Hill and EPA, Grass Valley, California. This project involved remediation of the former Lava Cap Mine superfund site for the USEPA Region 9. Work included clearing and grubbing forested areas, decontamination of mine buildings, demolition and removal of select buildings, regrading and capping arsenic contaminated waste rock piles, constructing LLDPE and rock lined drainage channels, constructing a buttress and spillway structure, excavating arsenic contaminated soil and placing it in a capped tailings cell, constructing an LLDPE lined cap and vegetative cover over regraded tailings cell, installing rock mulch to limit erosion from contaminated slopes, hydroseeding, and erosion control.

University of California, Berkeley, Phase III - Richmond, California. This project involved numerous remedial action activities for the University of California's Richmond Field Station in Richmond, California. The team was contracted to provide services that included approximately 3,000 cubic yards of contaminated soil removal, waste transportation and disposal, and sampling and analysis.

Chemical Manufacturing Facility Remediation, Richmond, California. This project involved remediation of a 100-year-old chemical manufacturing facility site. This project was completed under extreme time constraints imposed by the United States Army Corps of Engineers and the Regional Water Quality Control Board. In the limited construction season, over 300,000 cubic yards of material was excavated, treated, and replaced at the site; approximately 150,000 tons of clean material was imported and placed in wetland habitat areas, and six (6) ponds were closed and capped. The project also included in-situ treatment of low pH water; demolition of existing structures; construction of 2000 linear feet of 36 to 48 inch drainage lines and associated outfall structures; two low flow interceptors; and offsite disposal of hazardous waste.

ExxonMobil - Groundwater Interceptor Trenches, Benicia, California. This project involved construction of two (2) groundwater interceptor trenches utilizing the Bio-Polymer slurry trenching and sheet pile methods. The trenches were sealed with a geotextile fabric to prevent migration of adjacent silts into the trenches. The interceptor trenches contained sumps to collect and treat groundwater. The project also included excavation and replacement of 75,000 CY of levee material, and construction of a 232,000 sf soil-bentonite cutoff wall to a maximum depth of 75 feet. The cutoff wall with a maximum permeability of 5 x 10-7 cm/sec provides isolation of potential flood water, and protects the stability of the Cross Canal Levee in the event of 200 year flood event. Other work included excavation and off-site disposal of unsuitable levee material, and reconstructing the levee with import material.

White Tanks FRS No. 3 Remediation Project, Maricopa County, Arizona. The scope of work included the construction of a soil-cement embankment structure (dam), approximately 2500 feet long by a nominal height of 33 feet and is located upstream and adjacent to an existing earthen embankment (dam). The crew was subcontracted to construct two soil-cement-bentonite slurry walls, each approximately 2,500 feet in length, located at the base of the new embankment structure. Challenges included developing a mix design that was able to achieve an unconfined compressive strength of 100 psi in 7 days.

U. S. Army Corps of Engineers - Hamilton Army Airfield Wetland Restoration, Novato, California. The work scope involved construction of a 500,000 CY levee and containment berms. The purpose of the levee and containment berm is to enhance wetland areas within the closed Army airfield. Other work included construction of a maintenance road, drainage facilities, demolition and installation of settlement monitoring.

U. S. Army Corps of Engineers - Napa River Flood Protection, Napa, California. This project involved excavation of 100,000 CY of floodplain and Marsh plain terraces alongside the Napa River in order to enhance flood protection. The scope of work included construction of a new levee along Imola Avenue, trucking and off-site disposal of excavated soil and debris, installation of a turbidity curtain, screening, and crushing 80,000 cy of concrete.

Soil-Bentonite Cutoff Wall, Empire, Colorado. This project involved construction of 225,000 square feet of soil-bentonite cutoff wall to be used as a clay core for a dam foundation.

Soil-Bentonite Cutoff Wall, Brighton, Colorado. This project involved construction of 670,000 square feet of soil-bentonite cutoff wall around a gravel pit to be used for water storage.

MAGNUS Pacific

APPENDIX C – BIOPOLYMER TECH DATA SHEET

Quality Polymers from

RANTEC

28 Years of Innovation

RANTEC CORPORATION
PO Box 729
Ranchester, WY 82839

Phone (307) 655-9565
www.ranteccorp.com
Email: rantec@ranteccorp.com

Rantec G150™ BioPolymer

DESCRIPTION

G150 is Rantec's guar gum-based natural polymer (galacto-mannan) for biopolymer liquid shoring fluids (BLSF) and drilling muds. Molecular weight is in the range of 1.5 to 2.0 million. **G150** BLSF has been used extensively for geo-technical stabilization of extraction trenches during excavation and construction and well bores during drilling. **G150** is biodegradable and can be broken down completely thus maintaining the permeability of those soils and producing formations. Rantec has more than 16 years of experience in supplying **G150** for use in liquid shoring and drilling applications. As part of Rantec's continued improvement program **G150** in now easier to mix, less dusty and produces more viscosity per pound.

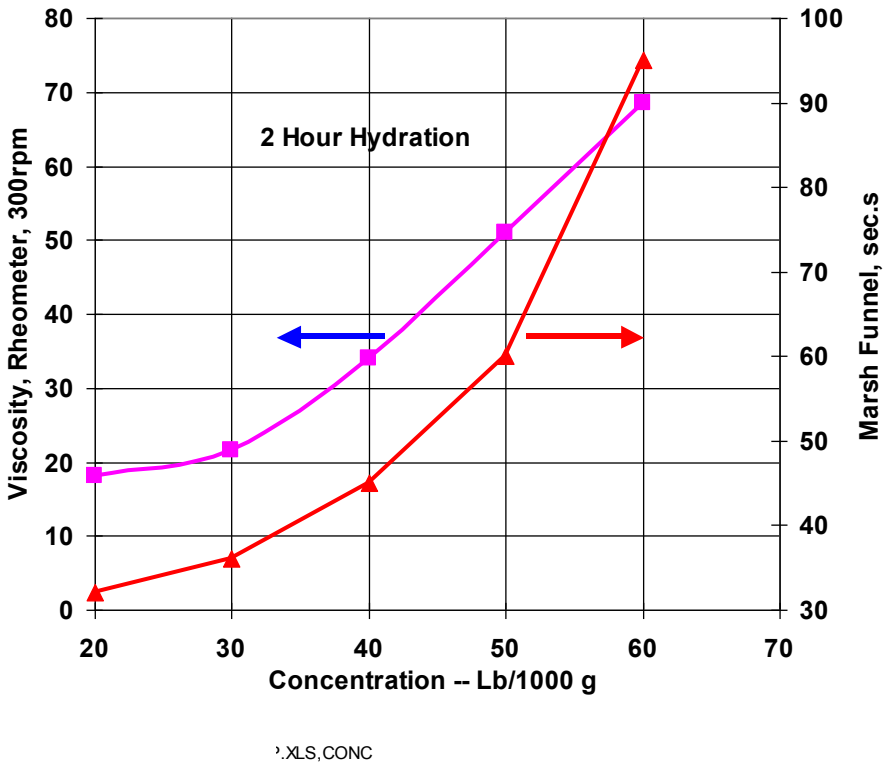


Figure 1: Viscosity with Concentration shows fresh water viscosity for a range of concentrations of Rantec **G150** biopolymer.

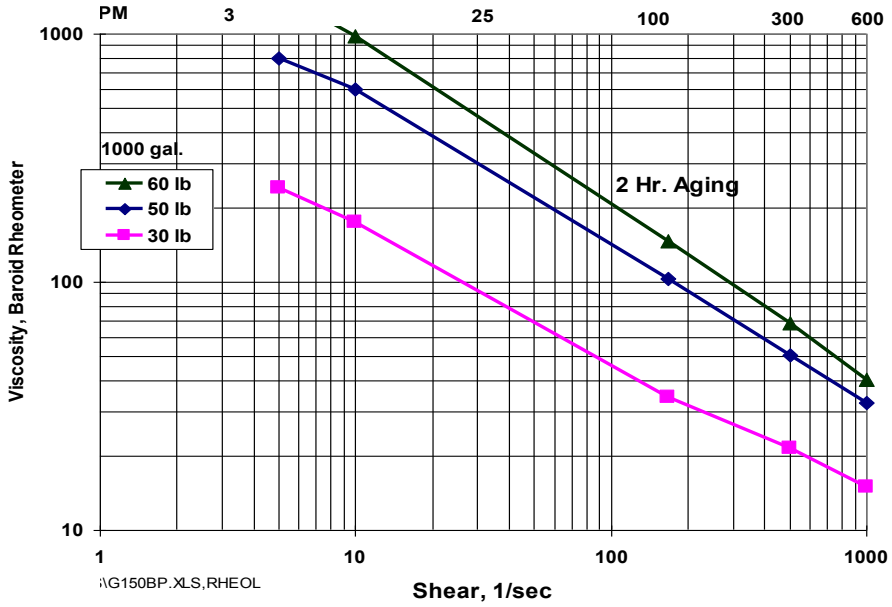
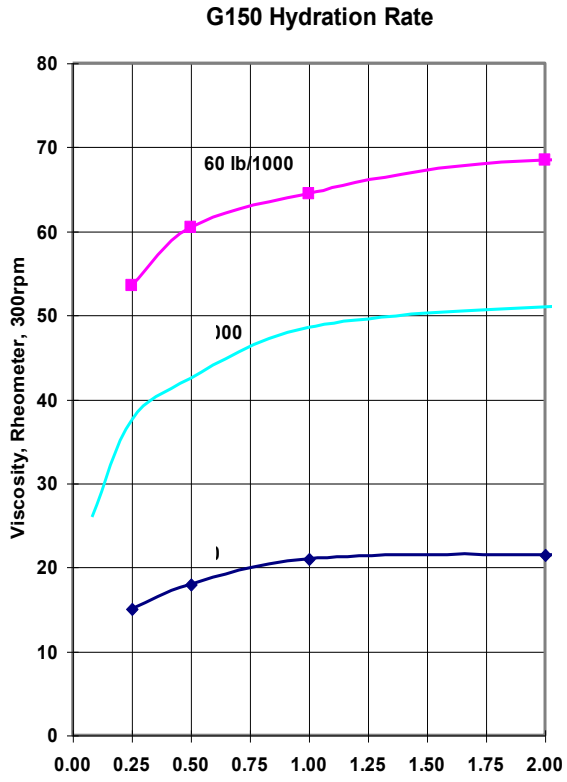


Figure 2: Rheology

Rantec **G150** BLSF is a non-Newtonian "shear-thinning" fluid. At low shear rates a gel is apparent, while under high shear, viscosity is very low.
Figure 2: Rheology demonstrates these rheological characteristics of the fluid.

High viscosity in the gel state or low shear condition is important for prevention of soil or water movement, while low viscosity is important under higher shear conditions such as mixing and pumping.

G150 fluids immediately recover original viscosity as soon as shear is relieved. High shear will not destroy the **G150** polymer molecule as can occur with many synthetic polymers.



YIELD AND MIXING

Typical design mix for G150 in difficult conditions would be:

G150	50 to 70 lb/1000 gallons
Busan 1059WS	1.2 to 2.0 lb/1000 gallons
Soda Ash	5 to 8 lb/1000 gallons to maintain pH 10
Lime	1 to 3 lb/1000 gallons if required to maintain pH 10

Rantec **G150** is designed to provide easy mixing and good yield of viscosity. **G150** yields workable viscosity in about 1 hour and is fully yielded in about 4 hours. **Figure 3: Viscosity Development** demonstrates the development of viscosity through a period of 24 hours. In 1 hour **G150** has yielded 90% of its viscosity. **G150** responds well to high shear mixing. Additional shear will accelerate the rate of viscosity yield.

Rantec will provide assistance in choosing equipment suited for good mixing of **G150** fluid. Systems can be engineered for a wide range of capabilities from manual addition to fully automated systems.

IN USE CHARACTERISTICS

Typical Use Rate – 60 lb/1000 gallons (0.72% w/w)
Odor of Broken Slurry – Not noticeable under aerobic conditions. May become putrid under anaerobic conditions.
BOD of Broken Slurry – Typically approximately 1200 ppm.
Useful Life of Slurry – 3 to 10 days depending upon temperature, soil conditions and additives
Degradability – Approximately 10 to 12% insoluble residue after enzyme break

PACKAGING

Rantec **G150** is available in packaging from 20 lb pails to 2000 lb super sacks. The most common packaging is 50 lb multi-wall paper bags. All packages are loaded on pallets and stretch wrapped to protect the product. For outside storage pallet covers can be provided on request.

SAFETY

G150 is a natural organic polymer often used in food ingredients as well as industrial applications. It is non-polluting and non-toxic. It is totally biodegradable, so disposal problems are reduced. Preservative can be used for long term applications. **G150** is non-mineral: therefore, it does not contaminate trenches, surroundings or assays.

RANTEC CORPORATION
17 KUKUCHKA LANE
RANCHESTER, WY 82839

Phone 307-655-9565 **Fax 307-655-9528** **email rantec@ranteccorp.com**

Safety Data Sheet

SECTION 1: IDENTIFICATION

Product Identifier
Trade Name: **G150 Guar Gum**

Recommended Use of the Chemical and Restrictions on Use
Product Use:
Uses Advised Against: None identified

Manufacturer/Supplier: **Rantec Corporation**
Address: 17 Kukuchka Lane
Ranchester, WY 82839

Phone Number: (307) 655-9565
Fax Number: (307) 655-9528
e-mail: rantec@ranteccorp.com

SDS Date of Preparation: December 15, 2014

SECTION 2: HAZARDS IDENTIFICATION

GHS Classification:
Combustible Dust
Respiratory Sensitizer Category 1

Label Elements:
Danger!

May form combustible dust concentrations in air.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Avoid breathing dust or fume.
In case of inadequate ventilation, wear respiratory protection.
IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
If experiencing respiratory symptoms: Remove victim to fresh air and call POISON CENTER or doctor.
Dispose of contents in accordance with local, regional and national regulations.

Other Hazards: None

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	%
Guar Gum	9000-30-0	100

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

Eye: Flush thoroughly with water. If irritation persists get medical attention.

Skin: No first aid should normally be needed. Wash exposed skin with soap and water after use. If irritation or rash develops, get medical attention. Use skin lotion if dryness occurs.

Inhalation: If symptoms of irritation or allergy develop, remove person from source of exposure to fresh air. Get immediate medical attention if asthmatic symptoms develop.

Ingestion: DO NOT INGEST. While this product is not toxic by ingestion, swallowing small amounts could cause complete blockage of the mouth, pharynx, trachea, esophagus and/or gastrointestinal system which may cause choking, suffocation and/or other life threatening medical conditions. Get medical attention immediately.

Most Important symptoms and effects, both acute and delayed:

May cause mechanical eye and skin irritation. Inhalation of dust may cause nose and throat irritation, coughing and sneezing. Inhalation may cause sensitization and difficulty breathing. Ingestion may cause gastric upset and nausea.

Indication of any immediate medical attention and special treatment needed: If inhaled and causes allergic reaction, seek prompt medical attention. Seek immediate medical attention if any amount is ingested.

SECTION 5: FIRE FIGHTING MEASURES

Extinguishing Media:

Use water fog, dry chemical, carbon dioxide or foam. Do not use solid water jet as that may create a dust cloud that can present an explosion hazard. Guar gum is very slippery when wet.

Specific Hazards Arising from the Chemical

High concentrations of dust suspended in air may present a potential explosion hazard. Settled dust presents a fire hazard. Re-suspension of the dust into the air by vibration, traffic, material handling, etc. in high concentrations in the presence of an ignition source could result in a dust explosion. Minimize the generation and accumulation of dust. Slip hazard: product is very slippery when wet.

Hazardous Decomposition Products: Combustion may produce oxides of carbon and nitrogen.

Special Protective Equipment and Precautions for Fire-Fighters:

Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:

Wear appropriate protective equipment. Avoid creating and breathing dust. Eliminate ignition

sources. Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosions. Safety and Health Information Bulletin. SHIB 07-31-2005; updated 11-12-2014. https://www.osha.gov/dts/shib/shib073105.html

Environmental Precautions:

Avoid unintentional release to the environment.

Methods and Material for Containment and Cleaning Up:

Do not use water or water based solvents. Collect dry and in a manner to minimize the generation of airborne dust or vacuum with a high vacuum cleaner. If a vacuum is used, explosion proof equipment is required. Non-sparking tools should be used. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentrations. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air.)

Reference to Other Sections:

Refer to Section 8 for protective equipment. Refer to Section 13 for disposal guidance.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling:

Avoid contact with eyes and clothing. Avoid creating and breathing dusts. Wear protective clothing and equipment as described in Section 8. Use only with adequate ventilation. Wash thoroughly with soap and water after handling. Minimize the generation and accumulation of dust. Keep dust away from open flames, hot surfaces and sources of ignition. Follow good housekeeping practices to keep surfaces, including areas overhead such as piping, drop ceilings, ductwork, etc. free from settled dust. Dry powders can build static electricity charges when subjected to friction of transfer and in mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Empty containers retain product residues. Follow all SDS precautions in handling empty containers.

Conditions for Safe Storage, Including any Incompatibilities

Keep containers closed when not in use.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits:

Chemical Name	Exposure Limits
Guar Gum (as PNOR)	5 mg/m3 TWA OSHA PEL (respirable), 15 mg/m3 TWA (total dust)

Note: The OSHA limits may not adequately protect workers from respiratory sensitization. Exposure levels should be maintained as low as possible for the workers' protection.

Refer to local regulations for specific requirements.

Exposure Controls:

Engineering Controls: Use explosion proof local exhaust ventilation as needed to maintain exposure concentrations below the recommended limits.
Eye and Face: Follow facility requirements. Dust goggles recommended for dusty conditions.
Skin: None required. Work gloves may be used to protect against mechanical irritation.
Respiratory: If the concentrations exceed the Threshold Value Limit (TLV), a NIOSH approved dust respirator, supplied air respirator or self-contained breathing apparatus is recommended. Select appropriate respiratory protection for respirable particulates based on consideration of the airborne workplace concentrations and duration of exposure. Select and use respirators in accordance with 29 CFR 1910.134, ANSI Z88.2, the NIOSH Respirator Decision Logic and good

industrial hygiene practice.
Protective Clothing: Appropriate protective clothing as needed to minimize skin contact.
Work Hygienic Practices: Wash thoroughly after handling.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid	**Appearance:** Creamy white powder
Odor: Bean-like odor	**Odor Threshold**: Not applicable
pH: Not applicable	**Relative Density:** Not applicable
Boiling Point: Not applicable	**Melting Point:** Decomposes
Vapor Pressure: Not applicable	**Water Solubility:** complete solubility
Vapor Density: Not applicable	**Evaporation Rate:** Not applicable
Viscosity: Not applicable	**Pour Point**: Not applicable
Flash Point: Not applicable	**Flammable Limits: LEL:** 0.04 oz/cf
Autoignition Temperature: None	**Flammable Limits: UEL:** Not applicable
Percent Volatile: Not applicable	**Flammability (solid/gas):** Not applicable
Partition Coefficient: n-octanol/water: Not applicable	**Decomposition Temperature:** None
Explosive Properties: Combustible dust	**Oxidizing Properties:** None

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Not reactive.

Chemical Stability: Stable under normal conditions.

Possibility of Hazardous Reactions: Reactions with strong oxidizers may generate heat.

Conditions to Avoid: Keep away ignition sources. Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosions. Safety and Health Information Bulletin. SHIB 07-31-2005; updated 11-12-2014. https://www.osha.gov/dts/shib/shib073105.html

Incompatible Materials: Avoid strong acids and oxidizing agents.

Hazardous Decomposition Products: Thermal decomposition may produce carbon and nitrogen oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects:

Eye Contact: Contact may cause irritation based on studies with laboratory animals.

Skin Contact: Contact may cause dryness.

Inhalation: Inhalation of dust may cause irritation of the nose, throat and respiratory passages. Symptoms include coughing, sore throat, nasal congestion, sneezing wheezing and shortness of breath. May cause allergic reaction in susceptible individuals.

Ingestion: Ingesting small amounts could cause complete blockage of the mouth, pharynx, trachea, esophagus and/or gastrointestinal system which may cause choking, suffocation and/or other life threatening medical conditions.

Acute Toxicity Data:
Guar Gum: Oral rat LD50: 9.4g/kg

Guar gum is a natural food additive, although direct use in powder or pill form is banned by the FDA due to the risk of respiratory or gastrointestinal blockage.

Chronic Health Effects: Prolonged overexposure to any nuisance dust may cause lung injury. Symptoms include cough, shortness of breath and reduced pulmonary function.

Germ Cell Mutagenicity: No data available. This product is not expected to cause mutagenic activity.

Carcinogenicity: None of the components of this product are listed as carcinogens or suspected carcinogens by OSHA, IARC or NTP.

Developmental / Reproductive Toxicity: No data available. This product is not expected to cause adverse effects on reproduction or development.

Specific Target Organ Toxicity (Single Exposure): No data available.

Specific Target Organ Toxicity (Repeated Exposure): Prolonged overexposure to any nuisance dust may cause lung injury. Symptoms include cough, shortness of breath and reduced pulmonary function.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity:
No data available. This product is not expected to be toxic to aquatic organisms.

Persistence and Degradability:
No data available.

Bioaccumulative Potential:
Not expected to bioaccumulate.

Mobility in Soil:
No mobility in soil is expected.

Other Adverse Effects: None known.

SECTION 13: DISPOSAL INFORMATION

Waste Treatment Methods

Disposal Method: Dispose in accordance with all local, state and federal regulations.
Empty Container: No special handling or disposal is required.
General Comments: It is the responsibility of the user of this product to characterize wastes generated to determine if the waste meets the definition of hazardous waste. The product uses, transformations, synthesis, mixtures, etc., may render the resulting end product subject to regulation.

SECTION 14: TRANSPORT INFORMATION

	UN Number	UN Proper Shipping Name	Transport Hazard Class(s)	Packing Group	Environmental Hazards
US DOT	None	Not regulated	None	None	Not applicable
EU ADR/RID	None	Not regulated	None	None	Not applicable
IMDG	None	Not regulated	None	None	Not applicable

Special Precautions for User: None

SECTION 15: REGULATORY INFORMATION

Safety, Health and Environment Regulations:

US Regulations:
EPA SARA 311/312 Hazard Classification: Fire Hazard, Acute Health

EPA SARA 313: This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372): None

Protection Of Stratospheric Ozone: This product is not known to contain or to have been manufactured with ozone depleting substances as defined in 40 CFR Part 82, Appendix A to Subpart A.

CERCLA Section 103: This product is not subject to CERCLA spill reporting requirements. Many states have more stringent release reporting requirements. Report spills when required under federal, state and local regulations.

California Proposition 65: This product is not known to contain chemicals regulated under Proposition 65.

Canadian Regulations:
Canadian WHMIS: D-2-A
This product has been classified in accordance with the hazard criteria in the CPR and the SDS contains all the information required by the CPR.

Chemical Inventories:
US TSCA All of the components of this material are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory or are exempt.
Canadian CEPA: All of the components are listed on the Canadian DSL or are exempt.
Australia: All of the components are listed on the AICS inventory or are exempt.
China: All the components are listed on the Chinese chemical inventory or are exempt.
Philippines: All the components are listed in the Philippine Inventory.
New Zealand: All of the components are listed on the New Zealand Inventory of Chemicals.
Korea: All of the components are listed on the Korean Existing Chemicals Inventory
Japan: All the components are listed on the Japan Inventory of existing chemicals.

SECTION 16: OTHER INFORMATION

NFPA Ratings:
Health: 1 Flammability: 2 Reactivity: 0

HMIS Ratings:
Health: 1 Flammability: 2 Reactivity: 0

SDS Date of Preparation/Revision: December 15, 2014

Revision History: Conversion to GHS format. Changes in all Sections.

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MAGNUS Pacific

APPENDIX D – ENZYME BREAKER TECH DATA SHEET

Quality Polymers from

RANTEC

30Years of Innovation

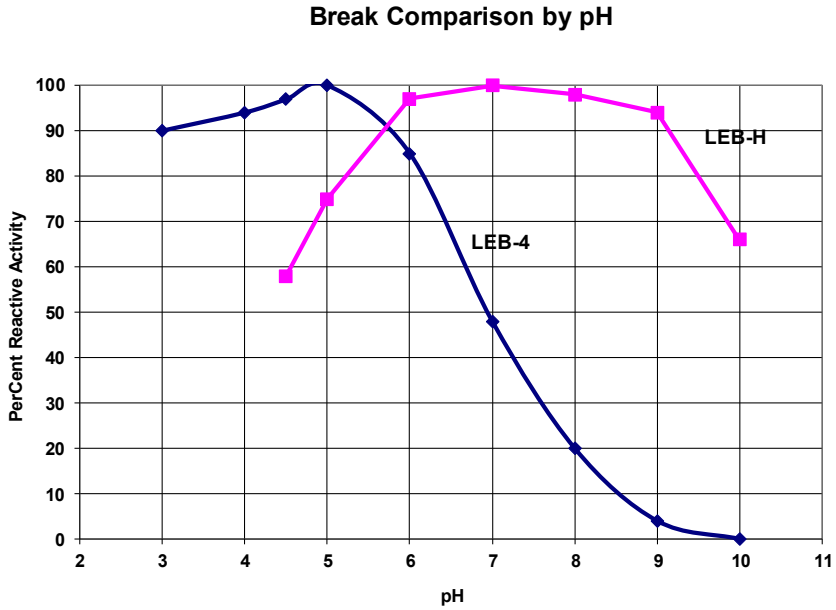
RANTEC CORPORATION
PO Box 729
Ranchester, WY 82839

Phone (307) 655-9565
www.ranteccorp.com
Email: rantec@ranteccorp.com

LEB-H™
HIGH pH ENZYME BREAKER

DESCRIPTION:

LEB-H™ is a high pH stable enzyme breaker. **LEB-H™** is the breaker of choice for fluids having a pH of 6.0 or higher. Conventional enzyme breakers exhibit maximum enzyme activity at a pH of 5 to 6 and are less than 50% active at pH 7. In contrast, **LEB-H™** has maximum activity at pH 7-8 and greater than 80% activity at pH 10. This makes **LEB-H™** ideally suited for the high pH of preserved biopolymer systems and reactive systems that become alkaline in pH level. **LEB-H™** is a freeze-proofed suspension of active enzymes in carrier liquid.



LEB-H™ Benefits

Effective Up To 140 °F

Functions up to pH 11.0

Convenient Liquid Form

Ideal for breaking Borate Gals

LEB-H™ Physical Properties

Form: Liquid	Charge: NA
Color: Light brown	Chemical Family: Protein
Odor: Fermentation	Flash Point: None
Solubility: Water, brine	Wt. per Gal: 9.0 lbs.

RANTEC
LEB-H™ LIQUID ENZYME BREAKER

APPLICATION and USE RATE

LEB-H™ is designed for use in borate crosslinked fracturing, Zero Valent Iron slurries, either injected or in backfilled trenches. Rate of break depends upon dose, pH and temperature. The following guidelines are used a general recommendations only and may vary with field conditions.

Hydraulic Fracturing with Borate Gel	0.5 to 1.5 pints per 1000 gallons
Trenches for 24 to 48 hour break	2.5 to 7.5 pints per 1000 gallons
Jet Grouting and Hydraulic Fracturing (on the fly addition)	7.5 to 60 pints per 1000 gallons

LEB-H™ is a highly concentrated solution and to facilitate handling should always be diluted in fresh water prior to use. Add 1 gallon LEB-H™ to 9 gallons of water.

COMPATIBILITY

LEB-H™ must not be blended with any other additive (except water) prior to use.

HANDLING AND STORAGE RECOMMENDATIONS

LEB-H™ should be stored in cool, dry location. Shelf-life is typically 1-2 years but can be extended by storing under refrigeration. Keep all containers tightly closed. **LEB-H™** is non-toxic and virtually harmless. It may be irritating if contacted with the eyes. It may irritate the skin of extremely sensitive individuals. Chemical splash goggles and impervious gloves are recommended when handling **LEB-4™** . Refer to the Material Safety Data Sheet for more detailed information.

PACKAGING

LEB-H™ is packaged in 1 gallon, 5 gallon, and 55 gallon containers.

SAFETY DATA SHEET

Issuing date 28-Oct-2010 **Revision Date** 20-Mar-2015 **Version** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name LEB-H

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

Recommended use Oilfield Chemical
Uses advised against No information available

1.3 Details of the supplier of the safety data sheet

Supplier
Rantec Corporation
PO Box 729
Ranchester, WY 82839
Phone 307-655-9565
For further information, please contact:
E-mail Address No information available

1.4 Emergency telephone number

Emergency telephone 1-307-655-9565

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Classification according to EU Directives 67/548/EEC or 1999/45/EC
For the full text of the R-phrases mentioned in this Section, see Section 16

Symbol(s)
Not dangerous

2.2 Label Elements

2.3 Other information

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

For the full text of the R-phrases mentioned in this Section, see Section 16

Additional information
Not Hazardous (OSHA 29 CFR 1910.1200)

4. FIRST AID MEASURES

4.1 Description of first-aid measures

Eye contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.

Skin contact
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Ingestion
Call a physician or Poison Control Center immediately. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth.

Inhalation
Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. If symptoms persist, call a physician.

Protection of First-aiders
Remove all sources of ignition. Use personal protective equipment.

4.2 Most important symptoms and effects, both acute and delayed

4.3 Indication of any immediate medical attention and special treatment needed.

Notes to physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media
Use CO2, dry chemical, or foam.

Extinguishing media which shall not be used for safety reasons
No information available.

5.2 Special hazards arising from the substance or mixture

Special Hazard
None in particular.

5.3 Advice for firefighters

Special protective equipment for fire-fighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition. Evacuate personnel to safe areas. Ensure adequate ventilation. Use personal protective equipment.

See Section 12 for additional Ecological information.

6.2 Environmental precautions

Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.

6.3 Methods and materials for containment and cleaning up

Prevent further leakage or spillage if safe to do so. Dike far ahead of liquid spill for later disposal.

Soak up with inert absorbent material. Clean up promptly by sweeping or vacuum. Keep in suitable, closed containers for disposal. Do not flush into surface water or sanitary sewer system.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Do not breathe vapors or spray mist. Keep away from open flames, hot surfaces and sources of ignition. Avoid contact with skin, eyes and clothing. Wear personal protective equipment. When using, do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities

Keep in properly labeled containers. Keep containers tightly closed in a dry, cool and well-ventilated place.

7.3 Specific end uses

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure Guidelines Contains no substances with occupational exposure limit values

Exposure limits Contains no substances with occupational exposure limit values

Derived No Effect Level (DNEL) No information available

Predicted No Effect Concentration (PNEC) No information available

8.2 Exposure controls

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Eye Protection	Safety glasses with side-shields. Goggles.
Hand Protection	Impervious gloves.
Skin and body protection	Wear suitable protective clothing.
Respiratory protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn.

Hygiene measures Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing.

Environmental Exposure Controls Do not allow material to contaminate ground water system.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical State	Liquid	**Appearance**	clear
Odor	Mild - Musty	**Color**	amber - brown

Property	Values	Remarks/ Method
pH	7.0-7.5	
Freezing Point	-10 °C / 14 °F	
Boiling point/boiling range		
Flash Point	Not applicable	
Evaporation rate		No data available
Flammability (solid, gas)		No data available
Flammability Limits in Air		No data available
upper flammability limit		
lower flammability limit		
Vapor pressure		No data available
Vapor density		No data available
Relative density	1.090-1.110	
Water solubility	completely soluble	
Solubility in other solvents		No data available
Partition coefficient: n-octanol/water		No data available
Autoignition temperature		No data available
Decomposition temperature		No data available

Viscosity, kinematic	No data available
Explosive properties	No data available
Oxidizing Properties	No data available
Softening point	
Molecular Weight	
VOC Content	No data available
Density Bulk Density	9.10-9.26 lbs/gal

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available.

10.2 Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerization does not occur.

10.4 Conditions to Avoid
Heat, flames and sparks.

10.5 Incompatible Materials
Strong oxidizing agents.

10.6 Hazardous Decomposition Products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Product Information

Inhalation	May cause irritation.
Eye contact	May cause irritation.
Skin contact	May cause irritation.
Ingestion	May cause irritation.

Chronic toxicity

Carcinogenicity	Contains no ingredient listed as a carcinogen >0.1%
Sensitization	May cause sensitization of susceptible persons
Reproductive toxicity	No information available
Mutagenic effects	No information available
Developmental Toxicity	No information available
Teratogenicity	No information available
Target Organ Effects	No information available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Ecotoxicity effects The environmental impact of this product has not been fully investigated.

12.2 Persistence and degradability

No information available.

12.3 Bioaccumulative potential

No information available.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

No information available

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste from Residues / Unused Products Dispose of in accordance with local regulations.

Contaminated packaging Do not re-use empty containers.

EWC Waste Disposal No: According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used

14. TRANSPORT INFORMATION

DOT Not regulated

IMDG/IMO Not regulated

ADR/RID Not regulated

ICAO/IATA Not regulated

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories

TSCA	Complies
EINECS/ELINCS	Complies
DSL/NDSL	Complies
PICCS	-
ENCS	-
IECSC	-
AICS	-
KECL	-

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
PICCS - Philippines Inventory of Chemicals and Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
AICS - Australian Inventory of Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

15.2 Chemical Safety Assessment

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

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

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.

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

NFPA	**Health Hazard** 1	**Flammability** 0	**Stability** 0	**Physical and chemical hazards** -
HMIS	**Health Hazard** 1	**Flammability** 0		**Physical Hazard** 0

Personal protection - .

Full text of R-phrases referred to under sections 2 and 3

Full text of H-Statements referred to under sections 2 and 3

Prepared By HSE Department

Issuing date	28-Oct-2010
Revision Date	20-Mar-2015
Revision Note	Not Applicable.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

US Only: This safety data sheet complies with the requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

Disclaimer
While the information and data contained herein are presented in good faith and believed to be reliable, nothing herein shall be deemed to constitute a warranty, express or implied, that the information or data is reliable, accurate, or complete or that the products described herein are merchantable or fit for a particular purpose or that said information, data, or products can be used without infringing the intellectual property rights of third parties. Individuals who receive the products or the information or data relating to the products described herein, must use their own judgment in determining fitness for a particular purpose. Unless otherwise stated, the information or data contained herein relates to the products when not used in conjunction with any other products or materials. We disclaim all express and implied warranties of merchantability, fitness for a particular purpose, and non-infringement. We shall not be liable for any loss or damage that may occur from the use of the products described herein, including the use of the products in conjunction with other products or materials, or reliance on the data or information described herein.

MAGNUS Pacific

APPENDIX E – BIOCIDE TECH DATA SHEET

Tino Maestas

From: Stephanie B. Zier <sbz@ranteccorp.com>
Sent: Monday, September 21, 2015 7:46 AM
To: Tino Maestas
Subject: California Quote
Attachments: Near Dublin CA REVISED September 21 2015.docx

Tino,

Both liquid Busans 1058 and 1202 are registered in California. Busan 1202 has a higher active biostat concentration, so less product and shipping costs will be required. Therefor I am recommending the 1202.

There were a couple typos on Rick's quote. Attached is a revised quote. Quantities have been calculated for a trench 146' L x 30' D x 2.5' W.

Best Regards,
Stephanie Zier
Technical Sales
Phone: 307-655-9565 x 202
Fax: 307-655-9528
Mobile: 307-751-6033

Rantec Corporation
PO Box 729
17 Kukuchka Lane
Ranchester, WY 82839
www.ranteccorp.com

Tino Maestas

From: Stephanie B. Zier <sbz@ranteccorp.com>
Sent: Monday, September 28, 2015 6:54 AM
To: Tino Maestas
Subject: FW: Question

Tino,

Please see the reply from Buckman below. I hope this helps.

"That just means that we do have the product registered in California. Before Buckman can sell products within each state we have to confirm we have a State EPA registration within that state. Busan 1202 is registered in the state of California. I hope this answers your question.

Brent L. Sears
Area Manager - Performance Chemicals-Oil & Gas"

Best Regards,
Stephanie Zier
Phone: 307-655-9565 x 202
Mobile: 307-751-6033

-----Original Message-----
From: Karhu [mailto:72karhu@gmail.com]
Sent: Friday, September 25, 2015 4:55 PM
To: Brent Sears <blsears@buckman.com>
Subject: Question

Brent,

Can you help to answer the following?

"Stephanie,

One more question. How or what does it mean for Busan to be "registered in CA". Who regulates the material and who you do register with?"

Thanks

Steph

Buckman

BUSAN® 1202

ACTIVE INGREDIENT:	
Glutaraldehyde	50.0%
INERT INGREDIENTS:	50.0%
TOTAL	100.00%

KEEP OUT OF REACH OF CHILDREN

DANGER

FIRST AID

If Swallowed	• Call a poison control center or doctor immediately for treatment advice. • DO NOT INDUCE VOMITING. • Do not give anything to drink.
If in Eyes	• Wash immediately and continuously with flowing water for at least 30 minutes. • Remove contact lenses, if present, after the first 5 minutes, and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. • Call a poison control center or doctor immediately for treatment advice.
If on Skin, Clothes	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15–20 minutes. • Call a poison control center for treatment advice.
If Inhaled	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.

HOT LINE NUMBER

Have the product container or label with you when calling a Poison Control Center or doctor, or going for treatment. You may also contact 901-767-2722 for emergency medical treatment information.

NOTE TO PHYSICIAN

Aspiration may cause lung damage. Probable mucosal damage may contraindicate the use of gastric lavage.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Corrosive. May be fatal if swallowed. Causes irreversible eye damage. Causes skin burns. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Harmful if inhaled. Causes asthmatic signs and symptoms in hyper-reactive individuals. Do not swallow. Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Wear goggles, protective clothing, and butyl or nitrile gloves. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

STORAGE AND HANDLING

BUSAN 1202 is incompatible with many commonly used materials of construction such as steel, galvanized iron, aluminum, tin, and zinc. BUSAN 1202 can be stored and handled in baked phenolic-lined steel, polyethylene, stainless steel, or reinforced epoxy-plastic equipment. This product freezes at about –6°F (–21°C). Therefore, unless the storage tank is inside or underground, heating and insulation may be required. If heating is needed, exposure to high temperatures should be avoided. For short storage times (up to about 1 month), temperatures of up to 100°F (37.8°C) can be tolerated but the preferred maximum storage temperature is about 80°F (26.7°C).

A stainless steel centrifugal pump is suggested for transfer service. Spiral-wound stainless steel with TEFLON® Polymer is suitable for gaskets and packing.

Handle in a well-ventilated area. If vapors are irritating to the nose or eyes, special ventilation or respiratory protection (MSHA/NIOSH approved air purifying respirator equipped with an organic vapor cartridge) may be required.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

AIR WASHERS AND INDUSTRIAL SCRUBBING SYSTEMS/RECIRCULATING COOLING AND PROCESS WATER SYSTEMS: This product may be used only in industrial air washer systems which have mist-eliminating components. BUSAN 1202 should be added at the application rates described below, to a water treatment system at a convenient point of uniform mixing such as the basin area. Addition may be made intermittently (SLUG DOSE) or continuously. Badly fouled systems can be shock treated with BUSAN 1202. Under these conditions, blowdown should be discontinued for up to 24 hours.

BUSAN 1202 can be used in industrial process water systems that contain ultra filtration units and non-medical reverse osmosis membranes (where approved for compatibility by the membrane manufacturer) and associated distribution systems.

INTERMITTENT (SLUG DOSE) METHOD: *Initial Dose:* When the system is noticeably fouled, apply 11.3–22.7 fluid ounces (100–200 ppm product) of BUSAN 1202 per 1,000 gallons of water in the system or 89 to 177 mL of BUSAN 1202 per 1,000 liters of water in the system. Repeat until control is achieved. *Subsequent Dose:* When microbial control is evident, add 4.5–11.3 fluid ounces (40–100 ppm) of BUSAN 1202 per 1,000 gallons of water in the system weekly or 35 to 89 mL of BUSAN 1202 per 1,000 liters of water in the system weekly, or as needed to maintain control. Badly-fouled systems must be cleaned before treatment is begun.

CONTINUOUS FEED SYSTEM: *Initial Dose:* When the system is noticeably fouled apply 11.3–22.7 fluid ounces (100–200 ppm product) of BUSAN 1202 per 1,000 gallons of water in the system or 89 to 177 mL of BUSAN 1202 per 1,000 liters of water in the system. *Subsequent Dose:* Maintain this treatment level by starting a continuous feed of 2.3–11.3 fluid ounces (20–100 ppm product) of BUSAN 1202 per 1,000 gallons of water in the system per day or 17.7 to 88.6 mL of BUSAN 1202 per 1,000 liters of water in the system per day. Badly fouled systems must be cleaned before treatment is begun.

SERVICE WATER AND AUXILIARY SYSTEMS: BUSAN 1202 should be used at the same application rates, and in the same manner as described above. It should be added to the system at a point that will allow for uniform mixing throughout the system.

HEAT TRANSFER SYSTEMS: (Evaporative Condensers, Dairy Sweetwater Systems, Hydrostatic Sterilizers and Retorts, and Pasteurizers and Warmers and Once-Through Cooling Water Systems). BUSAN 1202 should be used at the same application rates, and in the same manner as described above. It should be added to the system at a point of uniform mixing such as a basin area, sump area, or other reservoir or collecting area from which the treated water will be circulated uniformly throughout the system.

INDUSTRIAL WASTEWATER SYSTEMS: (Wastewater Systems, Wastewater Sludge and Wastewater Holding Tanks). BUSAN 1202 should be added to a wastewater system or sludge at a convenient point of uniform mixing such as the digester. Add 0.4 to 2.0 gallons (450 to 2,250 ppm product) of BUSAN 1202 per 1,000 gallons of wastewater or sludge or 399 mL to 1,994 mL of BUSAN 1202 per 1,000 liters of wastewater or sludge.

MACROFOULING CONTROL: (*Not for use in the state of California). BUSAN 1202 should be added continuously to maintain a level of 20 ppm active ingredient in the system for a period of at least 96 hours. **Initial Dose:** When macrofouling is present in the system, apply 4.53 fluid ounces of BUSAN 1202 per 1,000 gallons of water in the system. Continue to add as needed to maintain the 20 ppm active ingredient level for a period of at least 96 hours.

BEET SUGAR MILLS AND BEET SUGAR MILL PROCESS WATER SYSTEMS: Busan 1202 should be added to the system at a point of uniform mixing such as the diffuser, transport water pump, weir box, or diffuser feed water pump. Additions may be made intermittently (SLUG DOSE) or continuously. INTERMITTENT (SLUG DOSE) METHOD – *Initial Dose:* When the system is noticeably contaminated, add 5.4 to 13.6 fluid ounces (200 to 500 ppm product) of BUSAN 1202 per ton or 177 to 442 mL of BUSAN 1202 per metric ton of sliced beets as a slug dose. Repeat until control is achieved. *Subsequent Dose:* When microbial control is evident, add 0.8 to 8.2 fluid ounces (30 to 300 ppm) of BUSAN 1202 per ton or 27 to 270 mL per metric ton of sliced beets in the system as a slug dose as necessary to maintain control. The total should not exceed 106 gallons per 1,000 tons of beets sliced per day. CONTINUOUS FEED METHOD – *Initial Dose:* When the system is noticeably contaminated, add 5.4 to 13.6 fluid ounces/minute (200 to 500 ppm product) of BUSAN 1202 per ton or 177 to 442 mL/minute of BUSAN 1202 per metric ton of beets sliced per minute in the system via automatic pump of suitable construction. *Subsequent Dose:* When microbial control is evident, add 0.8 to 8.2 fluid ounces/minute (30 to 300 ppm) of BUSAN 1202 per ton or 27 to 270 mL/minute of BUSAN 1202 per metric ton of beets sliced per minute in the system, or as necessary to maintain control. The total should not exceed 106 gallons per 1,000 tons of beets sliced per day.

PAPER MILLS AND PAPER MILL PROCESS WATER SYSTEMS: BUSAN 1202 should be added to paper making system at a point of uniform mixing such as the beaters, broke chest pump, save-all tank, or white-water tank. *Initial Dose:* When the system is noticeably contaminated, add 0.5–3.0 lbs of BUSAN 1202 per ton of pulp or paper (dry basis) as a slug dose. Repeat until control is achieved. Heavily-fouled systems should be boiled out prior to initial treatment. *Subsequent Dose:* When microbial control is evident add 0.3–2.0 lbs of BUSAN 1202 per ton of pulp or paper (dry basis) as a slug dose as necessary to maintain control.

PIGMENTS AND FILLER SLURRIES FOR PAPER AND PAPERBOARD: (For use in food and non-food contact pigments and filler slurries). Use from 0.1 to 0.6 lbs of BUSAN 1202 per 1,000 lbs dry powder to produce a concentration of 100 to 600 ppm as product (based on slurry solids) in the mixed slurry.

WATER-BASED COATINGS FOR PAPER AND PAPERBOARD: (For use in non-food contact coatings only). Use from 0.1 to 0.6 lbs of BUSAN 1202 per 1,000 lbs dry powder to produce a concentration of 100 to 600 ppm as product (based on slurry solids) in the mixed slurry.

AQUEOUS METALWORKING FLUIDS: BUSAN 1202 should be added to a metalworking fluid system at a point of uniform mixing such as the fluid collection tank. Additions may be made intermittently (SLUG DOSE) at intervals of one week or less. *Initial Dose:* When the system is noticeably fouled apply 1.8 to 5.4 gallons of BUSAN 1202 per 10,000 gallons of metalworking fluid to the system. Repeat until control is achieved. *Subsequent Dose:* When microbial control is evident, add 0.7 to 3.6 gallons of BUSAN 1202 per 10,000 gallons of metalworking fluid to the system weekly, or as needed to maintain control. Badly fouled systems should be cleaned before treatment is begun.

WATER BASED CONVEYOR LUBRICANTS: (Brewery, Juice, Dairy, Beverage, and Food Processing Systems). **Avoid contamination of food in application of product.** Thoroughly clean all tracks and conveyors to remove gross soil. Rinse well. Use an automatic feed system to provide 1.1 to 6.8 fluid ounces (50 to 300 ppm active) of BUSAN 1202 per 100 gallons of diluted lubricant.

GENERAL PRESERVATIVE USE: BUSAN 1202 is recommended for use in aqueous or water containing products and systems, including industrial, institutional and consumer in-can processes and products, to control the growth of bacteria and fungi. For effective preservation, add BUSAN 1202 to the product formulation at a rate of 0.02% to 0.20% (200 to 2,000 ppm product) based on the water content of the product (0.2 to 2.0 lbs BUSAN 1202 per 1,000 lbs water content). Mix uniformly.

PRESERVATIVE FOR CONCENTRATES: For use in concentrates where effective preservation is needed after dilution, add BUSAN 1202 to the product formulation at a rate such that the diluted end-use product will contain 0.02% to 0.20% BUSAN 1202. **At no time during the preservation process should the level of BUSAN 1202 exceed 2.0%.**

REVERSE OSMOSIS MEMBRANES: For effective preservation of reverse osmosis elements (where approved for compatibility by membrane manufacturer), immerse elements in a tank containing 0.2% to 2.0% BUSAN 1202. BUSAN 1202 can also be added to in-line recirculating systems for preservation of installed out-of-service reverse osmosis equipment (where approved for compatibility by membrane manufacturer). Add 0.2% to 2.0% BUSAN 1202 to the tank in the circulating system. Maintain the concentration of BUSAN 1202 by periodic addition to counteract any system leakage.

CONCRETE ADMIXTURES: For effective preservation of concrete admixtures, add BUSAN 1202 to the product formulation at a rate of 2,000 to 8,000 ppm based on the weight of the admixture (2.0 to 8.0 lbs BUSAN 1202 per 1,000 lbs concrete admixture). Mix uniformly.

WATER FLOODS: BUSAN 1202 should be added to a water flood system at a point of uniform mixing. Initial Treatment: When the system is noticeably contaminated, add 100 to 5,000 ppm BUSAN 1202 to the system (0.09 to 4.4 gallons BUSAN 1202 per 1,000 gallons flood water). Repeat until control is achieved. Subsequent Dose: When microbial control is evident, add 20 to 5,000 ppm BUSAN 1202 (0.02 to 4.4 gallons BUSAN 1202 per 1,000 gallons flood water) to the system weekly, or as needed to maintain control.

DRILLING, COMPLETION, AND WORKOVER FLUIDS: BUSAN 1202 should be added to a drilling fluid system at a point of uniform mixing. *Initial Treatment:* Add 50 to 1,000 ppm BUSAN 1202 (0.2 to 3.7 gallons BUSAN 1202 per 100 barrels of fluid) to a freshly prepared fluid depending on the severity of contamination. *Maintenance Dosage:* Maintain a concentration of 50 to 1,000 ppm BUSAN 1202 by adding 0.2 to 3.7 gallons of BUSAN 1202 per 100 barrels of additional fluid, or as needed, depending on the severity of contamination.

PACKER FLUIDS: BUSAN 1202 should be added to a packer fluid at a point of uniform mixing such as a circulating holding tank. Add 50 to 600 ppm BUSAN 1202 (0.2 to 2.2 gallons BUSAN 1202 per 100 barrels of fluid) to a freshly prepared fluid depending on the severity of contamination. Seal the treated packer fluid in the wall between the casing and production tube.

GAS PRODUCTION AND TRANSMISSION PIPELINES AND SYSTEMS: BUSAN 1202 should be added to a gas production or transmission pipeline via direct injection. The application should be conducted to ensure maximum distribution of the BUSAN 1202 through the entire internal surface of the pipeline. To facilitate application, it may be desirable to dilute the BUSAN 1202 with an appropriate solvent immediately before use. Injections to the system should be weekly, or as needed to maintain control.

GAS STORAGE WELLS AND SYSTEMS: Individual injection wells should be treated with a sufficient quantity of BUSAN 1202 to produce a concentration of 500 to 5,000 ppm BUSAN 1202 when diluted by the water present in the formulation. Injection should take place before gas is injected (during the summer). Injections should be repeated yearly, or as needed to maintain control. Individual drips should be treated with a sufficient quantity of BUSAN 1202 to produce a concentration of 200 to 2,000 ppm BUSAN 1202 when diluted by the water present in the drip. Injections should be repeated yearly, or as needed to maintain control.

HYDROTESTING: Water used to hydrotest pipelines or vessels should contain 100 to 4,000 ppm BUSAN 1202 (0.09 to 3.5 gallons BUSAN 1202 per 1,000 gallons water), depending on water quality and length of time the equipment will remain idle.

PIPELINE PIGGING AND SCRAPING OPERATIONS: Add BUSAN 1202 to a slug of water immediately following the scraper (ideally this water volume can be kept to a minimum and contained between the scraper and a trailing pig). Sufficient BUSAN 1202 should be added to produce a concentration of 0.1 to 1% (0.09 to 0.9 gallons BUSAN 1202 per 100 gallons water), depending on the length of the pipeline and the severity of biofouling.

STORAGE AND DISPOSAL

PESTICIDE DISPOSAL: Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or your Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Nonrefillable containers. Do not reuse or refill this container. Offer for recycling, if available. Triple rinse container (or equivalent) promptly after emptying. **Plastic Containers:** May be incinerated, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. **Metal Containers:** Must not be incinerated. Do not cut or weld on or near metal containers.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container half full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use of disposal. Repeat this procedure two more times.

Then offer for recycling if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities by burning. If burned, stay out of smoke.

Manufactured By:

Buckman Laboratories, Inc.

1256 N. McLean Blvd., Memphis, Tennessee 38108, U.S.A.

(901) 278-0330 or 1-800-282-5626

EPA Est. No. 10352-WV-2(A); 464-WV-1(B) **EPA Reg. No. 1448-354**

(A) 5-gallon pails in pallets; all drums; bulk. (B) Single 5-gallon pails only.

Product Weight: 9.5 lbs/gal 1.13 kg/L

NET CONTENTS MARKED ON CONTAINER

HMIS/NPCA RATING

Health 3 Flammability 1 Reactivity 0

Revised: 07/185/11

Nonrefillable greater than 5 gallons

Buckman

SAFETY DATA SHEET

BUSAN 1202

Section 1. Identification

GHS product identifier : BUSAN 1202

Other means of identification : Biocides

Product type : Liquid.

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

See label and/or technical data sheet, if available.

Supplier's details : Buckman Laboratories, Inc.
1256 North McLean Boulevard
Memphis, TN 38108
Phone 1-800-282-5626

Emergency telephone number (with hours of operation) : 24 Hour Emergency Phone (901) 767-2722

Section 2. Hazards identification

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

Classification of the substance or mixture : ACUTE TOXICITY (oral) - Category 3
ACUTE TOXICITY (inhalation) - Category 2
SKIN CORROSION/IRRITATION - Category 1
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Fatal if inhaled.
Toxic if swallowed.
Causes severe skin burns and eye damage.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction.
May cause respiratory irritation.

Precautionary statements

Prevention : Wear protective gloves. Wear eye or face protection. Wear respiratory protection. In case of inadequate ventilation wear respiratory protection. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.

Section 2. Hazards identification

Response : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. If experiencing respiratory symptoms: Call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical attention. 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 physician.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Biocides

Product code : BSN1202

Ingredient name	%	CAS number
Glutaraldehyde	50	111-30-8

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

While some substances are claimed as trade secret in accordance with the provision of OSHA 29 CFR 1910.1200(i), all known hazards are clearly communicated within this document.

Per Appendix D 1919.1200 OSHA, ranges can be used when there is batch-to-batch variability in a mixture or a trade secret claim.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : - Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for further treatment advice.

Inhalation : - Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth if possible.
- Call a poison control center or doctor for further treatment advice.

Skin contact : - Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

Ingestion : - Call poison control center or doctor immediately for treatment advice.
- Have person sip a glass of water, if able to swallow.
- Do not induce vomiting unless told to do so by the poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

Notes to physician : Probable mucosal damage may contraindicate the use of gastric lavage.

Section 4. First aid measures

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Satisfactory Materials of Construction : 304 stainless steel
Fiberglass-reinforced plastics: Polyester (e.g. "Atlac" 382)
Vinylester (e.g. "Derakane" 411 or 470) 316 stainless steel
Polyethylene - high density
Nickel
NOTE: With respect to all other materials not listed above, user should be aware that use of such materials with this product may be hazardous and result in damages to such materials and other property and personal injuries. No data concerning such materials not listed above should be implied by the user.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Glutaraldehyde	**ACGIH (United States).** CEIL: 0.2 mg/m³ CEIL: 0.05 ppm **ACGIH TLV (United States, 4/2014). Skin sensitizer.** C: 0.05 ppm **OSHA PEL 1989 (United States, 3/1989).** CEIL: 0.2 ppm CEIL: 0.8 mg/m³

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Section 8. Exposure controls/personal protection

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Clear.

Odor : Fruity.

Odor threshold : Not available.

pH : 3.1 to 4.5

Melting point : -18°C (-0.4°F)

Boiling point : 100.5°C (212.9°F)

Flash point : none

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 0.027 kPa (0.2 mm Hg) [room temperature]

Vapor density : 1.1 [Air = 1]

Relative density : 1.129

Dispersibility properties : Not available.

Solubility : Easily soluble in the following materials: cold water and hot water.

Section 9. Physical and chemical properties

Partition coefficient: n-octanol/water : -0.333

Auto-ignition temperature : 385°C (725°F)

Decomposition temperature : Not available.

Viscosity : Dynamic: 15.4 cps @ 25°C (Brookfield viscosity - @ 100 rpm, #0 spindle)

VOC : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Glutaraldehyde	LD50 Oral	Mouse	100 mg/kg	-
	LD50 Oral	Rat	134 mg/kg	-
	LD50 Oral	Rat	134 mg/kg	-
BUSAN 1202	LC50 Inhalation Dusts and mists	Rat - Female	0.28 mg/l	4 hours
	LC50 Inhalation Dusts and mists	Rat - Male	0.35 mg/l	4 hours
	LD50 Dermal	Rabbit - Male, Female	>2000 mg/kg	-
	LD50 Oral	Rat	200 mg/kg	-

Irritation/Corrosion

Not available.

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Glutaraldehyde	skin	Rabbit	Sensitizing
	Respiratory	Rat	Sensitizing

Mutagenicity

Not available.

Carcinogenicity

This product has not been tested unless noted in summary results.

Reproductive toxicity

Section 11. Toxicological information

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Glutaraldehyde	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : Fatal if inhaled. May cause respiratory irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : Causes severe burns. May cause an allergic skin reaction.

Ingestion : Toxic if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Section 11. Toxicological information

Potential chronic health effects

Not available.

Conclusion/Summary : In a NTP chronic 2-year inhalation study on glutaraldehyde, no carcinogenicity was seen in rats or in mice. An increase in large granular lymphocytes in Fischer rats dosed with glutaraldehyde for two years was random or a secondary carcinogenic effect due to a modifying influence on the occurrence of this common neoplasm in this rat strain. Effects of Repeated Exposure: Repeated skin contact may result in absorption of amounts which could cause death. May cause nausea and vomiting.

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
BUSAN 1202	Acute EC50 2.64 mg/l	Algae	72 hours
	Acute EC50 >50 mg/l	Daphnia	24 hours
	Acute EC50 17 to 25 mg/l	Daphnia	24 hours
	Acute LC50 0.11 mg/l	Algae	48 hours
	Acute LC50 0.69 mg/l	Daphnia	48 hours
	Acute LC50 10.8 mg/l	Fish	96 hours

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	2922	2922	2922
UN proper shipping name	CORROSIVE LIQUID, TOXIC, N.O.S. (glutaral, solution)	CORROSIVE LIQUID, TOXIC, N.O.S. (glutaral, solution). Marine pollutant (glutaral)	CORROSIVE LIQUID, TOXIC, N.O.S. (glutaral, solution)
Transport hazard class(es)	8 (6.1) 	8 (6.1) 	8 (6.1) 
Packing group	II	II	II
Environmental hazards	No.	Yes.	No.
Additional information	**Remarks** ERG Guide 154	The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg. **Emergency schedules (EmS)** F-A, S-B **Remarks** ERG Guide 154, HazMat Code 4936015	The environmentally hazardous substance mark may appear if required by other transportation regulations. **Remarks** ERG Guide 154, ERG Code 8P

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

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

Section 15. Regulatory information

Potential impurities present in trace quantities are included in the regulatory listings of this section.

U.S. Federal regulations : **United States inventory (TSCA 8b)**:This product is subject to regulation under the US Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and is therefore exempt from US Toxic Substances Control Act (TSCA) Inventory listing requirements.

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Immediate (acute) health hazard

Composition/information on ingredients

Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Glutaraldehyde	50	No.	No.	No.	Yes.	No.

CERCLA : CERCLA: Hazardous substances.: No products were found.

FDA : This product is allowed under the following FDA (21 CFR) sections :173.320, 175.105, 176.170, 176.180, 176.300 Limitations 176.170, 176.180: For use only as an antimicrobial agent in pigment and filler slurries used in the manufacture of paper and paperboard at levels not to exceed 300 parts per million by weight of the slurry solids. For 173.320: For use as a single additive for beet-sugar mills not more than 250 ppm.

BfR : XXXVI

EPA Reg. No. : 1448-354

FIFRA : This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

Corrosive. Causes irreversible eye damage and skin burns. Harmful or fatal if swallowed, inhaled or absorbed through skin. Do not get in eyes, on skin or on clothing. Avoid breathing vapours and mists. Not to be used as an aerosol. May cause allergic skin reactions in certain individuals. May cause asthmatic signs and symptoms in some hyper-reactive individuals. Wear eye goggles or face shields, rubber gloves and protective clothing when handling this product. Wash thoroughly with soap and water after handling and before eating, drinking and using tobacco. Remove contaminated clothing and wash before re-use.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA. Do not apply in marine and/or estuarine oil fields. Do not contaminate water when disposing of equipment washwaters.

Instructions in Case of Spills or leaks: Wear goggles or face shield, rubber gloves, and protective clothing. Absorb spills and leaks with inert material such as sand, clay or vermiculite. Shovel into a sealable container and dispose of in an authorized EPA disposal facility.

In Case of Fire: Use water, carbon dioxide, dry chemical (eg. Sodium bicarbonate) extinguishing medias. Fire fighters should be equipped with self-contained breathing apparatus and turnout gear.

In Case of Chemical Emergency: Call CHEMTREC day or night for assistance and information concerning spilled material, fire, exposure and other chemical accidents. 800-424-9300.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	3
Flammability	1
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing	:	5/8/2015.
Date of issue/Date of revision	:	5/8/2015.
Date of previous issue	:	5/8/2015.
Version	:	0.05
Prepared by	:	Buckman Regulatory Affairs
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader

Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Buckman Laboratories, Inc. warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use outside of such directions.

Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE. No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.
The exclusive remedy against seller shall be in a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

Any controversy or claim arising out or relating to this contract, or breach thereof, shall be settle by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgment upon the rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

APPENDIX F – ZERO VALENT IRON (ZVI) TECH DATA SHEET

CONNELLY – GPM, INC.
ESTABLISHED 1875
3154 SOUTH CALIFORNIA AVENUE · CHICAGO, ILLINOIS 60608-5176
PHONE: (773) 247-7231 www.ConnellyGPM.com FAX: (773) 247-7239

August 13, 2015

SCREEN SPECIFICATION
ETI CC-1004

U.S. SCREEN NUMBER (Opening Size)		
4	(4.75 mm)	100% PASSING
8	(2.36 mm)	95 - 100% PASSING
16	(1.18 mm)	75 - 90
30	(0.600 mm)	25 - 45
50	(0.300 mm)	0 - 10
100	(0.150 mm)	0 - 5

MATERIAL WEIGHS APPROXIMATELY 140 - 160 POUNDS PER CUBIC FOOT

TYPICAL ANALYSIS OF IRON AGGREGATE

Metallic Iron	87-93%
Total Carbon	2.85-3.23
Manganese	0.14-0.60
Sulphur	0.067-0.107
Phosphorous	0.000-0.132
Silicon	1.0-1.85
Nickel	0.05-0.21
Chromium	0.03-0.23
Vanadium	ND
Molybdenum	0.08-0.15
Titanium	0.004-0.1
Copper	0.11-0.20
Aluminum	0-0.005
Cobalt	ND
Magnesium	0.01
Boron	0.01
Zinc	0.01
Zirconium	0.01

GALEN B. DIXON
Technical Director

D:\WORD\WT\MscMemLST\SPECS&FORMS\1004SPECE-ml.DOC

Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200 and Canadian Hazardous Protection Act and Controlled Products Regulation. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory From)

Section I - Producer and Product Identification

IDENTITY (As Used on Label and List) **IRON AGGREGATE** Also known as Zero Valent Iron **INTENDED USE:** BLDG PROD. AGGREGATE	NOTE: Blank spaces are not permitted. If an item is not applicable or information unavailable, the space must be so marked.
Manufacturer's Name CONNELLY-GPM, INC.	Emergency Telephone Number (773) 247-7231
Address (Number, Street, City, State, and ZIP Code) 3154 South California Avenue Chicago, IL 60608-5176	Telephone Number for Information (773) 247-7231

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name)		
IRON	CAS #7439-89-6	+85%
CARBON (carbon black)**	CAS #1333-86-4	<3.5%
SILICON**	CAS #7440-21-3	<2%
CHROMIUM**	CAS #7440-47-3	<.25%
COPPER**	CAS #7440-50-8	<.25%
MANGANESE**	CAS #7439-96-5	<.75%
NICKEL**	CAS #7440-02-2	<.25%
CARBON (carbon black)	CAS #1333-86-4	<0.5%

All other constituents below 0.2%

**These are not separate components- they are alloyed constituents of the cast iron.

PRODUCT CLASSIFICATION: NON-HAZARDOUS, NO U.N. NUMBER NEEDED

SHIPPING CLASS: 50

Section III - Composition

Cast Iron (See Section II)	75-95%
Iron Oxide	5-25%
CARBON (carbon black)** CAS #1333-86-4	>0.5%

Section IV - First Aid Measures

Eye Contact: Flush with water - get medical attention
Skin Contact: Brush off excess. Wash with soap and water as soon as possible
Inhalation: Remove to fresh air.
Ingestion: DO NOT INDUCE VOMITTING! Seek medical attention.

Section V - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Not Available			

Extinguishing Media
Dry chemicals or sand or universal type foam

Special Fire Fighting Procedures
Firefighters should wear self-contained breathing apparatus and protective clothing.

Unusual Fire and Explosion Hazards
None

Section VI - Cleanup Measures

Steps to Be Taken in Case Material is Released or Spilled

If the material is spilled, normal clean up procedures may be used.
Clean up personnel should be wearing the proper protective equipment.
This includes gloves and nuisance dust protection.

Waste Disposal Method

Sanitary landfill, following Federal, State, and Local guidelines.

Other Precautions

Not Applicable

Section VII - Precautions for Safe Handling

Precautions to Be Taken In Handling and Storing

Do not store near powerful oxidizers such as strong acids. Keep material in a cool dry location.

Section VIII - Exposure Controls/Personal Protection

Hazardous Components (Specific Chemical Identity; Common Name)			OSHA PEL*	ACGIH*	Canada TWAEV
IRON	CAS #7439-89-6	+85%	10 mg/m^3	5 mg/m^3	10 mg/m^3
CARBON (carbon black)**	CAS #1333-86-4	<3.5%	3.5 mg/m^3	3.5 mg/m^3	7 mg/m^3
SILICON**	CAS #7440-21-3	<2%	(1)	(2)	20 mg/m^3
CHROMIUM**	CAS #7440-47-3	<.25%	1.0 mg/m^3	0.5 mg/m^3	
COPPER**	CAS #7440-50-8	<.25%	1.0 mg/m^3	1.0 mg/m^3	
MANGANESE**	CAS #7439-96-5	<.75%	5 mg/m^3	5 mg/m^3	
NICKEL**	CAS #7440-02-2	<.25%	1.0 mg/m^3	1.0 mg/m^3	

*8 hour time weighted average

**These are not separate components- they are alloyed constituents of the cast iron.

1) <1% Quartz 15 mg/m^3 of total dust, or 5 mg/m^3 respirable dust

2) >1% Quartz 10 mg/m^3 of total dust, or 5 mg/m^3 respirable dust

PRODUCT CLASSIFICATION: NON-HAZARDOUS, NO U.N. NUMBER NEEDED

SHIPPING CLASS: 50

Protective Gloves	Eye Protection
Non-absorbent safety gloves	OSHA approved glasses/goggles

Other Protective Clothing or Equipment

Hard hats and clothing that exposes as little skin as possible to the iron dust.

Work/Hygenic Practices

Keep dusting to a minimum.

Section IX - Physical and Chemical Properties

Boiling Point Iron Dust	3000 ^oC	Specific Gravity (H_2O = 1)	7.8
Vapor Pressure (mm Hg) @ 1787oC	1	Melting Point	1371-1480^oF
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water

Insoluble

Apearance and Odor

Odorless Brown/Black Powder

Section X - Stability and Reactivity

Stability	Unstable:		Contitions to Avoid:	Keep Dry. Keep away from strong acids
	Stable:	X		

Incompatibility (Materials to Avoid)

Strong acids and other oxidizers and strong bases.

Hazardous Decomposition may form various metallic oxides

Hazardous	May Occur		Contitions to Avoid:
Polymerization	Will Not Occur	X	

Section XI - Toxicological Information

Route(s) of Entry	Inhalation?	Skin?	Ingestion?
	Yes	No	Yes (not likely)

Health Hazards (Acute and Chronic)

As a solid, cast iron is not hazardous:

Chronic overexposure to iron oxide fume may cause apparently benign pneumoconiosis.

Acute overexposure may cause eye, nose, mouth, and skin irritation. Fume may also cause metal fume fev

Typical symptoms last 12-48 hours and include metallic taste and dryness and irritation of mouth and throat and chills and fever.

Chronic inhalation of fume from these constituent elements may result in the following conditions:

Chromium: Skin and mucous membrane lesions. Possible nose or lung cancer.

Manganese: Brnochitis or pneumonitis and impaired co-ordination

Nickel: Skin and mucous membrane lesions. Possible nose or lung cancer.

Zinc: Possible gastrointestinal inflamation

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated
		NO INFORMATION AVAILABLE	

Signs and Symptoms of Exposure

Contact may cause eye or skin irritation.

Inhalation may cause nose, mouth, throat, and/or lung irritation.

Ingestion (unlikely) may cause mouth, throat, and/or stomach irritation. Large amounts may cause acute iron poisoning, which may include hemorrhagic vomiting and diarrhea, abdominal pain, acidosis, coagulaopathy, shock, coma and convulsions, followed by hepatic and renal failure and perhaps cardiovascular collapse.

Medical Conditions Generally Aggravated by Exposure

Any skin, eye, mucous membrane, or respiratory diseases sensitive to particulate dust.

Section XII - Ecological Information

LC50	>750 mg/l
LD50	Information unavailable.

Section XIII - Disposal Information

Iron Aggregate, while typically safe for landfill disposal contains small amounts of regulated substances.

Section XIV - Transport Information

Iron Aggregate is Non-Hazardous shipping class 50

Section XV - Regulatory Information

U.S. FEDERAL REGULATIONS

A: General: This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication). The following component analysis applies only to those facilities that are required to report under applicable regulations.

B. Component Analysis: This material contains one or more of the following chemicals required to be identified under SARA Secton 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

	SARA 313 Form R Reporting Required Level (de minimus concentration)	CERCLA Final RQ
Nickel 7440-02-0	0.10%	100 lbs (if pieces are below 0.004 inches)
Aluminum 7429-90-5	1.00%	
Arsenic 7110-38-2	0.10%	1 lb (if pieces are below 0.004 inches)
Lead 7439-92-1	0.10%	10 lbs
Chromium 7440-47-3	1.00%	5000 lbs
Cobalt 7440-48-4	0.10%	
Copper 7440-50-8	1.00%	5000 lbs
Vanadium 7440-62-2	1.00%	

WARNING! This product contains a chemical know to the stat of California to cause cancer.

WARNING! This product contains a chemical know to the stat of California to cause reproductive/developmental effects.

No regulatory Information Available.

Section XVI - Other Information

Date REVISED	5/18/2015
Date Printed	5/18/2015

Signature of Preparer (optional)

APPENDIX G – SAND GRADATIONS

PARTICLE SIZE ANALYSIS

Test Report

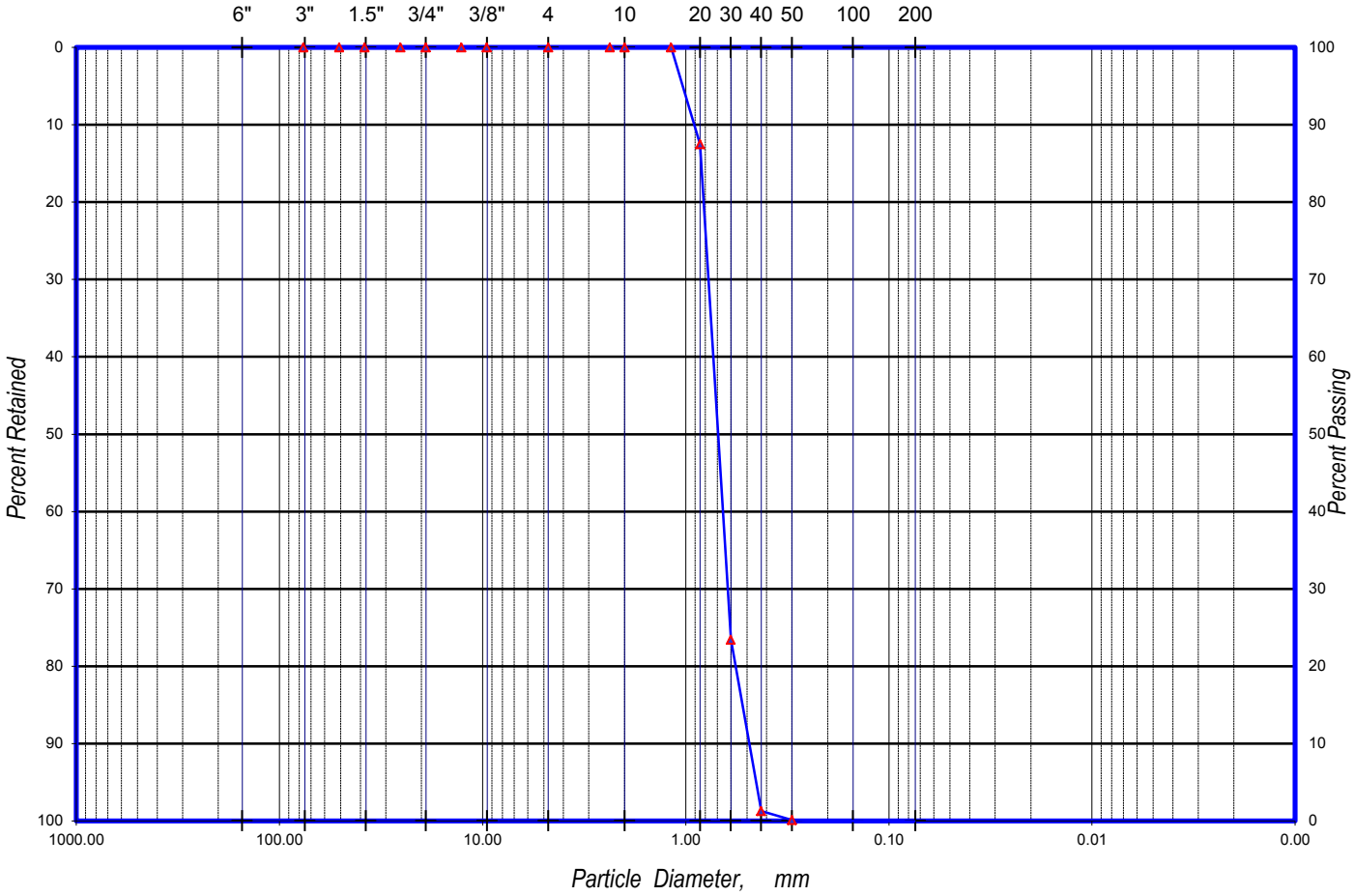
CalTrans 202

Geo-Logic ASSOCIATES

Client :	Project No:	Lab Sample No:
MAGNUS PACIFIC CORPORATION	2015.A111.100	**3953B**

Project Name:	Report Date:
PR WALL, DUBLIN CA	September 11, 2015

BOULDERS	COBBLES	GRAVEL		SAND			SILT AND CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
US SIEVE SIZE, INCHES				US STANDARD SIEVE SIZE No.			HYDROMETER



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	Silica Resource Sand (9/4/15)	Brown Poorly Graded Sand (SP)	0.0	100.0	0.0

Size Passing, mm D_{60} = 0.74 D_{30} = 0.63 D_{10} = 0.49

Coefficient of Curvature, C_c: 1.07 Coefficient of Uniformity, C_u: 1.50 Fineness Modulus = 2.77

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

MAGNUS Pacific

APPENDIX H – SUBCONTRACTOR DAILY QUALITY CONTROL REPORT

MAGNUS Pacific

Permeable Reactive Barrier (PRB)
Dublin Apt - Crown Chevrolet N Parcel
7544 Dublin Blvd, Dublin, CA

SUBCONTRACTOR DAILY QUALITY CONTROL REPORT

REPORT NO:	001
CONTRACT NO:	
PROJECT:	Dublin Apt PRB
PROJECT NO:	150019
SUPERINTENDENT:	James Dodd
PROJECT MANAGER:	Tino Maestas
DATE:	
WORK HOURS:	START END

WEATHER:

SUMMARY OF CONSTRUCTION PROGRESS:

TASKS	
COMMENTS	Construction Summary Excavation Production ZVI/Sand Placement CDF Placement Transportation & Disposal

LIST OF PERSONNEL ONSITE:

NAME	TITLE	ST	OT	DT	NAME	TITLE	ST	OT	DT

SUMMARY OF EQUIPMENT ONSITE (Note any new equipment):

DESCRIPTION	MODEL	EQ NO.	ON	OFF	IH	OH	ACTIVITY

MATERIALS RECEIVED/USED (Provide Bill of Lading):

MATERIAL	UNIT	REC	USED	REC TD	USED TD	ONSITE

MAGNUS PACIFIC - DAILY QUALITY CONTROL REPORT

REPORT NUMBER: 001 PROJECT: Dublin Apt PRB

QUALITY CONTROL ACTIVITIES PERFORMED (Testing, Sampling, Surveying, etc.):

COMMENTS	
ACTIVITY	

JOB SAFETY (List Items Checked; Results; Incidents; Concerns):

COMMENTS	
ACTIVITY	

DEFICIENCIES OR CORRECTIVE ACTIONS NOTED:

DEFICIENCIES	
ACTIONS	

SIGNIFICANT DOWNTIME / DELAYS (Work Stoppage, Obstruction Time, etc.):

COMMENTS	

FIELD CHANGE REQUESTS OR APPROVALS:

REQUESTS	
APPROVALS	

ADDITIONAL DOCUMENTATION SUBMITTED (Test Results, Check Lists, etc.):

DOCUMENT - FORMS\CERT	SUBMIT	DOCUMENT - FORMS / CERT	SUBMIT

ADDITIONAL ACTIVITIES OR SUBCONTRACTORS:

SUBCONTRACTOR	ACTIVITY	SUBCONTRACTOR	ACTIVITY

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	
REVIEWED BY:		TITLE/COMPANY:	
SIGNATURE:		DATE:	
REVIEWED BY:		TITLE/COMPANY:	
SIGNATURE:		DATE:	

MAGNUS Pacific

Dublin Apt Permeable Reactive Barrier
Daily Slurry Wall Quality Control Form

DATE:		**JOB NAME:**	Dublin Apartments PRB					**JOB NUMBER:**	150019
LOCATION: 7544 Dublin Blvd, Dublin, CA			**HEADING: PRB Wall**					**COMMENTS**	
EXCAVATION				**BACKFILL PROFILE**				Weather:	
	Depths (ft)		Area						
Station	Key	Depth	(SF)	Station	ZVI/Sand			Notes:	
								1.	
								2.	
								3.	
								G150 Guar Used Today (TN):	0.00
								G150 Guar Used To Date (LB):	0.00
								Busan Used Today (LBS):	0
								Busan CEMENT Used To Date (LBS):	0
								Soda Ash Used Today (TN):	0.00
								Soda Ash Used To Date (TN):	0.00
								SF Excavation Today:	0.0
								SF Excavation To Date:	0.0

FIELD QUALITY CONTROL TESTING

Magnetic Separation Test

Time	Batch #	% ZVI	% Sand	OPEN

Initial Biopolymer Slurry (at Batch Plant)

Time	Station	Visc	Density	pH	OPEN	Comments

Biopolymer Slurry (In-Trench)

Time	Station	Visc	Density	pH	OPEN	Comments

OPEN

DEFINITIONS

Depth	measured feet from top of workpad
Visc	marsh funnel seconds
Density	pounds per cubic feet
Sand	percent sand content
Filtrate	filtrate loss in cubic centimeters
Filter Cake	cake thickness in millimeters
Slump	slump cone test measured in inches
NM	not measured
--	not required

Comments:

Magnus Pacific _____ Engineer _____

APPENDIX I – MAGNETIC SEPARATION TEST PROCEDURE

MAGNETIC SEPARATION TESTING PROCEDURE

PART 1 – GENERAL

1.01 SUMMARY

A. This section includes a protocol for magnetic separation testing of granular zero valent iron and sand mixtures. The magnetic separation test allows determination of the weights of granular zero valent iron and sand in the mixture.

1.02 DEFINITIONS

The terms used in this Section are defined as follows:

A. Permeable Reactive Barrier

A permeable reactive barrier is a permeable reactive substance constructed in the subsurface orthogonal to the groundwater flow direction with the purpose of treating contaminants in groundwater as they pass through the barrier.

B. Granular ZVI (Granular ZVI)

Granular ZVI is a reactive material that is mixed with sand and placed in the permeable reactive barrier. Granular ZVI chemically degrades certain groundwater contaminants when they contact the granular ZVI.

PART 2 – MATERIALS

2.01 GRANULAR ZVI AND SAND MIXTURE SAMPLE

A. A 250 to 1,000 gram sample (0.5 to 2 lbs) of the granular ZVI and sand mixture should be obtained and placed in sample containers.

2.02 SUPPLIES

A. Sample containers

B. Balance/scale (battery powered scale if electrical outlet is not available, must be able to measure up to approximately 1,000 grams)

C. Hot plate, if electrical outlet available (or propane camping stove)

D. Frying pan (8 in or 10 in)

E. Large metal spoon

F. Disposable aluminum cookie sheet

G. Magnet (heavy duty from hardware store)

H. Ziplock bags

I. Sharpie pen(s)

J. Worksheets/log book

2.03 EXECUTION

A. Weigh the empty containers that the samples will be collected in.

B. Samples of the iron-sand mixture are collected from the discharge of the mixing device (e.g., shoot of a concrete mixer) and/or from the backfilled material in the excavation. The frequency and location of samples is dependent on the objectives of each project.

C. Weigh the sample (empty container and sample) and record the weight. Determine the net weight of the sample by subtracting the empty sample container weight. A suitable weighing device (balance or scale) must be used.

D. Dry the sample. If cemented together during drying, lightly breakup. Weigh and record the net dry weight.

E. Spread the sample out in a suitable container (e.g., disposable aluminum cookie sheet, etc.).

F. Cover the magnet in a material (such as a plastic bag) to allow the magnetic material to be easily separated from the magnet.

G. Pass the magnet over the sample to remove the magnetic (granular ZVI) fraction. Care must be taken to minimize the trapping of sand particles within the granular ZVI grains. The magnetic fraction is removed from the magnet and placed in a container.

H. Continue passing the magnet over the material until no more magnetic material is removed. Mixing of the non-magnetic fraction between passes may be required to obtain all the magnetic particles.

I. The magnetic fraction may contain some non-magnetic (sand) particles. Repeat Steps E to H should at least three more times to ensure the magnetic and non-magnetic fractions are completely separated. After each separation, the non-magnetic fraction should be added to the non-magnetic fraction from the previous separation.

J. Weight the magnetic and non-magnetic fractions and record weights. The total net weight of the magnetic and non-magnetic fractions should be the same as the weight prior to separation.

K. The dry iron net weight percent is determined by:

$$\text{Dry Iron Net Weight Percent} = \frac{\text{Net Weight of Magnetic Material}}{\text{Total Net Weight of Dry Sample}} \times 100$$

L. Estimated time to complete the magnetic separation test is about 15 to 25 minutes per sample, depending on the moisture of the sample.

END OF SECTION

ATTACHMENT C

Contractor Quality Control Plan

Dublin Apartments

Submittal Number: 025010-0002-02
Title: PRB - Contractor Quality Control Plan (CQCP)

7544 Dublin Boulevard
Dublin CA 94568

Project ID:
Owner: Dublin Apartment Properties, LLC
Construction Team: ZCON Builders
Design Team: BDE

Date Due: 10/12/2015
Date Issued: 10/09/2015
Substitution: Yes

Information

Types: Quality Control Report, Test Data/Reports
Trades: Environmental Consultant
Categories: N/A
Subcontractor/Manufacturer: Magnus Pacific

Stamps

ZCON Builders

This submittal has been reviewed for general compliance only as it relates to the CONTRACT DOCUMENTS. This review implies no approval of deviation from the plans and specifications, nor responsibility for errors or emissions in the submittal. The subcontractor shall remain responsible for all details required by the assembly confirmation of dimensions, fabrication and installation means and methods. This submittal shall not be used for the manufacture, assembly, fabrication, or installation with out the Architect's stamped approval.

Submittal No: 025010-0002-02 **Section No:** [none]

Date: 10/09/2015 **By:** Sean McKinley

SUBMITTAL OF PLANS, SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL, SAMPLES, OR MANUFACTURER'S CERTIFICATES

DATE: Oct 8, 2015

SUBMITTAL NO. 002.2

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS

TO: Mr. Sean R McKinley ZCon Builders 780 W Grand Avenue Oakland CA 94612 w: 510-444-4190 c: 510-507-3591 e: smckinley@zconbuilders.com	From: Mr. Tino B. Maestas, P.E. Magnus Pacific, LLC 6558 Lonetree Blvd Rocklin, CA 95765 Direct: 916-462-6419 Cell: 916-471-8210 email: tmaestas@magnuspacific.com	**PROJECT NO.** 150019	CHECK ONE: ☐ THIS IS A NEW SUBMITTAL ☒ THIS IS A RESUBMITTAL
SPECIFICATION SEC. NO. 025010 - Permeable Reactive Barrier	PROJECT TITLE AND LOCATION 7544 Dublin Apartments, Dublin, California		

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.)	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See Instruction on B)	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION	FOR CLIENT USE
				SPEC. PARA.NO.	DRAWING SHEET NO.			
1	Revised Contractor Quality Control Plan (PRB)		1	1.4 B.15	N/A	A		

REMARKS

I have reviewed and approved the attached submittal(s) to ensure contract compliance. All quantities, dimensions, specific performance requirements, materials, catalog numbers and similar data have been verified as complete.

Tino Maestas 10/8/2015

Tino B. Maestas, P.E.

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	Date

Magnus Pacific, LLC
6558 Lonetree Blvd
Rocklin, California 95765
Phone: 916 462 6400
www.magnuspacific.com

October 8, 2015 Submittal No. 025010-0002-02

Sean R McKinley
ZCON Builders
780 W Grand Avenue
Oakland CA 94612
w: 510-444-4190
c: 510-507-3591
e: smckinley@zconbuilders.com

Subject: **CQCP Errata Sheet of Comments/Responses**

Dear Mr. McKinley:

Magnus is replacing Submittal No. 025010-0002-01 with this revised submittal. Table 5 in the CQCP was corrected to indicate that the marsh funnel viscosity for in-trench slurry shall be greater than or equal to 60 and the density shall be greater than or equal to 62.8 pcf.

In response to the comments provided on our Contractor Quality Control Plan (Submittal No. 025010-0002-00), Magnus has prepared this errata sheet as a cover page to our re-submittal.

Section 3.1
Comment: must have minimum 5 years experience on projects similar to this. DCB OK.
Response: Mr. Maestas has been responsible for developing and implementing Quality Management Systems in compliance with the US Army Corp of Engineers Quality Management System since 2001 at his first appointment as a Quality Control Officer at the Rocky Mountain Arsenal in Commerce City, CO. Although Mr. Maestas, nor Magnus Pacific, has solely specialized in Permeable Reactive Barrier installation for 5 continuous years, his experience and responsibilities as a Quality Control Manager have spanned a breadth of specialties related to environmental and geotechnical applications. Magnus Pacific assumes that the Design Engineer does not take exception to Mr. Maestas acting in his capacity as the Quality Control Manager. Recent USACE Certificate for Construction Quality Management for Contractors training for Mr. Maestas has been included in this CQCP. Acknowledging that this certification is required every 5 years; Mr. Maestas' original certification was completed in January 2001.

Section 3.1 – Item #6
Comment: CQC Manager shall be on-site whenever work is being completed per 3.5.A.1.
Response: Mr. Maestas will be on-site and acting full time as the CQM throughout excavation and continuously throughout completion of ZVI/sand media placement.

Magnus Pacific, LLC
6558 Lonetree Blvd
Rocklin, California 95765
Phone: 916 462 6400
www.magnuspacific.com

Section 4.1.A
Comment: Prepare a materials installation quality control plan per 3.5.3.k.
Response: The referenced specification reads:

k. A materials installation quality control plan to include:
(1) Field sampling and frequency requirements to ensure that chemical and geotechnical characteristics of biopolymer slurry mixes are sufficient for excavation wall support prior to installation.
(2) Field sampling of PRB Media ZVI and sand percentages to ensure compliance with the basis of design (i.e., required percentage of ZVI) prior to installation and during installation. Testing shall consist of separation of the mixed material using a magnet and accurately measuring each material to ensure it falls within the specification. Contractor shall complete a Magnetic Separation Test Record (MSTR) for each test. Each MSTR shall be approved by the Engineer. The MSTR is included with the Construction Documents as an attachment.
(3) Field sampling for analysis of moisture content of the sand from selected stockpiles prior to mixing. Sand shall contain 5 percent moisture or less.

Response continued: frequency and test type for biopolymer testing, PRB media mixing compliance, and initial moisture content of sand are specifically identified in Section 5.0 of this CQCP.

Section 4.1A
Comment: Prepare a survey control plan per 3.5.A.3.j
Response: The referenced specification reads:

j. A Survey Control Plan used during construction to assure that:
(1) the media is being placed to the required alignment, grades, depths, and dimensions.
(2) Biopolymer slurry, ZVI and total PRB Media volumes are monitored at regular specified frequency (no less than once every 25 feet).

Response Continued: A survey control plan is discussed in the Permeable Reactive Barrier Project Execution Plan (Submittal 025010-0001-01). In particular, ZCON will supply a surve by a licensed Professional Land Surveyor to stake out the horizontal alignment of the PRB on 25-foot centers. The PLS will also install a temporary benchmark in close vicinity of the PRB alignment for use as vertical control. Magnus will place station markers on 10-foot station centers along the PRB alignment using utility marking flags by stretching a tape measure between the survey stakes provied by the PLS. Throughout excavation, the flags will be offset directly adjacent to the active trench excavation for horizontal control. Excavation depths will be recorded using a weighted sounding cable that will be used at 10-foot stations. Soundings will be performed to verify depth to top-of-key and bottom of excavation at each 10-foot station along the PRB alignment. Depth measurements will be recorded relative to the workpad and elevations will be determined for each depth measurement.

Biopolymer slurry, ZVI and total PRB media volumes will be recorded on a per batch basis no less than once every 25 feet as required by the specification.

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Section 4.1.A
Comment: prepare a installation verification plan per 3.5.A.3.l
Response: The referenced specification reads:

l. An installment verification plan to verify the installed continuity of the PRB.

Response Continued: Magnus Pacific intends to mix ZVI and sand on a batch basis using ready mix mobile trucks. Strict QC processes require mixing of known weights of iron to known weights of sand. Each bag of iron is a certified weight and the mix designs are controlled to ensure a whole bag of iron. Sand will then be proportioned by using calibrated weight scales into the ready mix truck. After a thorough mixing in the ready mix truck, a sample of the ZVI/sand media will collected and tested by the magnetic separation test to verify compliance with design intent. Upon successful verification, the batch (estimated at 5-CY/batch) will be placed in the trench using a tremie pipe. The station location of the tremie pipe will be recorded for each batch placed. Further, sounding measurements will be recorded at the tremie pipe and at 10-foot up-station and 10-foot downstation of the tremie pipe following each batch placed.

Section 4.5
Comment: so far, submittal numbers have not been included on the submittal registery.
Response: The submittal number is documented on the submittal register (Submittal No. 004). Further, Magnus is providing submittal numbers on each Submittal Cover sheet in the upper right corner that is cross referenced to the submittal register. Magnus is following the document control numbering as indicated in Section 4.5 of the CQCP and the Magnus document control numbering can be cross-referenced to the Project Document Control Numbering issued by the Newforma system.

Attachment 3
Comment: Field sampling for sand moisture content. Or add to existing form.
Response: Magnus will collect a sample of material in the field upon receipt from the supplier and submit the sample to a certified material testing lab for verification of initial moisture content. The lab test result will be submitted with the following day SDQCR.

Sincerely,
MAGNUS PACIFIC CORPORTATION

Tino Maestas, P.E.
Project Director

CONTRACTOR QUALITY CONTROL PLAN

PERMEABLE REACTIVE BARRIER (PRB)

DUBLIN APARTMENTS –

CROWN CHEVROLET NORTH PARCEL

7544 DUBLIN BLVD, DUBLIN, CALIFORNIA

OCTOBER 8, 2015

Prepared for:

PRIME CONTRACTOR
Zakskorn Construction Company
Dba ZCON Builders
780 West Grand Ave.
Oakland, CA 94612

OWNER
Dublin Apartment Properties LLC
2 Henry Adams St, Ste 450
San Francisco, CA 94103

Prepared by:

Magnus Pacific, LLC.
6558 Lonetree Blvd.
Rocklin, CA 95765
Phone: (916) 462-6400

Table of Contents

1.0 OBJECTIVE 4
1.1 Project Scope 4
2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROGRAM 5
2.1 Introduction 5
2.2 Quality Assurance/Quality Control Program Overview 5
3.0 ORGANIZATION 7
3.1 Quality Control Manager 7
3.2 Contractor Other Personnel 8
3.3 Commercial Testing Firms 8
4.0 PROCEDURES 9
4.1 Control of Construction 9
4.2 Receiving and Warehousing 10
4.3 Offsite Control 10
4.4 Documentation 10
4.5 Submittal Management Procedures 11
4.6 Drawings and Document Control 11
4.7 Materials Certification 11
4.8 Workmanship Inspection 11
4.9 Calibration of Equipment 11
4.10 Punch-Out Inspection 12
4.11 Pre-Final Inspection 12
4.12 Final Inspection 12

4.13 Revision Policy 13
5.0 TESTING METHODS 14
6.0 SUBMITTALS AND RECORDING FORMS 17
7.0 QUALITY CONTROL PROCEDURES 18
7.1 Surveillance of Subcontractor's Operations 18
7.2 Inspection Acceptance Procedure 18
7.3 Inspection Discrepancy Procedures 18
8.0 DEFINABLE FEATURES OF WORK 20

Attachment 1 – Authorization Letter/CQM Certification
Attachment 2 – Preparatory & Initial Phase Inspection Checklist
Attachment 3 – QC Daily Reports & Forms

1.0 OBJECTIVE

Magnus Pacific has developed this Contractor Quality Control (CQC) Plan in accordance with Specification Section 02 50 10 for the Dublin Apartments - Permeable Reactive Barrier Project in Dublin, California. This document establishes the Quality Control System of Magnus Pacific, LLC (Magnus) to provide the necessary supervision, control phases and tests of all items of work, including that of suppliers and subcontractors, that will ensure the compliance of all work with the applicable specifications and drawings in respect with the contractor-furnished equipment, materials, workmanship, construction, finish, functional performance, and identification.

1.1 Project Scope

Installation of a Permeable Reactive Barrier (PRB) to treat impacted groundwater migrating onto the site.

The PRB will consist of a trench installed along the up-gradient site boundary that will be backfilled with a mixture of granular Zero Valent Iron (ZVI) and sand where natural hydraulic gradients adjacent to and beneath the site will cause PCE-affected groundwater to flow through the PRB to reduce Volatile Organic Compounds (VOC) concentrations.

The PRB design consists of the following elements:

- A 2-foot-wide, 146-foot-long continuous trench that is backfilled with ZVI/sand treatment media located near the upgradient site boundary along Golden Gate Drive.
- The PRB will be installed to approximately 29 feet bgs, including a 1-foot key into an existing clay layer observed from approximately 28 to 30 feet bgs
- The treatment media will be prepared in a 55%/45% ZVI/sand ratio by volume, creating an equivalent 1.1-foot-thick treatment zone of 100% ZVI.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROGRAM

2.1 Introduction

Magnus Pacific strives to obtain a uniform, high quality level of workmanship throughout all phases of procurement, fabrication, construction and installation of equipment and facilities through the utilization of a Quality Control System, to assure to this end, the following principles will be observed:

- Assure the highest quality by maintaining supervised controls and written instructions governing quality control procedures and practices, establish clearly defined responsibility and authority for compliance;

- Conform to all contractual requirements, specifications, applicable standards and the Magnus Pacific Quality Control Plan. Compile accurate records of test certifications and other required documentation;

- Notify Project Management and the Owner of quality discrepancies for immediate corrective action. Assure that corrective action is implemented properly.

2.2 Quality Assurance/Quality Control Program Overview

Responsibility for project QA/QC remains a corporate line management function. Magnus Pacific's Corporate Quality Assurance/Quality Control Officer (CQAO) is responsible for the overall and ongoing development of the QA/QC Program. These responsibilities include:

1. Coordinating the development and the updating of the QA/QC program;

2. Hiring, developing, and managing of Project Engineers to perform QC duties on Magnus Pacific projects;

3. Assisting project management with developing/implementing training as necessary for QC duties on Magnus Pacific projects;

4. Auditing projects for compliance with designated QC procedures.

Magnus Pacific Project Engineers are responsible for following/implementing designated QC procedures in the field and reporting discrepancies to management. These personnel report to the Site Project Manager, who is responsible for ensuring technical consistency among these personnel.

3.0 ORGANIZATION

3.1 Quality Control Manager

Magnus Pacific's CQC Manager for this project is Mr. Tino Maestas. Mr. Maestas will report and receive his authority directly from Mr. Matthew Marks, Magnus Pacific Regional Manager. Mr. James Dodd, Magnus Pacific Construction Manager, will serve as the alternate CQC Manager and receives his authority also from Mr. Matthew Marks.

The CQC Manager will formulate and implement, as required, the written procedures and instructions contained in this plan. Actual practices are not limited to this plan and where a discrepancy exists between this plan and the contract requirements, the contract requirements will prevail. The CQC Manager's duties will include the following:

1. Assure compliance with the quality control requirements of the contract.

2. Coordinates the quality control efforts of subcontractors and suppliers to correspond to the overall CQC Plan.

3. Provide direct feedback and advise the Owner representative regarding the effectiveness and capability of the quality control organization.

4. Review and coordinate submittals and approvals of contract furnished materials and corresponding tests. Perform follow-ups of subcontractor's work as required.

5. Ensure all work complies with the contract plans and specifications.

6. CQC Manager shall be on-site whenever work is being completed.

The following letters are enclosed in *Attachment 1*:

- A letter to the CQC Manager signed by the Regional Manager which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC Manager, including authority to stop work.

- Copies of Magnus Pacific's quality control personnel's QC certification.

3.2 Contractor Other Personnel

Other contractor's personnel such as superintendents, engineers and QC technicians will carry out quality control functions all of whom will be physically on the job-site for the duration of the contract work.

3.3 Commercial Testing Firms

Commercial testing firms to be utilized are:

Geo-Logic Associates, Inc.
143E Spring Hill Drive
Grass Valley, CA 95945

4.0 PROCEDURES

4.1 Control of Construction

The CQC Manager will perform sufficient control phases and test of all work including the work of subcontractors, to ensure conformance to applicable specifications and drawings with respect to materials, workmanship, construction, functional performance, and identification. Also, the CQC Manager will be responsible for the maintenance and accuracy of the record drawings (as built). The QC organization will perform at least three phases of control for all definable features of work as follows:

A. Preparatory Phase – This phase will be performed prior to beginning each definable feature of work and includes:

1. Review Contract Requirements.
2. Check to assure that all materials and/or equipment are on hand and have been tested, submitted, and approved as required.
3. Check to assure that provisions have been made to provide the required control inspection and testing.
4. Examine work area to assure that all preliminary work has been accomplished.
5. Review activity hazard analysis when necessary.
6. Discuss procedures for controlling quality of the work including repetitive deficiencies.
7. Document construction tolerances and workmanship standards for that feature of work.
8. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Owner.
9. Discuss the initial control phase.

A sample outline of the preparatory phase inspection meeting is enclosed in *Attachment 2.*

B. Initial Phase – This phase will be performed at the time when beginning each definable feature of work and includes:

1. Check preliminary work and review minutes of the preparatory meeting.
2. Check new work for compliance with contract documents.
3. Verify required control inspection and testing.
4. Establish level of workmanship.
5. Resolve all differences.
6. Check for use of defective or damaged materials.
7. Check for omissions and resolve any differences with the Owner

8. General check of dimensional requirements.
9. Check safety compliance.
10. Verify compliance with all applicable control plans.

A sample outline of the initial phase inspection meeting is enclosed in *Attachment 2*.

C. Follow-up Phase - This phase will include checks performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks will be made a matter of record in the CQC documentation. Final follow-up checks will be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. Magnus Pacific will not build upon nor conceal non-conforming work.

4.2 Receiving and Warehousing

Inspection of permanent construction materials received will be performed by the CQC Manager, or other contract personnel. Visual inspection will include the identification of the material, damage, quantity and completeness evidence of compliance with approvals, and proper documentation.

Results of receiving inspection will be reported on an appropriate report form as further identified in Section 6.0.

4.3 Offsite Control

In order to assure that all requirements of the contract plans and specifications are met and maintained and to assure the delivery of quality products, all suppliers will be required to submit certificates of compliance, test data, or other supporting documents that are required by the Contract documents to demonstrate compliance. Suppliers will be notified of any deficiencies, and will be required to submit additional information.

4.4 Documentation

The CQC Manager will maintain current records of all control activities and tests. This will include factual evidence that the required control phases and tests have been performed and proposed remedial action for any defective or rejected materials. Records will cover both conforming and defective features and they will include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the Contract. Legible copies of these records on an appropriate form will be furnished to the Owner on a daily basis. Test logs will be used to track tests and to ensure the frequency of tests are taken are

consistent with design objectives. The test logs will also be utilized to ensure retests for failed areas have been performed.

4.5 Submittal Management Procedures

Magnus Pacific will use the submittal register, submitted under separate cover, to schedule and track the progress of submittals for this project. The submittal register will be updated on a weekly basis by the CQC Manager. New submittals will be numbered in ascending numerical order (e.g. 001, 002, 003, etc.) as required by each Specification and resubmittals will be designated using the original submittal number followed by the revision number (e.g. 001.1, 001.2, 001.3, etc.).

4.6 Drawings and Document Control

Contract drawings, work orders and change orders issued for construction will also be issued to the CQC Manager. It is the responsibility of the CQC Manager to maintain this technical information and keep it current and recorded as it is revised. No technical information will be replaced or revised without receipt of properly authorized change notice, revision, or equal.

4.7 Materials Certification

Copies of all purchase orders or subcontracts requiring receiving inspection will be given to the CQC Manager for receiving and record purposes. When the purchase order requires vendor certification of materials, equipment, or supplies, such certification will be verified as to accuracy and conformance and may be used in lieu of test for those properties covered by the certification. Copies of all certifications received will be maintained by the CQC Manager, and they will be available to the Owner upon request or submitted if required by the specifications.

4.8 Workmanship Inspection

Each subsequent phase of construction will be inspected by the CQC Manager such that areas that will be built upon (or embedded as result of construction of a subsequent work task) are inspected for conformance prior to initiating the subsequent work task. The CQC Manager will verify by signature that all items installed are in accordance with the contract plans and specifications prior to placement or construction of the subsequent work task. Any corrective action required will be recorded.

4.9 Calibration of Equipment

Contractor furnished measuring and test equipment shall be calibrated and maintained to traceable industry standards. Records of these calibration certifications will be maintained by the Quality Control department and made available upon request.

a. Each instrument will be plainly and permanently numbered, the equipment will be operated only by those persons directly responsible for the equipment or personnel under their cognizance.

b. Each piece of equipment will be checked for accuracy as recommended by the manufacturer for frequency of calibration. Required calibration of measuring and test equipment will be conducted by a certified laboratory.

c. Measuring and test equipment dropped, damaged, or believed to be inaccurate will be removed from service and recalibrated.

4.10 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time as stated in the Contract Documents, the CQC Manager will conduct an inspection of the work and the develop a punch list of items which do not conform to the approved drawings and specifications. Such a list of deficiencies will be included in the CQC documentation and will include the estimated date by which the deficiencies will be corrected. The CQC Manager or staff will make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, Magnus Pacific will notify the Owner that the project is ready for the Owner Pre-Final inspection.

4.11 Pre-Final Inspection

The Owner will perform this inspection to verify that the project is complete and ready to be occupied. An Owner Pre-Final Punch List may be developed as a result of this inspection. The Magnus Pacific CQC Manager will ensure that all items on this list have been corrected before notifying the Owner so that a Final inspection can be scheduled. Any items noted on the Pre-Final inspection will be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time slated for completion of the entire work or any particular increment thereof of the project is divided into increments by separate completion dates.

4.12 Final Inspection

Magnus Pacific's Quality Control Inspection personnel, including the superintendent or other primary management person, the Owner's Representative will be in attendance at this inspection. The final acceptance inspection will be formally scheduled by the Owner based upon notice from Magnus Pacific. Notice will be given to the Owner at least 14 days prior to the final acceptance inspection and shall include Magnus Pacific's assurance that all specific items previously identified to Magnus Pacific as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance

inspection. The general requirement of final acceptance will include, but no limited to, the following:

1. General appearance
2. Workmanship
3. Cleanliness of areas and equipment
4. Removal of unused material and temporary facilities
5. Condition of job files and completion of project documentation

4.13 Revision Policy

Activities, programs, and procedures not covered in this Quality Control Plan or proposals or additions to these standards, shall be discussed at meetings held for that purpose at such times and places the Quality Control System Manager may select, and shall take such action to request acceptance from the Owner to incorporate such revisions as deemed necessary. A record shall be kept of such meetings and interested parties present, together with the subject matter reviewed. Such meetings shall be held as required by changes in the contract specifications for the purpose of reviewing the QC plan, to review revisions, additions, or deletions. Accepted revisions shall be incorporated in the plan as first revision, second revision, etc., a revised index page shall be included.

5.0 TESTING METHODS

All testing will be completed in accordance with the applicable section of the specifications. Field QC testing results will be submitted on the daily QC report. Off-site testing, as needed, of water and/or soil will be submitted with the daily QC report within 24 hours of Magnus Pacific's receipt from the commercial test facility.

Property	Requirement	Test Frequency	Test Method
MIX WATER			
pH	6 to 9	1 per source	API STD 13B
Total Hardness	<250 ppm	1 per source	Hach Kit
Total Dissolved Solids	<500 ppm	1 per source	Hack Kit

IRON AGGREGATE ETI CC-1004			
Gradation	Mesh # % Pass 8 95-100 16 75-90 30 25-45 50 0-10 100 0-5	1 per source	California Test 202
Bulk Density	Document Only	1 per source	ASTM C138
Permeability	>142 feet/day	1 per source	ASTM D-2434
Porosity	>40%	1 per source	ASTM D-7263/D-854

SAND			
Gradation	Same gradation as ZVI	1 per source	California Test 202
Bulk Density	Document Only	1 per source	ASTM C-138
Initial Moisture Content	<5% by weight	1 per source – verified upon receipt of material in the field	ASTM 2216
Permeability	>142 feet/day	1 per source	ASTM D-2434
Porosity	>40%	1 per source	ASTM D-7263/D-854

Property	Requirement	Test Frequency	Test Method
ZVI/Sand (55%/45% by volume)			
Permeability	>142 feet/day	1 per mix	ASTM D-2434
Porosity	>40%	1 per mix	ASTM D-7263/D-854
BIOPOLYMER			
Rantec G150	Certificate of Compliance	1 per Lot shipped	N/A
INITIAL BIOPOLYMER SLURRY (AT BATCH PLANT)			
Biopolymer Content	50-70lbs per 1000-gal	Ongoing	Viscosity & density
Viscosity	>80 seconds	2 per shift	API STD 13B
Density	>62.8 pcf	2 per shift	API STD 13B
pH	>10	2 per shift	API STD 13B
IN-TRENCH BIOPOLYMER SLURRY (2 DEPTHS PER EVENT)			
Viscosity	>60 seconds	2 per shift	API STD 13B
Density	>62.8 pcf	2 per shift	API STD 13B
pH	>10	2 per shift	API STD 13B
BROKEN BIOPOLYMER SLURRY			
Viscosity	<30 seconds	Following trench circulation of ~2-3 pore volumes of the trench	API STD 13B

Property	Requirement	Test Frequency	Test Method
ZVI/SAND AS MIXED (PRIOR TO PLACEMENT)			
Magnetic Separation Test	+/- 2% per batch Avg must be <0%	1 per batch for the first 6 batches per day of mixing; at 100% compliance reduce frequency to 1 per every 6 batches	See PRB PEP (Appendix I)
ZVI/SAND (AS-PLACED IN THE TRENCH)			
Magnetic Separation Test	<0%	Sampled at mid-depth along slope every 20 feet along trench alignment	See PRB PEP (Appendix I)
KEY MATERIAL			
Key Material	Design Elevation	Every 10 feet along trench alignment	Engineer Identification
CONTROLLED DENSITY FILL (CDF)			
CDF Cement	Certificate of Compliance	1 per source	ASTM C-150, Type II
CDF Aggregate	Certificate of Compliance	1 per source	ASTM C-33
CDF Delivery Tickets	Weighmaster Certificates	1 per truck	ASTM C-94
28-Day Compressive Strength	30 psi<UCS<100 psi	2 per 50-CY	ASTM C-39
Bleed	<2%	2 per 50-CY	ASTM C-940 (Section 10)
GEOTEXTILE			
Nominal Thickness	8 oz non-woven	1 per source	per Manufacturer

6.0 SUBMITTALS AND RECORDING FORMS

Magnus Pacific will complete submittals in accordance with the technical specifications. Magnus Pacific will submit to the Owner a submittal register identifying the submittals required by the Contract documents. All submittals will be recorded on the submittal register. Magnus Pacific will submit field test results on the daily quality control report. Magnus Pacific will review our subcontractors and suppliers' submittals prior to submitting to the Owner. Should the Owner reject a submittal or request additional information, Magnus Pacific will revise the submittal accordingly in a timely manner such that the schedule of the related activities is not delayed.

The CQC Manager will be utilizing the Contractors Daily Quality Control Report to document the day's quality control activities of Magnus Pacific and all subcontractors. The daily QC report will contain notations specifically defining the phase of control on each day's activities and note compliance or non-compliance with previous phases when applicable. Also, the daily QC report will include the following items:

1. Operating plant/equipment with hours worked, idle, or down for repair.
2. Work performed each day, giving location, description, crew size and identification, and scheduled activity number reference.
3. Quantity of materials received at the site with statements as to acceptability, storage, and reference to specifications/drawings requirements.
4. Submittals reviewed, with contract reference, by whom, and action taken.
5. Instructions given/received and conflicts in plans and/or specifications.

Copies of all test and inspection reports including calculation sheets will be submitted with this daily QC report. The original and one copy of the daily QC report and all attachments will be submitted to the Owner daily within 24 hours after the date covered by the report. A sample copy of the Subcontractor Daily Quality Control Report (SDQCR), QC recording forms, and a chain of custody form are attached in *Attachment 3*. The QC report will be signed and dated by the CQC Manager and/or his designee.

7.0 QUALITY CONTROL PROCEDURES

7.1 Surveillance of Subcontractor's Operations

Surveillance of the subcontractor's operations will be the responsibility of the CQC Manager. Major discrepancies will be recorded and transmitted to the related subcontractor. The CQC Manager has the authority to act directly with the subcontractor representatives on routine quality control activities. If a discrepancy is related to a work task that will be covered or embedded by a preceding operation, a resolution will be made prior to the item being covered. Major discrepancies will be followed up on a daily basis, upon correction of such a discrepancy, the date corrected and by whom.

There is one Quality Control System manager for Magnus Pacific with support of the Project Construction Manager and Magnus Pacific Project Management. Surveillance of the subcontractors operations is the responsibility of the Quality Control System Manager. The Contractor's Quality Control System Manager has authority to act directly with subcontractor representatives on routing quality control activities.

In addition to the Contractor's Quality Control System Manager, the Dredging Contractor's Superintendent and other supporting specialty contractors field supervisor will act as their quality control engineer and will be directly responsible to the Contractor's Quality Control System Manager, and the Magnus Pacific Quality Control Support team.

7.2 Inspection Acceptance Procedure

All construction work will be completed in accordance with the contract plans and specifications. All rework or changes to the contract plans or specifications must be authorized by the Owner. All construction activities will be recorded on the daily QC report and all work in compliance with the contract plans and specifications will be noted accordingly. Control, verification, and acceptance testing procedures for each quality control test is included the QC matrix in Section 5.0.

7.3 Inspection Discrepancy Procedures

Intended as an inspection system whereby all discrepancies in quality, workmanship, materials, equipment, supplies, and/or unauthorized deviations from engineering requirements on specifications can be reported and to ensure that responsible supervision personnel are notified.

a. Discrepancies will be recorded on the Quality Control Daily Report form. Each discrepancy will be assigned a number by the recording Quality Control System Manager. A concise statement locating the discrepancy and description of the discrepancy will be filled in by the Quality Control System Manager.

b. When material, equipment, supplies, or workmanship, that does not conform to the contract drawings or specifications are rejected, the Quality Control System Manager will initiate a discrepancy report and immediately furnish copies to the contractor's Project Manager and Construction Manager and/or Subcontractor's project representative.

The discrepancy report log will be periodically reviewed by the Project Manager with the Quality Control System Manager to formulate a disposition of each listed uncorrected discrepancy. They will establish timetables for final resolution of all discrepancies.

8.0 DEFINABLE FEATURES OF WORK

1. Biopolymer slurry excavation
2. ZVI/Sand Mixing & Placement
3. CDF Cap Placement

ATTACHMENT 1

Authorization Letters Outlining Duties and Responsibilities

CQM Personnel Certification

Magnus Pacific, LLC
6558 Lonetree Boulevard
Rocklin, CA 95765
www.magnuspacific.com

September 17, 2015

Mr. Tino Maestas, P.E.
Magnus Pacific, LLC
6558 Lonetree Blvd.
Rocklin, CA 95765

Subject: Authorization Letter, Construction Quality Control Manager

Project: Permeable Reactive Barrier
Dublin Apartments
7544 Dublin Blvd, Dublin, CA

Dear Mr. Maestas:

Please allow this letter to serve as notification of corporate appointment for you to serve as the QC Manager for the above referenced project. Your responsibilities and authorities are outline below:

- Responsible for implementing and managing the QC program as described in the contract.
- Authorized to stop any production work that is not in compliance with the contract and direct removal/replace of all non-compliant work.
- Ensuring that construction activities are performed according to plans and specifications.
- Responsible for developing and maintain an effective QC Plan and system.
- Responsible for the preparation of acceptable documentation of all QC activities.
- Responsible to identify, schedule and perform the three phases of control on all Definable Features of Work (DFW) as identified in the construction schedule and cross referenced in the QC Plan.

Yours truly,
MAGNUS PACIFIC, LLC

Matthew Marks
Vice President/Regional Manager

cc: CQCP

U.S. ARMY CORPS OF ENGINEERS

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

NAVFAC

CERTIFICATE

FLORENTINO MAESTAS

SPK511200259

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

SACRAMENTO	3/8-3/9/12	SPK-SACRAMENTO	LARRY J. SMITH
Location	Training Date(s)	Instructional District/ NAVFAC	CQM-C Manager

DREW A. PERRY	DREW.A.PERRY@USACE.ARMY.MIL	(916) 557-7779	
Facilitator/Instructor	Email	Telephone	Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE
CQM-C Recertification online course: https://www.myuln.net

Director, USACE Learning Center

ATTACHMENT 2

Preparatory Phase Inspection Sheet &

Initial & Follow-Up Phase Inspection Sheet

PREPARATORY PHASE CHECKLIST

(CONTINUED ON SECOND PAGE)

SPEC SECTION	DATE
Enter Spec Section # Here	Enter Date (DD/MMM/YY)

CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #
Enter Cnt# Here	Enter DFOW Here	Enter Sched Act ID Here	Enter Index# Here

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED ____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED?

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING?

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES.)

COMMENTS:

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN?

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS.

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK.

CLARIFY ANY DIFFERENCES.

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NOT, WHAT ACTION IS TAKEN?

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAS TEST FACILITIES BEEN APPROVED?

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

QC MANAGER DATE

INITIAL PHASE CHECKLIST

SPEC SECTION	DATE
Enter Spec Section # Here	Enter Date (DD/MMM/YY)

CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #
Enter Cnt# Here	Enter DFOW Here	Enter Sched Act ID Here	Enter Index# Here

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED ____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

PROCEDURE COMPLIANCE

IDENTIFIY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.

COMMENTS:

PRELIMINARY WORK

ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?

WORKMANSHIP

ESTABLISH LEVEL OF WORKMANSHIP.

WHERE IS WORK LOCATED?

IS SAMPLE PANEL REQUIRED? YES ☐ NO ☐

WILL THE INIITAL WORK BE CONSIDERED AS A SAMPLE? YES ☐ NO ☐

(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE)

RESOLUTION

RESOLVE ANY DIFFERENCES.

COMMENTS:

CHECK SAFETY

REVIEW JOB CONDITIONS USING EM 385-1-1 AND JOB HAZARD ANALYSIS

COMMENTS:

OTHER

OTHER ITEMS OR REMARKS

QC MANAGER DATE

ATTACHMENT 3

Subcontractor Daily Quality Control Report

Biopolymer Slurry Wall Daily Report

Excavation Profile/Sounding Form

Batch Plant QC Form

Trench Slurry QC Form

ZVI-Sand Batch Mixing Log

Magnetic Separation Test Form

Chain of Custody

MAGNUS Pacific

Permeable Reactive Barrier (PRB)
Dublin Apt - Crown Chevrolet N Parcel
7544 Dublin Blvd, Dublin, CA

SUBCONTRACTOR DAILY QUALITY CONTROL REPORT

REPORT NO:	001
CONTRACT NO:	
PROJECT:	Dublin Apt PRB
PROJECT NO:	150019
SUPERINTENDENT:	James Dodd
PROJECT MANAGER:	Tino Maestas
DATE:	
WORK HOURS:	START END

WEATHER:

SUMMARY OF CONSTRUCTION PROGRESS:

TASKS	
COMMENTS	Construction Summary Excavation Production ZVI/Sand Placement (include LF of PRB and ZVI/sand/slurry weight totals) CDF Placement Quantities of Spoils Transportation & Disposal

LIST OF PERSONNEL ONSITE:

NAME	TITLE	ST	OT	DT	NAME	TITLE	ST	OT	DT

SUMMARY OF EQUIPMENT ONSITE (Note any new equipment):

DESCRIPTION	MODEL	EQ NO.	ON	OFF	IH	OH	ACTIVITY

MATERIALS RECEIVED/USED (Provide Bill of Lading):

MATERIAL	UNIT	REC	USED	REC TD	USED TD	ONSITE

MAGNUS PACIFIC - DAILY QUALITY CONTROL REPORT

REPORT NUMBER: 001 PROJECT: Dublin Apt PRB

QUALITY CONTROL ACTIVITIES PERFORMED (Testing, Sampling, Surveying, etc.):

COMMENTS	
ACTIVITY	

JOB SAFETY (List Items Checked; Results; Incidents; Concerns):

COMMENTS	
ACTIVITY	

DEFICIENCIES OR CORRECTIVE ACTIONS NOTED:

DEFICIENCIES	
ACTIONS	

SIGNIFICANT DOWNTIME / DELAYS (Work Stoppage, Obstruction Time, etc.):

COMMENTS	

FIELD CHANGE REQUESTS OR APPROVALS:

REQUESTS	
APPROVALS	

ADDITIONAL DOCUMENTATION SUBMITTED (Test Results, Check Lists, etc.):

DOCUMENT - FORMS\CERT	SUBMIT	DOCUMENT - FORMS / CERT	SUBMIT

ADDITIONAL ACTIVITIES OR SUBCONTRACTORS:

SUBCONTRACTOR	ACTIVITY	SUBCONTRACTOR	ACTIVITY

NAME:		TITLE/COMPANY:	
SIGNATURE:		DATE:	
REVIEWED BY:		TITLE/COMPANY:	
SIGNATURE:		DATE:	
REVIEWED BY:		TITLE/COMPANY:	
SIGNATURE:		DATE:	

MAGNUS Pacific

Dublin Apt Permeable Reactive Barrier
Daily Slurry Wall Quality Control Form

DATE:		**JOB NAME:**	Dublin Apartments PRB					**JOB NUMBER:**	150019
LOCATION: 7544 Dublin Blvd, Dublin, CA			**HEADING: PRB Wall**					**COMMENTS**	
EXCAVATION				**BACKFILL PROFILE**				Weather:	
	Depths (ft)		Area						
Station	Key	Depth	(SF)	Station	ZVI/Sand			Notes:	
								1.	
								2.	
								3.	
								G150 Guar Used Today (TN):	0.00
								G150 Guar Used To Date (LB):	0.00
								Busan Used Today (LBS):	0
								Busan CEMENT Used To Date (LBS):	0
								Soda Ash Used Today (TN):	0.00
								Soda Ash Used To Date (TN):	0.00
								SF Excavation Today:	0.0
								SF Excavation To Date:	0.0

FIELD QUALITY CONTROL TESTING

Magnetic Separation Test

Time	Batch #	% ZVI	% Sand	OPEN

Initial Biopolymer Slurry (at Batch Plant)

Time	Station	Visc	Density	pH	OPEN	Comments

Biopolymer Slurry (In-Trench)

Time	Station	Visc	Density	pH	OPEN	Comments

OPEN

DEFINITIONS

Depth	measured feet from top of workpad
Visc	marsh funnel seconds
Density	pounds per cubic feet
Sand	percent sand content
Filtrate	filtrate loss in cubic centimeters
Filter Cake	cake thickness in millimeters
Slump	slump cone test measured in inches
NM	not measured
--	not required

Comments:

Magnus Pacific _____ Engineer _____

MAGNUS Pacific

Biopolymer Slurry Trench

Date: **Job Number:** **Technician:** **Heading:**

EXCAVATION/BACKFILL PROFILE

Station	A.M.	Station	SHIFT	Station	P.M.	Comments - Down Time etc..

Comments:

ITEMS TO NOTE Trench soundings every 10 ft; top of key; bottom of excavation; backfill profile start of day, between shifts, and end of day. Slurry level in trench at start and end of day; record time and depth from top of work platform in comments section. Minimum width is 2 ft; note wider sections due to sloughing or over-excavation.

MAGNUS Pacific

Biopolymer Slurry at Batch Plant

Date:	Job Number:	Technician:	Shift: D N Heading:

BIOPOLYMER SLURRY

Required Testing (per 10 Hour Shift)

Time	Viscosity (Sec)	Density (pcf)	Filtrate (cc)	pH

Time	Viscosity (Sec)	Density (pcf)	Filtrate (cc)	pH

As Necessary

Time	Viscosity (Sec)	Density (pcf)	Filtrate (cc)	pH

Time	Viscosity (Sec)	Density (pcf)	Filtrate (cc)	pH

Specification	Viscosity > 80 mfs	Density < 64 pcf	N/A	pH > 10

G150 Bags Received _____ **Soda Ash Received** _____

G150 Bags Used _____ **Soda Ash Bags Used** _____

Busan Start Volume _____

Busan End Volme _____

Record approx usage based on dosing pump or measuring the level difference of the liquid at start and stop of each shift.

Comments: _____

MAGNUS Pacific

Biopolymer Trench Slurry

Date:	Job Number:	Job Name:	Technician:	Shift:	Heading:

TRENCH SLURRY

Required Testing

(2 per 10 Hour Shift)

A.M. Sample	Time	Station	Depth (ft)	Viscosity (mfs)	Density (pcf)	Sand (%)	Filtrate (cc)	Filter Cake -	pH -

P.M. Sample	Time	Station	Depth (ft)	Viscosity (mfs)	Density (pcf)	Sand (%)	Filtrate (cc)	Filter Cake -	pH -

As Necessary

Additional Sample	Time	Station	Depth (ft)	Viscosity (mfs)	Density (pcf)	Sand (%)	Filtrate (cc)	Filter Cake -	pH -

	Specifications	Visc > 60 mfs	Density > 64 pcf	N/A	N/A	N/A	pH > 10

Comments:

ZVI PRB PROJECT
DUBLIN APARTMENTS
7544 DUBLIN BLVD, DUBLIN, CA

MAGNUS Pacific

ZVI Batch Mixing Log

Date	Job No.	Technician

Batch No.	Time	Truck No.	% Iron by Weight	Pass?	# of Iron Bags Used	# of Sand Bags Used
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

MAGNUS Pacific

Magnetic Separation Testing Form

Date | Job No. | Technician

A	Weight of empty container		grams
B	Sample the iron-sand mixture from the discharge of the mixing truck or backfill		
C	Weight of container + sample		grams
	Bulk weight of sample A - C		grams
D	Net dry weight of sample		grams
E	Spread the sampleout in a suitable container (e.g. disposable aluminum cookie sheet)		
F	Cover the magnet in a plastic bag		
G	Pass the magnet over the sample to remove the magetic (granular ZVI) fraction. Place magnetic fraction in new container		
H	Continue passing the magnet over the material until no more magnetic material is removed		
I	The magnetic fraction may contain some non-magnetic (sand) particles. Repeat Steps E to H at least 3 more times.		
J	Weight of iron fraction		grams
	Weight of sand fraction		grams
K	Dry Iron Net Weight % J ÷ D x 100%		%

Geotechnics, Pittsburgh, PA
544 Braddock Ave

East Pittsburgh, PA 15112
phone 412.823.7600 fax

Chain of Custody Record

Magnus Pacific

Client Contact	**Project Manager: Tino Maestas**	**Site Contact: N/A**	**Date:**	COC No: 001
Magnus Pacific	**Tel/Fax: 916-471-8210**	**Lab Contact: Liisa Doty**	**Carrier:**	_____ of _____ COCs
6558 Lonetree Blvd	**Analysis Turnaround Time**			150019
Rocklin, CA 95765	Calendar (C) or Work Days (W) _____			
(916) 471-8210 Phone	TAT if different from Below _____			
(xxx) xxx-xxxx FAX	☐ 2 weeks			SDG No.
Project Name:	☐ 1 week			
Site:	☐ 2 days			
PO #	☐ 1 day			Sampler:

Sample Identification	**Sample Date**	**Sample Time**	**Sample Type**	**Matrix**	**# of Cont.**	**Filtered Sample**	Sample Specific Notes:

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification

☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* *Poison B* ☐ *Unknown* ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

amec foster wheeler

ATTACHMENT D

Site Specific Health & Safety Plan

Dublin Apartments

Submittal Number: 025010-0006-00
Title: Site Specific H&S Plan

7544 Dublin Boulevard
Dublin CA 94568

Project ID:
Owner: Dublin Apartment Properties, LLC
Construction Team: ZCON Builders
Design Team: BDE

Date Due: 10/09/2015
Date Issued: 09/25/2015
Substitution: No

Information

Types: Other
Trades: Environmental Consultant
Categories: N/A
Subcontractor/Manufacturer: Magnus Pacific

Stamps

ZCON Builders

This submittal has been reviewed for general compliance only as it relates to the CONTRACT DOCUMENTS. This review implies no approval of deviation from the plans and specifications, nor responsibility for errors or emissions in the submittal. The subcontractor shall remain responsible for all details required by the assembly confirmation of dimensions, fabrication and installation means and methods. This submittal shall not be used for the manufacture, assembly, fabrication, or installation with out the Architect's stamped approval.

Submittal No: 025010-0006-00 **Section No:** [none]

Date: 09/25/2015 **By:** Laura Henry

SUBMITTAL OF PLANS, SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL, SAMPLES, OR MANUFACTURER'S CERTIFICATES

DATE: Sept 26, 2015

SUBMITTAL NO. 006

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS

TO: Mr. Sean R McKinley ZCon Builders 780 W Grand Avenue Oakland CA 94612 w: 510-444-4190 c: 510-507-3591 e: smckinley@zconbuilders.com	From: Mr. Tino B. Maestas, P.E. Magnus Pacific, LLC 6558 Lonetree Blvd Rocklin, CA 95765 Direct: 916-462-6419 Cell: 916-471-8210 email: tmaestas@magnuspacific.com	**PROJECT NO.** 150019	CHECK ONE: ☒ THIS IS A NEW SUBMITTAL ☐ THIS IS A RESUBMITTAL
SPECIFICATION SEC. NO. 01 35 29	PROJECT TITLE AND LOCATION 7544 Dublin Apartments, Dublin, California		

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type size, model number/etc.)	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. (See Instruction on B)	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE	VARIATION	FOR CLIENT USE
				SPEC. PARA.NO.	DRAWING SHEET NO.			
1	Site Specific H&S Plan		1	1.3.A	N/A	A		

REMARKS

I have reviewed and approved the attached submittal(s) to ensure contract compliance. All quantities, dimensions, specific performance requirements, materials, catalog numbers and similar data have been verified as complete.

9/25/2015

Tino B. Maestas, P.E.

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	Date

6558 Lonetree Blvd.
Rocklin, CA 95765
Tele. (916) 462-6400
www.magnuspacific.com

September 25, 2015

Reference:
Health & Safety Plan (HASP) Submittal
Dublin Apartments Permeable Reactive Barrier (PRB)

The Magnus Pacific site specific **Health and Safety Plan (HASP)** complies with all components listed in the job specifications Section 01 35 29 (Health and Safety Requirements for Remediation).

The following table is provided as a compliance reference tool for the client's plan review staff:

Specifications Section 1.4; Subsection B.1		Magnus Pacific HASP Reference
a.	Project Overview	Page-6, Section A
b.	Project Personnel	Pages 6-7; Section B
c.	Site Description and History	Page-6; Section A
d.	Scope of Work, Hazard Assessment	Pages 7-9; Section D
e.	Work Area Access and Control	Pages 10-11; Section F
f.	Personal Protective Equipment	Pages 11-12; Section H
g.	General Safe Work Practices	Appendix-B; Code of Safe Work Practices
h.	Personnel and Equipment Decontamination	Page 12; Section I
i.	Excavation Safety	Pages 23-25; Section AA
j.	Working Near Utilities	Page 24; Section AA
k.	Working at Heights	Pages 22-23; Section Y
l.	Hoisting and Lifting	Appendix-B; Code of Safe Work Practices; Section-7
m.	Medical Monitoring and Training	Page 13; Section J and Page 16; Section P
n.	Emergency Response	Page 18; Section S
Specifications Section 1.4; Subsection B.2		**Magnus Pacific HASP Reference**
a.	Fitness for Duty	Page 13; Section J
b.	Safety Inspections	Page 15; Section O
c.	Vehicle and Equipment Safety	Appendix-B; Code of Safe Work Practices; Sections 3 & 4
d.	Utility Clearance and Safety including electrical hazards	Page 24; Section AA
e.	Hazard Reporting Process	Page 21; Section W
f.	Stop Work Protocols	Page 5; H&S Policy Statement; #6
g.	Housekeeping	Page 11; Section G
h.	Evacuation Procedures	Page 18; Section S

SITE SPECIFIC HEALTH & SAFETY PLAN (SS-HASP)

Prepared for

DUBLIN APARTMENTS
PERMEABLE REACTIVE BARRIER (PRB)
7544 DUBLIN BLVD.
DUBLIN, CALIFORNIA

Version 1.0 | Submitted: September 25, 2015

Prepared by:

Tim McAndrew, Health & Safety Manager

MAGNUS Pacific

MPC Job No. 150019

SITE SPECIFIC HEALTH & SAFETY PLAN ACKNOWLEDGMENT SHEET

I acknowledge having received a briefing on this Site Specific Health and Safety Plan (HASP), and that I understand the requirements of this plan, including the potential for random or for-cause drug and alcohol testing. I further acknowledge that failure to follow the requirements of this plan may result in removal from this site.

Printed Name	Company	Signature	Date

MAGNUS Pacific

Health & Safety Plan (HASP)

Table of Contents

Project Management Team Roster and Emergency Telephone Contact List 4

a) Project Description and Scope of Work Evaluation 6

b) Key Personnel Responsible for the Health and Safety Program 6

c) Identification of Competent/Qualified and First Aid/CPR Trained Persons 7

d) Hazard Assessment – Chemical and Physical Hazards 7

e) Air Sampling and Industrial Hygiene Monitoring Plan 10

f) Site Access and Control Procedures 10

g) Housekeeping 11

h) Personal Protective Equipment (PPE) Requirements 11

i) Decontamination Procedures 12

j) Medical Surveillance Program 13

k) 2-Week Look Ahead Planning With a Safety Focus 13

l) Procedures for Effectively Communicating Safety and Health Matters to Employees 13

m) Safety Incentive Program / Safety Recognition Program 13

n) Progressive Disciplinary Action Program 14

o) Workplace Hazard Identification Inspection and Corrective Action Program 15

p) Site Orientation and Safety Training Program 16

q) Provisions for Maintaining Records 17

r) Hazard Communication Program 17

s) Emergency Response and Evacuation Program 18

t) Fire Prevention Program 19

u) Hot Work Program 20

v) Drug Free Workplace / Substance Abuse Prevention Program 20

w) Incident Investigation and Reporting Program 21

x) Near Miss Incident Investigation Program 22

y) Fall Prevention Program 22

z) Lockout/Tagout / Control of Hazardous Energy Program 23

aa) Excavation Safety Program 23

bb) Cold Stress Prevention Program 26
cc) Heat Stress Prevention Program 26
dd) Site Logistics Plan 26
ee) Measures to Mitigate Public Exposure to Hazards (as applicable) 27

Appendices:

Appendix-A | Accident/Incident/Near Miss Investigation and Stop Work Report Forms

Appendix-B | Contractor's Illness and Injury Prevention Program (IIPP) and Code of Safe Work Practices

Appendix-C | Activity Hazard Analyses (AHAs)/Job Hazard Analyses (JHAs)

Appendix-D | Maps and General Site Forms

Appendix-E | Copies of Contractor's Staff OSHA Certifications

Appendix-F | Table-1 | Contaminants of Concern (COC) Action Levels & Responses

The remainder of this page intentionally blank.

Project Management Team Roster and Emergency Telephone Contact List

Magnus Pacific, LLC.
6559 Lonetree Blvd.
Rocklin, California 95765
Tele. (916) 462-6400
Fax (916) 783-0215
http://www.magnuspacific.com
California Contractor's License No. 929638

Magnus Pacific Project Management Staff:

1. Tino Maestas, Project Director ..... (916) 471-8210
2. John Councilman, Operations Manager ..... (916) 212-2148
3. Tim McAndrew, Project Health & Safety Officer (PHSO) ..... (916) 745-5936
4. Valentino "Val" Martinez, Contractor's Superintendent and Site Health & Safety Officer (SHSO) ..... (870) 221-1725
5. Scott Maxey, Corporate Health & Safety Director ..... (323) 303-8480
6. Mike Blewett, Alternate Site Health & Safety Officer ..... (530) 249-7604

ZCON Builders Project Management Staff:

- Brian King, V/P of Construction ..... (510) 774-5988
- Sean McKinley, Project Manager ..... (510) 507-3591
- Dan Sharp, Superintendent ..... (510) 377-6202

Dial 9-1-1 POLICE – FIRE – HAZMAT – MEDICAL EMERGENCIES Dial 9-1-1	
CHP – California Highway Patrol (Alameda County – Golden Gate Division)	(925) 828-0466
Police – Dublin Police Department (non-emergency)	(800) 647-1512
Fire/Rescue – Alameda County Fire Department (non-emergency)	(925) 833-3473
Hazardous Materials Response Team – Alameda County Fire Dept. (non-emergency)	(925) 833-3473
Ambulance/EMS – AMR Ambulance Service (non-emergency)	(800) 913-9197
Hospital – Valley Care Medical Center 5555 W Las Positas Blvd. Pleasanton, CA 94588	(425) 847-3000
Work Care – Employee Health Case Management	(888) 449-7787
Environmental Protection Agency (EPA) – 24-Hour Emergencies	(800) 300-2193
California Poison Control System	(800) 222-1222
California Office of Spill Prevention and Response (OSPR)	(800) 852-7550
Cal-OSHA Regional Office (Bay Area – Oakland/San Francisco)	(510) 286-1066
California Office of Emergency Services - OES (State Emergency Operations Center)	(916) 845-8510
PG&E EFS Hotline	(800) 743-5000

Health and Safety Policy Statement

The preservation of safety and health of all employees, the public, and the environment is of primary importance. Therefore the following policy statement is provided for this Contract:

1. Magnus Pacific, LLC. complies with all construction safety standards set forth in the Code of Federal Regulations (Title 29; Sections 1910/1926) and Cal-OSHA standards (Title-8; Subchapter-4 Construction Safety Orders and Subchapter-7 § 5192 HAZWOPER Standards). Additionally, Contractor will also adhere to the safety and health standards specified by the client. Wherever a conflict is discovered between various safety plans of agencies that may be operating on-site, Magnus Pacific shall comply with the more stringent standards of the governing agency having superior jurisdiction.

2. It is policy that every employee is entitled to work under the safest possible conditions for the construction industry. To this end, every reasonable effort will be made in the interest of accident prevention, fire protection, and health preservation.

3. This comprehensive safety and health program shall be implemented for this Contract with the objective of reducing the number of accidents and injuries to an absolute minimum; and a goal of achieving zero recordable(s) and zero lost time incidents. To be successful such a program must embody the proper attitudes towards accident prevention on the part of both the supervisors and employees. It also requires cooperation in all safety and health matters, not only between supervisor and employee, but also between employee and his or her fellow worker. It is only through cooperation that such programs can work effectively.

4. The designated Competent Person/Health & Safety Representative will be responsible for implementing the safety program. All employees shall adhere to the rules, regulations, and other provisions of our safety program.

5. A designated Competent Person/Health & Safety Representative will be present at all times when work is being performed.

6. **IMMINENT DANGER –"STOP WORK" POLICY:** All personnel operating on-site, including client staff and other contractors/subcontractors, etc., are vested with full authority & responsibility to initiate a **"Stop Work"** action without fear of reprisal or retribution. For any dangers that are serious and/or immediately dangerous to life or health (IDLH), work shall be immediately stopped until appropriate corrective actions are implemented.

The remainder of this page intentionally blank.

a) Project Description and Scope of Work Evaluation

The project is located at 7544 Dublin Boulevard (Dublin, CA). The site is approximately 6.3 acres and is divided by St. Patrick Way into the north parcel (approx. 5 acres) and south parcel (approx. 1.3 acres). The site was originally developed in 1963 as Crown Chevrolet; a car dealership with an auto body shop, on land that was formerly used for agriculture.

The main scope of work (SOW) on this project involves construction of a Zero Valent Iron Permeable Reactive Barrier (ZVI-PRB) using bio-polymer slurry trench method, approximately 146-linear feet, 30-feet deep, 2-feet wide. Backfill will be accomplished with 55%/45% ZVI/sand mixture, capped with CDF.

The following phases of work have been evaluated and will require pre-task job hazard analysis (JHA):

1. Mobilization and Demobilization (including General and Physical Site Hazards)
2. Zone Delineation
3. Fueling Equipment
4. Excavation and Construction of Permeable Reactive Barrier (PRB)
5. Batch Plant Operations

***Note:** Additional JHAs may be developed in the field. All JHAs will be developed and reviewed with the involved personnel and "marked up" with ink pen to delineate new or changing conditions.*

b) Key Personnel Responsible for the Health and Safety Program

The following staff members are the identified personnel who are accountable and responsible for safety at both the corporate and project level. Their OSHA certifications are included as Appendix-E of this Health and Safety Plan (HASP), and their qualifications include **40-hour HAZWOPER/Supervisor** and **OSHA-30 hour Course** or higher qualification levels:

Contractor's Project Manager (PM) – Tino Maestas, Regional Project Director

The Project Manager (PM), Mr. Tino Maestas, has primary responsibility for fulfillment of contract terms at the corporate level. He also has oversight responsibility of operations at the project level to verify that all legal and safety requirements are met, and to keep the project on schedule.

Contractor's Corporate Health & Safety Director – Scott Maxey

Magnus Pacific's Health & Safety Director, Mr. Scott Maxey, has primary responsibility for fulfillment of the health and safety requirements at the corporate level. Mr. Maxey is a **Certified Safety Professional (CSP)** and **Certified Industrial Hygienist (CIH),** and **Hazwoper Instructor/Supervisor** with over 20-years of leadership experience working on large, complex job sites across the country.

Project Health & Safety Officer (PHSO)– Tim McAndrew, Health & Safety Manager

The Project Health & Safety Officer, Tim McAndrew, is responsible for implementing and overseeing the HASP at the project level in coordination with the site Superintendent. Duties including coordinating the site health and safety operations, maintaining proper medical surveillance, providing hazard communication information, training employees in safe operating procedures, emergency response, reviewing accident reports, reviewing

inspection results, and advising the Project Manager on matters concerning the health and safety of employees or the affected public. He will also be consulted before any changes in the recommended procedures or levels of personal protective equipment are made. Mr. McAndrew is a designated **"Competent Person"** whose competencies include (but not limited to): **OSHA-500** (authorized instructor of OSHA 10-hour and 30-hour courses), **OSHA-521** (Industrial Hygiene), **OSHA-3010** Excavation/Trenching, **OSHA-3115** Fall Protection, **HAZWOPER Instructor/Supervisor** and certified **Safety Trained Supervisor (STS)**.

Project Superintendent and Site Health & Safety Officer (SHSO) – Valentino "Val" Martinez

The Project Superintendent & SHSO, Mr. Val Martinez, directly assists the PM with the on-site field activities, and is full responsibility for site operations. It is the Superintendent's duty to maintain site security, control site access for unauthorized personnel, supervise personnel on the site, stop site activities based on unsafe conditions or weather extremes, enforcing the buddy system where required, and verify that all procedures are followed. Mr. Martinez is a designated **"Competent Person"** whose competencies include (but not limited to): **OSHA 30-hour Course**, **OSHA 40-Hour HAZWOPER/Supervisor**, Fall Protection, and Excavation/Trenching.

Alternate Site Health & Safety Officer (SHSO) – Mike Blewett

Mr. Mike Blewett is a designated Health & Safety Officer based in Magnus Pacific's corporate offices (Rocklin/Sacramento) and he will serve as an Alternate Health & Safety Officer for this project to facilitate additional staffing depth if required. Mr. Blewett is a designated **"Competent Person"** whose competencies include (but not limited to): **OSHA-30 Hour**), **OSHA 40-Hour HAZWOPER /Supervisor**, Excavation/Trenching and Fall Protection.

c) Identification of Competent/Qualified and First Aid/CPR Trained Persons

Listed below are the names of designated **Competent and Qualified Persons** for this project that are also trained in **First Aid/CPR** and **HAZWOPER/ Supervisors**. Proof of qualifications to meet OSHA Competent-Qualified Person requirements is attached in Appendix-E of this HASP.

1) Tim McAndrew, Project Health & Safety Officer (PHSO)
2) Val Martinez, Contractor's Project Superintendent and Site Health & Safety Officer (SHSO)
3) Mike Blewett, Alternate Health & Safety Officer (SHSO)
4) Scott Maxey, Corporate Safety Director

d) Hazard Assessment – Chemical and Physical Hazards

Periodic hazard-risk exposure assessments are conducted to identify and evaluate workplace hazards. These assessments include:

1. Through the Activity Hazard Analyses (AHAs)/ Job Hazard Analyses (JHAs) when the Site Specific Safety Plan (HASP) is initially drafted;
2. When new substances, processes, procedures or equipment which present potential new hazards are introduced onto the job site;
3. When new, previously unidentified hazards are recognized on the job site;

4. When occupational injuries and illnesses occur on the job site;
5. When we hire and/or reassign permanent or short-service employees to processes, operations, or tasks for which a hazard evaluation has not been previously conducted ;
6. Whenever workplace conditions warrant an additional inspection.

- **Chemical Hazards** (Reference Appendix-F | Table-1 COC Action Levels and Responses)

  According to the information provided by previous site investigations the chemicals of concern (COCs) at the site are related to the previous operations at the site, which are predominantly volatile organic compounds (VOCs) commonly associated with petroleum products. The potential for exposure to the hazards associated with site operations is through inhalation, ingestion, and dermal/skin exposure to site COCs. Inhalation hazards will be minimized by dust reduction and air monitoring. Ingestion hazards will be minimized through strict adherence to personal hygiene and decontamination methods established in this HASP. The potential for dermal hazards will be minimized through strict adherence to PPE and personal hygiene requirements established in this HASP.

  - The potential for ingesting COCs or other impacted media is low.
  - The potential for inhaling impacted media is low.
  - The potential for dermal exposure is moderate.

  Excavation of soils in the project area is the primary activity that can result in worker exposures. However, our historical experience with this scope of work indicates that all soils will be predominantly wet within the work areas, therefore exposure to airborne dust is anticipated to be low. The work activity is unlikely to exposure workers to hazards in excess of the California Occupational Health and Safety Administration (Cal-OSHA) Permissible Exposure Limits (PELs). Nevertheless, dust and air monitoring will be performed by a subcontractor during excavation activities to monitor worker exposure and to develop and implement additional data protective measures that may be warranted.

- **Chemicals of Concern** (Reference Appendix-F | Table-1 COC Action Levels and Responses)

Petroleum Hydrocarbon/Volatile Organic Compounds (VOCs)

Hydrocarbon fuels (including gasoline and diesel fuel) are complex mixtures of hydrocarbons and additives. The constituents of hydrocarbon fuels possess a range of vapor pressures. For highly volatile components, chronic exposures or exposures to a high concentration may cause unconsciousness, coma, and possible death from respiratory failure. Exposure to low concentrations of vapor may produce flushing of the face, slurred speech, and mental confusion. Fuels are also irritating to the skin, and may cause drying and dermatitis as a result of prolonged contact. Various components and additives of the fuels can themselves present significant additional hazards.

The aromatic compounds benzene, toluene, ethylbenzene and xylene (BTEX) are of greatest concern in relation to site investigation activities, and are addressed separately below. However some additives used for performance enhancement (e.g., methyl tert-butyl ether - MTBE), oxygenation (e.g., alcohols and MTBE) and water scavenging (e.g., ethylene glycol methyl ether - EGME) can also present significant hazards as a result of prolonged inhalation

or skin exposure. In the past tetra-ethyl and tetra-methyl lead, both of which have been identified as carcinogens and present moderate skin contact hazards, were added to gasoline for anti-knock control.

There are no set limits for total petroleum hydrocarbon (TPH); however, gasoline guidelines may be used instead. Both the OSHA PEL and ACGIH TLV for gasoline are 300 ppm. Although not anticipated as necessary, control of inhalation exposure to gasoline (and its various constituents and additives) can be accomplished through the use of air purifying respirators equipped with organic vapor cartridges. The use of skin protection (i.e., chemically-protective gloves) is required when handling gasoline-contaminated materials.

BTEX is an acronym for benzene, toluene, ethylbenzene and xylenes. These compounds are volatile organic compounds (VOCs), are common in petroleum-related products (e.g., oil, gasoline, coal-tar DNAPL, etc.), and frequently co-occur at hazardous waste sites. Toluene, ethylbenzene, and xylenes have harmful effects on the central nervous system. Benzene is classified as a known human carcinogen. Short-term effects of low-level benzene exposure include drowsiness, dizziness, accelerated heart rate, headaches, tremors, confusion, and unconsciousness. The short-term effect of high-level benzene exposure is death.

Heavy Metals

Various concentrations of heavy metals are common in most soils. Inhalation of metal fumes or metal-contaminated dust is not anticipated during this project because the soil materials will be moist. Exposure to metals may occur via ingestion or skin contact. Large amounts of material would need to be ingested for any detrimental effects to occur. Momentary skin contact allows little, if any, opportunity for passage of any of the metals into the body. Field procedures require immediate washing of soil sediments from exposed skin, therefore provisions will be made on site for the quick drenching of skin.

Additional Chemicals

Additional chemicals and solvents may be brought to the jobsite by the contractor and used during the course of the project for various activities such as housekeeping and equipment cleaning. The Safety Data Sheets for these chemicals will be included in SDS booklet located in the site office.

- **Physical Hazards**

  The physical hazards associated with site operations are relatively typical of most construction sites. These hazards may include:

  a. Slips, trips, falls on terrain, and while mounting/dismounting equipment;
  b. Cuts and pinches from hand tools, and other hazardous hand tasks;
  c. Heavy lifting;
  d. Heavy equipment movement and vehicular traffic;
  e. Drilling hazards;
  f. Excavation hazards;
  g. Fall hazards while operating elevated platform (ie: man lift)
  h. Noise (occasionally above 85 dBA near generators, batch plant and excavator);
  i. Hazardous weather conditions;
  j. Biological hazards (ie: animals, bees/insects, snakes, spiders, poisonous plants, etc.)

e) Air Sampling and Industrial Hygiene Monitoring Plan

(Reference Appendix-F | Table-1 COC Action Levels and Responses)

Magnus Pacific will conduct industrial hygiene monitoring for this project, including personal monitoring of all contractor and subcontractor personnel. The SHSO will be equipped to perform sequential monitoring for volatile organic compounds (VOCs). Monitoring assets will include a multi-gas meter with photo ionization detector (PID) and colorimetric tubes, with specific BTEX sensitivity ranges.

All monitoring equipment will be calibrated in accordance with manufacturers' requirements, Magnus Pacific calibration standards and site specific requirements (e.g., at the beginning and end of each work shift). Calibration of equipment will be documented on an Air Monitoring Calibration Form.

Documentation will include:

- Date/time
- Zero reading before calibration
- Concentration of calibration gas
- Reading obtained with calibration gas before adjusting span
- Final reading obtained with calibration gas after adjusting span

f) Site Access and Control Procedures

Each HAZWOPER controlled work area will consist of the following three zones:

- **Exclusion Zone**: Contaminated work area.
- **Contamination Reduction Zone**: Decontamination area.
- **Support Zone**: Uncontaminated or "clean area" where personnel should not be exposed to hazardous conditions.

Each zone will be periodically monitored in accordance with the air monitoring requirements established in this HASP. The Exclusion Zone and the Contamination Reduction Zone are considered work areas. The Support Zone is accessible to the public (e.g., vendors, inspectors). The SHSO will be responsible for establishing and clearly identifying each zone.

- **Exclusion Zone**

The Exclusion Zone is the area where primary activities occur, such as sampling, remediation operations, construction activities in contaminated areas (including groundwater), cleanup work, etc. This area must be clearly marked with hazard tape, barricades or cones, or enclosed by fences or ropes. Only HAZWOPER-qualified personnel involved in work activities will be allowed in an Exclusion Zone. The extent of each area will be sufficient to ensure that personnel located at/beyond its boundaries will not be affected in any substantial way by hazards associated with sample collection activities.

All personnel should be alert to prevent unauthorized, accidental entrance into controlled-access areas (the Exclusion Zone and CRZ). If such an entry should occur, the trespasser should be immediately escorted outside the area, or all HAZWOPER-related work must cease. All personnel, equipment, and supplies that enter

controlled-access areas must be decontaminated or containerized as waste prior to leaving (through the CRZ only).

- **Contamination Reduction Zone (CRZ)**

The Contamination Reduction Zone is the transition area between the contaminated area and the clean area. Decontamination (DECON) is the main focus in this area. The decontamination of workers and equipment limits the physical transfer of hazardous substances into the clean area. This area must also be clearly marked with hazard tape and access limited to personnel involved in decontamination. Decontamination procedures are further explained in Magnus Pacific HS-0012, *Decontamination Program*.

- **Support Zone (SZ)**

The Support Zone is an uncontaminated zone where administrative and other support functions, such as first aid, equipment supply, emergency information, etc., are located. The Support Zone shall have minimal potential for significant exposure to contaminants (i.e., background levels). Employees will establish a Support Zone (if necessary) at the site before the commencement of site activities. The Support Zone would also serve as the entry point for controlling site access.

g) Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Additional information on the requirements of housekeeping can be found in Magnus Pacific HS-054 *House Keeping Program.*

h) Personal Protective Equipment (PPE) Requirements

The standard level of PPE required for personnel working on this project (and all site visitors) will be **Level-D**, which will include:

1. Hard hat
2. High visibility vest (Class-2)
3. Protective eyewear
4. Safety-toe work boots
5. Long pants and long (or short) sleeved shirts
6. Work gloves (task-specific type, when performing hand hazardous work)
7. Ear plugs (available, as may be required)

Magnus Pacific staff will be prepared to upgrade to **modified Level-D or Level-C,** if warranted by the COC action levels. This will include the following ensemble items:

8. Tyvek coveralls
9. Nitrile gloves
10. Rubber boots (or boot covers)

11. Duct tape (for sealing seams)
12. Respiratory protection - Air purifying respirators (APR) with organic vapor cartridges – (Level-C only).

**Note pertaining to respiratory protection: All Magnus Pacific staff will be medically-qualified, trained, and fit tested; and, must have no facial hair that would interfere with the APR seal.*

i) Decontamination Procedures

- **Personal Hygiene Safeguards:**

The following minimum personal hygiene safeguards shall be adhered to:

- No smoking or tobacco products on any HAZWOPER and construction projects.
- No eating or drinking in the Exclusion Zone.
- It is required that personnel present on site wash hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before leaving the site for the day.
- It is recommended that personnel present on site shower or bathe at home after the end of each shift of working on the site.

- **Standard Personal Decontamination Procedures:**

Outer gloves and boots should be decontaminated periodically as necessary and at the end of the shift. Brush off solids with a hard brush and clean with soap and water or other appropriate cleaner whenever possible. Remove inner gloves carefully by turning them inside out during removal. Wash hands and forearms frequently. It is good practice to wear work-designated clothing while on-site which can be removed as soon as possible. If gross contamination is encountered on-site, contact the Superintendent/SHSO to discuss proper decontamination procedures. The steps required for decontamination will depend upon the degree and type of contamination but will generally follow the sequence below.

1. Remove outer gloves; remove hard hat, Tyvek coverall and rubber boots/covers;
2. Remove respirator, wipe clean and store
3. Remove inner gloves

- **Disposal of PPE:**

PPE that is not grossly contaminated can be bagged and disposed as non-hazardous waste. PPE that is grossly contaminated must be double-bagged (sealed) and field personnel must communicate with the Project Management Team to determine proper disposal.

- **Tools & Equipment Decontamination:**

All tools and equipment will be decontaminated at the site. As a general practice, decontamination of excavation equipment will take place within the excavation area(s) through a combination of dry and wet brushing. Decontamination of minor tools will be performed over 55-gallon drums or within plastic buckets with water sprays. Street sweeping will be performed for to remove any materials that has been tracked onto public roadways.

j) Medical Surveillance Program

Magnus Pacific personnel working on **HAZWOPER** projects are required to participate in the corporate medical surveillance program, which includes physical examinations prior to the start of field work, at least once per calendar year, and at the termination of employment. Additional examinations may be required if a worker is exposed to harmful chemicals, or if deemed necessary by a physician, in accordance with 29 CFR 1910.120(f)(3). For further detail, reference Magnus Pacific SOP HS-008 Medical Surveillance Program (available upon request).

k) 2-Week Look Ahead Planning With a Safety Focus

The Project Management Team will prepare work schedules based on a projected *2-Week Look Ahead*. These schedules will outline the following components with a focus on safety:

1. Projected feature(s) of work to be conducted during the 2-week period;
2. Anticipated hazards associated with each feature of work;
3. Control measures necessary to eliminate or minimize the hazards.

l) Procedures for Effectively Communicating Safety and Health Matters to Employees

The following methods are routinely utilized to communicate information and messages to employees:

- **Tailgate Safety Meetings** (aka "Toolbox Safety Meetings")
  Each working shift begins with a Tailgate Safety Meeting where the crew members openly discuss the plan of the day (POD) including features of work to be performed, group activities and individual tasks necessary to complete the work, required equipment/materials/tools, hazards associated with the planned work, and level of PPE and other safety control measures that will be implemented to eliminate or minimize the hazards. During these meetings the Project Management Staff is able to communicate various matters pertaining to health and safety.

- **Project-Specific Bulletin Boards**
  Each job site is equipped with a project-specific bulletin board located in the on-site project office. These boards are intended to broadcast information and messages to the employees pertaining to various work-related issues, including but not limited to matters about health and safety.

- **Broadcast Email Messages and Corporate Web Site**
  The Magnus Pacific Corporation maintains a robust email server which is used to distribute email messages to employees based on various group configurations, including (but not limited to) geographically-based working groups and project-specific working groups.

  The Corporate web site, http://www.magnuspacific.com , is also used to post information and messages related to health and safety via the Internet. This web site is readily accessible 24-hours per day.

m) Safety Incentive Program / Safety Recognition Program

The Magnus Pacific Corporation promotes health and safety through a variety of employee incentive and recognition efforts including (but not limited to):

- **Weekly** project-specific *"Safety Recognition Awards"* which are distributed to select employees who have demonstrated exemplary behaviors related to safety on the job site. These awards may include cash value gift cards to various stores and merchant shops in the community. Corporate logo items may also be distributed as promotional safety incentives (ball caps, T-shirts, jackets, etc).
- **Weekly and/or Monthly** *"Safety Luncheons"* where groups of employees, and subcontractors, are gathered for a meal provided by the company to recognize accident & incident-free performance during a specified period of time on job sites. Various health and safety topics are routinely discussed during these *Safety Luncheons*;
- **Annual** *"Employee of the Year Safety Awards"* are distributed to select employees who have demonstrated exemplary safety behaviors consistently throughout the year. These awards may include honorary plaques and cash value gift cards;
- **Annual** *"Project of the Year Safety Awards"* are distributed to specific groups of employees who were involved in specific projects that were exemplary in nature pertaining to health and safety on the site.

n) Progressive Disciplinary Action Program

All site workers are required to attend the New Employee Orientation prior to start of work, where they become familiar with the contents of this HASP and other safety & health requirements. Every site worker is expected to follow the site safety & health requirements. Whenever a violation of safety policy occurs that requires correction, the Superintendent/SHSO will document the situation on the *Daily Safety and Health Report* (Form 3) with a prescribed corrective action issued to the involved employee(s). Corrective actions will be documented on the *Daily Safety and Health Report* with further explanation given in the daily project report. If corrective actions are not implemented within the prescribed time frame, the involved persons will be counseled in writing using Form 2 *"Safety/Health Violation Notice"*. The Magnus Pacific Project Manager will be informed within 24-hours of issuance of the violation notice. The involvement of the PM is essential to the progressive discipline process in order to ensure that there are no similar violations of safety policies at the work site.

- **First Violation of a Safety Rule or Regulation**

An employee who is cited for a first-time with Form 2 *"Safety/Health Violation Notice"* will typically be counseled on the job site, and may have duties reassigned or be temporarily suspended. The level of discipline will be commensurate with the nature and seriousness of the infraction. The management of a first offense is intended to modify the employee's behavior to prevent recurrence of the violation.

- **Second Violation of a Safety Rule or Regulation**

An employee responsible for a repeat infraction or receiving a second Form 2 *"Safety/Health Violation Notice"* of the same nature shall be immediately removed from the job site for the remainder of the contract period.

- **Safety Enforcement of Subcontractors and Suppliers**

All personnel of subcontractors and suppliers are responsible to comply with all aspects of the HASP and will be managed with the same disciplinary process outlined in this section.

- **Company Policy Statement for Holding Managers and Supervisors Accountable for Safety Enforcement:**

The following is quoted from the Magnus Pacific Health and Safety Program Manual, *SOP HS-031 Disciplinary Procedure:*

"First line supervisors and management, site managers, department managers, and safety representatives are responsible for enforcing all safety and health policies. Magnus Pacific will take disciplinary action against employee(s)/contractor(s)/subcontractors for failing to abide by the policies, and against those supervisors/managers for failing to enforce such policies."

o) Workplace Hazard Identification Inspection and Corrective Action Program

- **Daily Safety and Health Inspections**

Site Safety and Health Inspections will be conducted daily by the Superintendent/SHSO, or designated alternates. Any deficiencies will be noted on the daily Tailgate Safety Meeting record along with prescribed corrective action(s). The Superintendent will coordinate implementation of the corrective actions.

- **Designated Shift Safety Observers**

At the beginning of each work shift, one member of the workforce is designated as a *"Safety Observer"* in addition to his/her regular job duties. This crew member is responsible to observe the work site throughout the shift with specific emphasis on identifying safety related issues that are exemplary in nature (both positive and negative), including: personnel behaviors, physical site hazards, and work activities/tasks. These observations are logged in a "Safety Observation" booklet, which are then reviewed with the entire crew during the next Tailgate Safety Meeting.

- **Periodic Quality Control (QC) Safety and Health Audits**

Periodically (such as monthly) a Quality Control (QC) Safety and Health Audit will be completed by the PHSO. Any observed safety/health deficiencies will be noted in writing. Corrective actions will be prescribed to the Project Manager and Superintendent/SHSO. Notes pertaining to the approximate time estimated for abatement will be recorded on the audit record. Once the corrective actions have been implemented, a follow-up audit will typically be conducted to confirm the corrective action(s) have sufficiently resolved the problem.

- **Imminent Danger – Stop Work Conditions**

For any identified hazards that are serious and/or immediately dangerous to life or health (IDLH), work shall be stopped until appropriate corrective actions are implemented before work resumes. All personnel operating on

site are vested with authority and responsibility to initiate a Stop Work action without fear of reprisal or retribution.

p) Site Orientation and Safety Training Program

Mandatory training and certifications for field personnel will be facilitated by the PHSO or Superintendent/SHSO prior to performing field activities on this project. The Superintendent/SHSO will be responsible for providing all workers and subcontractors site and activity-specific training during the course of the project. All personnel, whether worker or visitor, will be required to review the HASP and sign an acknowledgement form that they understand the document.

Specific site orientation and safety training with all personnel will include the following:

- General Safety Rules
- Stop Work Authority and Responsibility
- Personal Protective Equipment (PPE) Requirements – types, uses and limitations
- Chemicals/Contaminants of Concern (COC) and Hazardous Materials (types/characteristics)
- Air Monitoring and Related Action Levels
- Hazard Communication Information
- Spill Plan/Clean-up Procedures and Reporting Requirements
- Decontamination Procedures/Personal Hygiene
- Equipment Safety/Operations
- Cold and Heat Stress Training
- Fire Prevention/Protection/Fire Fighting Procedures
- Hoisting and Rigging Procedures
- Emergency Response and Evacuation Procedures (hospital routes, emergency contact numbers, etc.)
- Accident/Incident/Near Miss Investigation and Reporting Procedures
- Federal and State OSHA Regulations
- Tool Inspection/Operation Practices
- Excavation/Trench Safety
- Working Near Heavy Equipment
- *NOTE: All personnel working on **HAZWOPER** sites must have current **40-hour HAZWOPER** training (and **8-hour annual HAZWOPER refresher training**, as warranted). Supervisors must also have **8-hour supervisor training**.

As a component of continuing education, the Superintendent/SHSO will facilitate periodic safety and health training throughout the term of the project for site supervisors and personnel. Such training sessions will be scheduled within the project work flow and may incorporate seasonally appropriate topics (ie: heat stress training during spring/summer months, and hypothermia training during fall/winter months).

Pre-Construction Emergency Response Meeting/Training

A multi-agency meeting shall be scheduled prior to the start of all field work and will include the Project Management Team, and representatives of subcontractors and the client. Emergency service agencies will be invited to participate at this meeting including police, fire, ambulance/EMS, and other public safety agencies, as appropriate. Health and safety issues and coordination of emergency procedures will be discussed during this meeting.

q) Provisions for Maintaining Orientation, Training, Inspection, Corrective Action and Investigation Records

Magnus Pacific utilizes a state of the art Internet-based Records Management System (RMS) to log all communiqués, records and reports associated with field projects. Such reports include (but not limited to) orientation and training records, inspection reports, corrective actions and investigation reports. Data is entered either directly into database platforms, or written copies of records are scanned electronically and uploaded into the computerized system. Electronic records and data trending reports can be readily retrieved from the RMS upon demand. Additionally, hard copies of all relevant project records and records are maintained on file in the site project office, which can also be readily retrieved upon demand.

r) Hazard Communication Program

In compliance with the OSHA Hazard Communication standard, the following written Construction Hazard Communication Program has been established for this project. Any questions regarding this program, or help needed in implementing this program, should be directed to the Superintendent/SHSO.

- **Container Labeling**

The Superintendent/SHSO will verify that all containers on site (including batch plant silos) containing hazard materials/substances shall be:

1. Conspicuously labeled as to the contents;
2. Have the appropriate hazard warning posted on the label;
3. List the name and address of the manufacturer on the label.

- **Material Safety Data Sheets (MSDS) and/or Safety Data Sheets (SDS)**

The Superintendent/SHSO will be responsible for receiving and maintaining a file of all Material Safety Data Sheets (MSDS) and/or Safety Data Sheets (SDS) required for this project. The MSDS/SDS reference binder will be located in the on-site project office (or site vehicle) and shall be readily available for anyone with an interest or “need-to-know”.

- **Employee Training On Hazard Communication**

Each employee who may be potentially exposed to hazardous substances during the course of their work is provided with hazard communication training by means of an overview of the program during the New Employee Orientation. The Superintendent/SHSO is responsible for ensuring that all project employees and subcontractors working on the site have been trained in hazard communication.

- **Hazardous Non-Routine Tasks**

Prior to performing non-routine tasks, such as a confined space entry, the Superintendent/SHSO must be informed by the supervisor directing employees to perform this non-routine task. Upon being informed that a non-routine task will take place, the will inform the potentially affected employees of hazardous materials/substances to which they may be exposed, as well as protective measures that will be taken to reduce the chance of exposure (i.e. personal protective equipment (PPE), air testing, ventilation, respirators, etc.).

s) Emergency Response and Evacuation Program

During the site-specific orientation training, all employees shall be trained to recognize and report emergency situations to their immediate supervisor. The Superintendent/SHSO will coordinate activation of the local **9-1-1** system (Police, Fire-Rescue, EMS or Hazmat response) for all emergency situations, and the client representative will also be notified. **Note: This site will be equipped with both 2-way radios and cellular phones for communications.*

- **Emergency Telephone Numbers and Maps to Local Hospital/Medical Clinic**

A list of emergency telephone numbers (on page 4 of this HASP) shall be posted prominently in the site project office and copies of these emergency numbers will also be maintained in each Project Management Team member's site vehicle. Maps to the closest hospital **(Valley Care Medical Center)** and closest urgent care clinic **(Work Care)** will also be posted in the project office and site vehicles (map also located in Appendix-D).

- **On-Site Medical Support**

First aid kits will be readily accessible to all personnel throughout the site. First aid kits will be provided at a ratio of one for every 25 employees. At least two (2) personnel on site will be trained in first aid and CPR, as listed in subsection (c). Eye wash kits (at least one meeting OSHA requirements, being able to operate for 15-minutes) will also be readily available to all personnel through the site.

- **Spill Response**

Site personnel will initiate a 'Stop Work' if hazardous or unknown potentially hazardous materials/substances are unexpectedly spilled during project work activities. Spills kits with absorbent pads/materials are maintained on site for immediate response to mitigate spills. The Superintendent/SHSO will be informed of all spill events and will respond to assess the situation. The designated client representative will also be notified of all spill events. For large spills, a Hazardous Materials Response Team (HMRT) may need to respond to limit exposures to site personnel and/or the environment. Whenever a spill situation escalates beyond the capabilities of the site personnel, the area will be evacuated and a hazardous exclusion zone (EZ) will be established to prohibit access while awaiting the arrival of a HMRT.

- **Evacuations**

An aerial map of the site with pre-determined evacuation routes will be posted in the project office. In case of dangerous conditions requiring site evacuation, employees will be instructed (verbally, either face-to-face or via radio) to evacuate the immediate area using the prescribed exit route(s). Personnel will proceed directly to a pre-determined evacuation meeting place in order to be accounted for by the Superintendent/SHSO. A roll call will be conducted to confirm that all personnel have safely evacuated. The

Superintendent/SHSO will assess the emergency conditions and liaison with the appropriate fire-rescue and/or medical authorities. Escape routes and procedures will be reviewed periodically with all personnel throughout the term of the project.

t) Fire Prevention Program

Magnus Pacific's Fire Protection Program is prepared in accordance with the California Code of Regulations Title-8; Chapter-4; Subchapter-4; Article-36 (Fire Protection and Prevention). The objective of this program is to protect and prevent fire in the workplace. All fires, including extinguished fires and regardless of size, must be reported immediately after they occur to the client contact representative.

Magnus Pacific and subcontractor vehicles MUST yield right of way to all emergency vehicles with flashing lights activated. No vehicle or equipment shall be parked or stored within 15 feet of a fire hydrant or red zone.

General information: Fuel (flammable vapor and gases), air (oxygen), and heat (a source of ignition) are necessary to sustain a fire. Fires and explosions cannot occur without the presence of all three of these elements.

Basic fire prevention will be accomplished with the following control methods:

- All flammable liquids shall be stored in suitable metal containers only;
- At the end of each work shift, all flammable materials shall be removed and stored in a suitable container in a designated area which is free from other combustibles;
- Gasoline or any other low flash point flammable liquids shall not be used for cleaning purposes or to start fire; and
- Smoking, or the use of spark or flame producing equipment, in areas where flammable liquids are being used or stored is strictly prohibited. This includes during the fueling of site vehicles and equipment.

Because of the possibility of fire and explosion at the site, portable fire extinguishers (A-B-C) will be readily available to field personnel throughout the site. Magnus Pacific is responsible for providing an adequate number of fire extinguishers. Extinguishers shall be suitably placed, distinctly marked, readily accessible and maintained in a fully charged and operable condition. Fire extinguisher training will be conducted for all field personnel periodically through the term of the project.

Magnus Pacific recognizes that it's personnel, or subcontractors, are <u>not</u> trained in professional firefighting tactics, therefore at no time shall fires of any sizeable magnitude be fought at the unreasonable risk of site personnel. In such circumstances, the local **9-1-1 system** will be activated and the area will be evacuated while awaiting the arrival of fire-rescue authorities.

u) Hot Work Program

Before any hot work is performed on the project site, the Superintendent/SHSO will review the work to be conducted, inspect the location on site (including equipment to be used), review the Magnus Pacific SOP HS-27 "Fire Prevention Program" with all involved personnel, and issue a Hot Work Permit. All hot work locations shall have a designated *Fire Watch* assigned. This person's responsibility shall be to monitor the hot work and have immediate access to the fire extinguisher located at each hot work site (a portable fire extinguisher (class A-B-C) will be readily available). The *Fire Watch* shall remain at his/her designated watch for 30-minutes from the conclusion of hot work activities to monitor for fire kindling.

v) Drug Free Workplace / Substance Abuse Prevention Program

In reference to Magnus Pacific's Substance Abuse Prevention Program

Our program prohibits the use, possession or distribution on the project site of any of the following by Magnus Pacific employees and by subcontractor employees: alcoholic beverages, intoxicants, narcotics, illegal or unauthorized drugs (including marijuana), simulated drugs and related drug paraphernalia.

Employees must not report for duty under the influence of any drug/alcohol that may in any way adversely affect their working ability, alertness, coordination, response; or, adversely affect the safety of others on the job site. For purposes of this program, under the influence shall be presumed for any individual whose drug or alcohol level exceeds applicable testing levels.

All employees who work on the project will provide evidence of a negative drug/alcohol screen no later than the time of initial safety orientation prior to commencing work, and will be required to submit to a post injury drug test (if injured on the job). Such test will be administered when the injured worker receives medical treatment.

Magnus Pacific may perform periodic random drug testing on site employees. Subcontractors may utilize their own company random testing program.

Magnus Pacific will promptly remove employees from the job site who are discovered to be under the influence of alcohol or drugs. Magnus Pacific, and its subcontractors, will determine when the employee in violation can return to the project or be permanently removed.

Subcontractors must submit their substance abuse prevention programs to Magnus Pacific for evaluation, or they will be required to adopt the drug and alcohol program of Magnus Pacific. If the subcontractor chooses to adopt the program, notice must be made in writing to Magnus Pacific. Magnus Pacific will periodically check with subcontractors to evaluate their compliance of the substance abuse prevention program.

Legally prescribed drugs may be permitted on premises or work locations, provided the drugs are contained in the original prescription container and are prescribed by an authorized medical practitioner for the current use of the person in possession. Legally prescribed drugs must not affect working ability, alertness, coordination or response of the person taking the medication. Prescription drugs may not be shared between employees.

w) Incident Investigation and Reporting Program

- **General Information**

For all incidents, accidents (including vehicle accidents), work-related injuries/illnesses, equipment and property damages, near misses, general liability and third party incidents, the involved employee(s) will immediately notify the Superintendent/SHSO or their immediate supervisor. Prior to the end of the shift, the involved employee(s) will provide a written statement to the Superintendent/SHSO (or designee), who will facilitate an investigation and completion of an "Accident/Incident Investigation Report". A copy of the report will be submitted to the Project Manager and Corporate Safety Manager within 24-hours from the time of occurrence. A copy of the final report will also be provided to the client representative.

- **Notification Procedures**

In the event of an accident/incident (as described above), the involved employee(s) will immediately notify the Superintendent/SHSO or their immediate supervisor. The Superintendent/SHSO will respond to the location on site to assess the situation and conduct an investigation. Superintendent/SHSO will notify the Project Manager as soon as possible but not more than 4-hours after the time of occurrence. Internal Corporate notifications will progress thereafter.

The Superintendent/SHSO will also notify the client representative about the event. A copy of the final Accident/Incident Investigation Report, along with appropriate corrective actions, will be submitted to the client in a timely manner, but not later than five (5) working days following the event.

Cal-OSHA will be notified within 8-hours of any event resulting in a fatality, a permanent total disability, a permanent partial disability, or the hospitalization of three or more people resulting from a single occurrence.

- **Investigation Process and Incident Review Meetings**

The Superintendent/SHSO will schedule an "Incident Review Meeting" with the key project staff, and invite client representatives, within 24-hours of occurrence of an incident. Magnus Pacific's Project Management Team thoroughly investigates all accidents utilizing a "root-cause analysis" process. The purpose is to identify the underlying causes(s) of the event and to develop appropriate corrective action strategies to prevent recurrences. Corrective actions will be implemented after the investigation has been reviewed, discussed and before work resumes on the specific task(s). The Superintendent/SHSO will conduct a follow-up inspection of the corrective actions to ensure they are effectively working as planned.

- **Reporting and Records Management Process**

Magnus Pacific utilizes a state of the art Internet-based Record Management System (RMS) to record all accidents, incidents, first-aid, near-misses and stop work events. The involved employees are required to submit written statements about the event prior to the end of their assigned shift. Photographs are captured on all accident/incidents and included within the final report.

The Superintendent/SHSO facilitates the completion of an Accident/Incident Investigation Report (Form-1, copy located in Appendix A of this HASP). The Accident/Incident Report is then entered into the computerized RMS for the purpose of long term storage and data trending needs, which can be readily retrieved from the

RMS upon demand. Additionally, hard copies of all records and reports are maintained on file in the site project office, which can also be readily retrieved upon demand.

x) Near Miss Incident Investigation Program

Magnus Pacific utilizes the same processes to investigate Near Miss events (including notification, investigations, incident reviews, records management), as outlined above in the section titled *Incident Investigation and Reporting Program*.

y) Fall Prevention Program

In reference to Magnus Pacific's SOP HS-023 – Fall Protection Program

Our fall protection program requires each employee on a walking/working surface (horizontal and vertical surfaces) with an unprotected side or edge that is 6-feet (1.8 m) or more above a lower level shall be protected from falling by the use of a fall protection and/or fall arrest or restraint system(s) as required by the California Code of Regulations Title-8; Chapter-4; Subchapter-4; Article-36 (Fall Protection). This program includes activities when personnel are working on aerial platforms (aka: man lifts and scissor lifts) and excavations.

One or more of the designated Competent Person(s) identified in this HASP will oversee all activities that involve fall hazards. An Exclusion Zone (EZ) will be established around the perimeter of the hazardous work area to restrict access to authorized personnel only; however, the EZ shall not serve as the exclusive means of fall protection.

To protect workers from falling, a Personal Fall Protection System (PFPS) will be used which will consist of the following components:

1. Full body harnesses;
2. Lanyards, self-retracting lanyards;;
3. Rated straps and life line ropes;
4. Self-closing and self-locking carabiners/snaphooks;
5. Anchorages (capable of supporting at least 5,000 lbs. per worker)

- **Fall Rescue Plan and Procedures**

The "buddy system" will be used continuously to ensure a Safety Monitor (Spotter) will be within visual/verbal range to initiate rescue of the fallen worker if required. Should a fall occurs requiring rescue, the following procedures will be performed:

1. The Competent Person directly overseeing the operation shall activate the emergency reporting procedures (as outlined above in Section-Q) to summon the response of local Fire-Rescue for professional rescue services;
2. Self-rescue procedures will be limited to personnel descending to the nearest stable surface (with the assistance of the Safety Spotter, if required), then await the assistance of professional rescuers to accomplish safe extraction.

- **Fall Protection Training**

All personnel assigned to perform work involving fall hazards will be trained on the safe use of fall protection systems, and recognition of the fall hazards specific to this job. All training will be documented in the Company's record management system.. Such documentation will include the date/time/location that the training was conducted, instructor names(s), participating student name(s), and a description of the topics covered.

z) Lockout/Tagout / Control of Hazardous Energy Program

In reference to Magnus Pacific's SOP HS-020 – Hazardous Energy Control Program

Magnus Pacific's Hazardous Energy Control Program is developed in accordance with all applicable federal, state and local regulations. The objective of this program is to prevent injuries and accidents from energized electrical sources and other types of stored energy during the installation, maintenance and removal of electrical equipment and machinery.

All energized equipment and machinery will be de-energized and locked out/tagged out whenever site employees are engaged in the cleaning, repairing, servicing or adjusting of prime movers, machinery and equipment. Physical locks or tag devices shall be affixed directly on the control mechanism(s) of the de-energized equipment. All lock and tag devices shall be properly labeled with the name and date/time of the person who applied the device. Lock and tag devices may only be removed by the person who originally applied the device, and only after a complete safety inspection is conducted of the de-energized equipment and adjacent vicinity.

aa) Excavation Safety Program

In reference to Magnus Pacific's SOP HS-018 – Excavation and Trenching Safety Program

The objective of this program is to protect employees from serious hazards associated with excavation and trenching activities. All work shall be performed in accordance with California Title-8; Subchapter-4; Article-6 (Excavations).

- **Definitions**

Excavation: Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Trench: A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of the trench (measured at the bottom) is not greater than 15 feet (4.6 m).

Note: If forms or other structures are installed or constructed in an excavation, so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Competent Person: A Competent Person is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate the hazards.

- **General Requirements for All Excavations/Trenching and Below Grade Operations**

1. Magnus Pacific maintains and will post its most current California Excavation/Trenching Activity Permit.

2. A designated "Competent Person" will be present during all excavation/trenching activities. The Competent Person will classify the soil type, select protective systems and perform inspections daily and whenever there is a change in site conditions.

3. Barricades will be used to establish a perimeter at the excavation/trench site to prohibit entry by unauthorized persons. Signage will be conspicuously posted to warn of the presence of the hazard.

4. Prior to excavation, the site will be thoroughly inspected to identify overhead and underground utilities and other structures/substructures. An Underground Service Alert (USA) agency will be utilized. The regional Utility Notification System will be contacted to notify all known owners of underground facilities in the area.

- **Personnel Protection for Excavations/Trenching**

Workers entering an excavation/trench 5-feet or deeper shall be protected by one of the following:

1. Shoring
2. Sloping
3. Benching
4. Other protective systems –

Once the protection method is selected, the specific requirements for each type of protection is dependent on the soil type.

- **Soil Classification**

Soil shall be classified by a Competent Person as stable rock, type A, B or C soil.

Type A = Very cohesive (indented by thumb with great effort).
Type B = Semi cohesive
Type C = Non cohesive (easily penetrated by the thumb).

- **Sloping Requirements for Excavations/Trenching**

1. A short-term (24 hours or less) maximum allowable slope of ½ H: 1V (63 degrees) is allowed in excavations in Type A soil 12-feet or less in depth.
2. Simple slope excavations 20-feet or less in Type A soil shall have a maximum slope of ¾ H:1V (53 degrees).
3. Simple slope excavations 20-feet or less in Type B soil shall have a maximum slope of 1H:1V (45 degrees).
4. Excavations shall be sloped at an angle not steeper than 1 ½ H: 1V (34 degrees) measured from the horizontal if the soil type is classified as Type C or is unknown.

5. A registered professional engineer shall design sloping or benching when excavations are greater than 20-feet in depth.

- **Hazardous Atmospheres in Excavations/Trenching**

1. The atmosphere in the excavation shall be tested before workers enter excavations/trenches greater than 4-feet.
2. Ventilation and air monitoring precautions shall be taken to prevent employee exposure to atmospheres with less than 19.5% oxygen.
3. Ventilation and air monitoring precautions shall be taken to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20% LFL/LEL.
4. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing for oxygen concentrations, flammable gases, and VOCs shall be conducted as often as necessary to ensure that the atmosphere remains safe.

- **Safe Work Practices in Excavation/Trenching**

1. Employees who are conducting work activities at depths greater than 4-feet will have unimpeded access to access/egress routes (ladder, runway, or an approved escape route) at a distance not greater than 25-feet lateral travel;
2. Ladders shall extend 36-inches above the trench/excavation surface;
3. Excavated soil shall be a minimum of 2-feet away from the edge of the excavation;
4. No employees shall be permitted underneath loads handled by lifting or digging equipment.
5. Employees shall not work in excavations in which there is accumulated water.
6. Vibration from heavy equipment, railroads, etc., shall be considered a hazardous increasing condition.
7. Walkways/bridges with standard guardrails shall be provided when employees or equipment are required or permitted to cross over excavations.

- **Excavation/Trenching Inspections**

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for:

1. Indication of failure of protective systems;
2. Evidence of a situation that could result in possible cave-in;
3. Hazardous atmosphere; or,
4. Other hazardous conditions.

The Competent Person will conduct the inspection prior to the start of work, and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrences. The results of all inspections shall be logged in a daily Excavation Inspection Report.

bb) Cold Stress Prevention Program

All site personnel will be trained to recognize and treat the signs and symptoms of cold stress. Magnus Pacific's SOP HS-014 – Cold Stress Prevention Program that serves as the curriculum template for this training which includes:

1. General information on the different levels/types of cold related conditions;
2. Signs and symptoms of each condition;
3. Field treatment procedures to mitigate cold related conditions;
4. Preventative action steps including; dressing in layers, staying dry, taking rest periods in a warm shelter or site vehicle ;
5. Reporting and response protocols for cold related emergencies that have escalated beyond the capabilities of field personnel.

cc) Heat Stress Prevention Program

Heat illness prevention will be accomplished on-site in accordance with the California Code of Regulations; Subchapter-7; Subsection-3395. All site personnel will be trained to recognize and treat the signs and symptoms of heat stress. Magnus Pacific's HS-015 – Heat Stress Prevention Program will serve as the curriculum template for this training which includes:

1. General information on the different levels/types of heat related conditions;
2. Signs and symptoms of each condition (heat cramps, heat exhaustion and heat stroke);
3. Field treatment procedures to mitigate heat related conditions;
4. Preventative action steps including; taking rest periods in the shade and drinking plenty of water;
5. Reporting and response protocols for heated related emergencies that have escalated beyond the capabilities of field personnel.

- **Body Fluid Replacement**

Sufficient bottled water will be made available at the Support Zone (SZ) to provide each employee at least 1-quart per hour for the whole shift. Frequent consumption of small amounts of water is important to prevent heat illness. When heat stress risk is determined to be a problem by the Superintendent and/or HSM, employees will be provided with water and/or a balanced electrolyte solution to replace fluid and electrolyte loss. During times when heat stress can occur and employees may be sweating more than usual, they will be encouraged to consume water more frequently, a minimum of 4-cups per hour of fluid replacement (water or electrolyte replacement, such as Gatorade).

dd) Site Logistics Plan

A Support Zone (SZ) will be established at the site to manage all logistics requirements for the project.

1. The **Health & Safety Mobilization Checklist** (copy in Appendix-D of this HASP) will be completed to ensure all required health and safety assets are on-site and mobilization duties have been accomplished;

2. All field logistics requests will flow through the project management staff.
3. All heavy equipment, tools, materials and supplies will be located within a designated staging area adjacent to the SZ. All tools, materials and supplies will be stored inside secure containers when not in use.
4. Portable restroom facility(s) and hand wash station(s) will be staged on site and maintained in a sanitary condition by a contacted vendor.
5. All supply deliveries and service subcontractors will be coordinated by the Project Management Team in accordance with the site access procedures and traffic control plan.

ee) Measures to Mitigate Public Exposure to Hazards (as applicable)

Analysis of the project reveals that public exposure to hazards is anticipated to be minimal. Nevertheless, Magnus Pacific will have contingency plans to mitigate the following common exposure hazards that may affect the general public and project staff:

1. **Dust Exposure** – Exposure to airborne dust may be possible due to the disturbance of earthen materials during various features of work. To mitigate dust exposures, Magnus Pacific will reduce visible airborne dust through the application of water sprays, and surface foam material, at regular intervals throughout the scheduled work day.

2. **Noise Exposure** – Exposure to noise may be possible due to heavy equipment movement and operations throughout the project. To mitigate exposures to noise, Magnus Pacific schedule work shifts in compliance with client daily schedule requirements.

3. **Odor Exposure** – Exposure to odors may be possible due to the excavation and activities which bring earthen materials (spoils) to the surface. To mitigate exposure to odors, Magnus Pacific will continually apply water sprays in order to minimize odor emissions to the greatest extent feasible.

4. **Traffic Hazards and Pedestrian Hazards** – Public exposure to construction traffic and other site control hazards are possible. Some minimal traffic exposure is possible during access and egress from the site gate(s), as well as some limited pedestrian hazards for persons who may be walking in the vicinity of the project site. To mitigate these hazards, Magnus Pacific will establish and enforce job site traffic control with a combination of barricades and posted warning signage. Flaggers may be stationed at access and egress points as necessary to control traffic.

5. **Other Hazards** – At the time of pre-mobilization, Magnus Pacific does not anticipate any of the other public exposure hazards. However, if additional hazards are discovered after mobilization, the Project Management Team will coordinate with the client representative to promptly assess the risks and develop appropriate mitigation strategies, to either eliminate or minimize public exposures to the greatest extent feasible.

END OF PLAN

Appendix – A

Accident-Incident Investigation Forms

MAGNUS Pacific

SOP HS-036 Accident/Incident Report (Form 1)
Revised: January 2012

ACCIDENT/INCIDENT INVESTIGATION REPORT

PART 1 IDENTIFICATION INFORMATION

Employee Name	
Date of Accident	Time: AM PM
Occupation	Shift
Department	SS#:
Phone number:	OSHA 300 Case number (if required):

PART 2 SUPPLEMENTARY INFORMATION

Company			
Mailing Address			
City	State	Zip	
Telephone ( )			
Accident Location	☐ Same as establishment?	☐ On premises?	(Check if applies)
Location Where Accident Occurred (if different from above):			
Remarks:			
Was injured person performing regular job at time of accident? ☐ Yes ☐ No			
Length of Service: With Employer		On this job	
Time shift started AM PM		Overtime? ☐ Yes ☐ No	
Name and address of physician:			
City	State	Zip	
If hospitalized, name and address of hospital:			
City	State	Zip	
Fatality? ☐ Yes ☐ No		If Yes, date of death	

PART 3 ACCIDENT TREE

NATURE OF INJURY OR ILLNESS:	**PART OF BODY AFFECTED:**

Operation Location:	Operation Task:	Employee Task:	Employee Body Position/Activity	Agency	Preceding Situation or Event	Type of Accident

PART 4 DESCRIPTION AND ANALYSIS

Fully describe accident:

What factors led to the accident (from Part 3/Tree)?

MACHINERY/EQUIPMENT INVOLVED

Manufacturer			Equip. age
Serial No.		Model	
Function			
Location			
Has machine/equipment been modified? ☐ Yes ☐ No			If so, when?
Was it guarded? ☐ Yes ☐ No			
If Yes, describe guarding and how it functions to provide element of safety desired:			
Was guarding properly:	Constructed? ☐ Yes		☐ No
	Installed? ☐ Yes		☐ No
	Adjusted? ☐ Yes		☐ No
If No to any of above, explain:			
Was there any mechanical failure? ☐ Yes ☐ No		If yes, explain:	
If construction related, date of contract:			
Is firm ☐ General Contractor		☐ Subcontractor	
Name of other contractors			
List any weather conditions that contributed to the incident:			

TRAINING

Did employee receive specific training or instructions relating to safety and health on the job being performed? ☐ Yes ☐ No	
Type:	
Instructed by:	
When instructed:	Length of training:

PERSONAL PROTECTIVE EQUIPMENT		
Did employee use any protective equipment for the job or task performed? ☐ Yes ☐ No		
Type:		
Did equipment fail? ☐ Yes ☐ No		
If so, describe:		
CORRECTIVE ACTIONS:		
Were any corrective or preventive actions put into place due to the incident? ☐ Yes ☐ No		
If so, list them:		
Action Taken	**Expected Result**	**Expected Completion Date**
Were corrective actions followed through to completion? ☐ Yes ☐ No		
If so, list results and dates:		
Action Taken	**Expected Result**	**Expected Completion Date**

STATEMENTS CONCERNING ACCIDENT		
EMPLOYEE STATEMENT CONCERNING ACCIDENT		
Name	Title	Date
SUPERVISOR/EMPLOYER'S STATEMENT		
Name	Title	Date
WITNESS STATEMENT		
Name	Title	Date
SAFETY COMMITTEE COMMENTS		
Name	Title	Date

ATTACH ADDITIONAL COMMENTS, REPORTS AND PHOTOS ON NEXT PAGE

MAGNUS Pacific

SOP HS-036 Accident/Incident Report (Form 1)
Revised: January 2012

Accident/Incident Statement – Check One: ❒ Involved Party ❒ Witness

Employee Name:		
Date of Accident/Incident:	Time: AM PM	
Occupation:	Shift	
Company:		
Mailing Address:		
City	State	Zip
Work Telephone ( )	Cell/Other Telephone: ( )	

Fully describe accident/incident (Who, What, Where, When, How?)
What factors led to the accident/incident? (ie: weather or road conditions?)
Corrective action suggestions:

Signature_____

Date:_____/_____/_____

FORM 2

Safety/Health Violation Notice

Subcontractor In Violation:	Project:
Contract No.	Prime Contractor:

Date: Time: Issued By:

Vehicle type: License Number: State:

Has Access to Site Been Denied? Yes No

Reason

Violation Number

Type of Violation: ***A.*** *Non-Serious* ***B.*** *Serious* ***C.*** *Stop Work-Imminent Danger* ***D.*** *Repeat Violation*

Location of Violation:

Supervisor Responsible:

Violation Description:

Violation Corrected: AM/PM

Action Performed to Abate Violation:

Signature:

Date & Time:

Standard Source:

OSHA_____ NIOSH_____ NFPA_____ Site Safety Plan_____

NEC_____ ANSI_____ EPA_____ Other_____

SOP HS-037: October 2009

Near Miss Report

Forward to:
Health & Safety Manager
3001 Lava Ridge Court. Suite 240 Roseville, CA. 95661

Name of person involved (First, Middle, Last): Title of person involved:

Name of person completing the form (First, Middle, Last): Title of person completing form:

Department: Contact phone number(s): Witness (Name & Phone Number):

Date & Time of incident: Near Miss Location (Try and be specific, or provide landmarks):

Date Time

Near Miss Description:

Personal Protective Equipment (PPE) Used (if applicable)

Severity – Circle the level of severity which you feel could occur if such an incident envolved (Example ***High*** = Fatality, Permanent disability, High dollar loss; ***Medium*** = Temporary disability, Some lost dollar amount; ***Low*** = Tasks occur infrequently by few individuals, Also consider complexity of the system, Latent and human factors. Consider such factors as physical injuries, damage to equipment property, and environmental impacts)

High **Medium** **Low**

Probability – Circle the level of probability which you feel that a person or property may be exposed to in a similar situation and that required hazards or system failures may be present or likely. (Example: ***High*** = Tasks occur frequent and by numerous individuals; ***Medium*** = Tasks occur on a regular basis by certain individuals; ***Low*** = Tasks occur infrequently by few individual. Also consider such criteria as complexity of the system, latent and human factors, etc.)

High **Medium** **Low**

Corrective Actions: (What should be done or has been done to prevent recurrence of this incident? e.g. employee training, change of procedures, purchasing of equipment, etc.)

Near Miss Report

Miscellaneous information/Photos: (Please attach to second page)

Form-5

STOP WORK REPORT

Date of Stoppage:	**Job Name:**
Time of Stoppage:	**Job Number:**
Weather Conditions:	**Location on Site:**
Activity/Task Stopped:	
Employee(s) – Subcontractors Involved:	
Description of Work Stoppage (Who, When, What, Where, Why?)	
Description of Corrective Actions	
Validation & Verification of Satisfactory Corrections:	
Date & Time Work Fully Resumed:	
Name:	**Signature:**
Title:	

Appendix – B

Illness & Injury Prevention Program (IIPP)
and Code of Safe Work Practices (CSWP)

Health & Safety

Code of Safe Work Practices

Prepared By:

Magnus Pacific Corporation

Last Revision: 5/23/2014

Headquarters:

6558 Lone Tree Blvd.
Rocklin, California 95765
Office: (916) 462-6400
Fax: (916) 783-0215

Table of Contents

1.0 General Work Rules 2
2.0 Health and Safety Rules 2
General 2
3.0 Equipment Operations 2
General 2
4.0 Equipment Repair 3
Heavy Equipment Mechanics 3
5.0 Personal Protective Equipment (PPE) 4
General PPE Requirements 4
Site-specific Requirements 5
6.0 Electrical Safety 5
General 5
Employee Training 6
Standards for Equipment 7
7.0 Manual Lifting 8
General 9
Preparing to Lift 9
8.0 Excavation and Trenching Safety 9
9.0 Welding and Cutting 10
General 10
10.0 Ladder Safety 11
General Requirements 11
Straight Ladders 11
Step Ladders 11
11.0 Drilling Operations 12
General 12

1.0 GENERAL WORK RULES

Employees are expected to conduct themselves in a professional manner while conducting Company business. Such conduct is expected to include compliance with work rules established for the safety of the employee and to minimize the liabilities of the Corporation. Violation of established work rules will result in disciplinary action which may include verbal warning, written reprimand, and/or discharge from employment.

Employees will be provided with copies of the following rules in order that the employees receive adequate notice of the standard to which they are held. Each employee is encouraged to discuss these rules with their immediate supervisor or the site or Corporate Health & Safety Manager if there is any question as to the applicability of a particular rule.

2.0 HEALTH AND SAFETY RULES

General

- No drinking, gambling, or use of illegal drugs will be allowed on the worksite. Anyone reporting to work under the influence of alcohol and/or illegal drugs shall be subject to disciplinary action, which may include immediate discharge. With the exception of company-sponsored functions or the express consent of a Corporate Manager, no person shall bring alcohol onto company premises. Any person bringing illegal drugs onto company premises shall be subject to immediate discharge. Employees under a physician's care and/or taking prescribed narcotics must notify the designated SHSO;
- No firearms are allowed on company worksites;
- Eating, drinking, smoking, and chewing gum or tobacco are not allowed in the active work area exclusion zones or contamination reduction zone;(Hazmat Site)
- Exception: Bottled water will be allowed in CRZ only if it has a screw on cap.
- Changes in work practices or work rules shall be implemented only after approval by the Project Manager and the Corporate or designated SHSO;
- No horseplay or practical jokes while working on the projects will be allowed.
- Maximum site speed limit on any project is 25 mph (dependent on site, speed limit may be lower). Adjust your speed according to conditions and obey all posted traffic control signs;
- Construction equipment always has the right-of-way over on site vehicles. Loaded haul equipment having the right-of-way over empty;
- Employees must report all injuries and/or illnesses to their supervisor. This includes minor (i.e. bruises, scrapes, splinters, and cuts);
- On all project sites employees will perform their job assignments according to the "buddy" system, maintaining a line of sight with co-workers at all times;
- Failure to adhere to safety requirements and endanger yourself and/or others will not be tolerated, and end in employee termination;
- Seat belts are mandatory when operating company equipment or vehicles.

3.0 EQUIPMENT OPERATIONS

General

- Worksites require a variety of heavy equipment. Haul trucks, dozers, front-end loaders, and backhoes are some of the heavy equipment which may be present at a site, as well as compressors, generators, and other miscellaneous smaller items;
- Belts, pulleys, sheaves, gears, chains, shafts, clutches, drums, flywheels, and other reciprocating or rotating parts of equipment pose potential pinch points. No guard, safety appliance, or device shall be removed or made ineffective unless immediate repairs or adjustments are required, and then only after the power has been shut off and proper lockout/tagout procedures have been implemented. Guards and devices shall be replaced as soon as repairs and adjustments have been completed;
- High temperature lines and equipment may endanger employees or create a fire hazard. Exhausts from all equipment powered by steam or internal combustion engines must be properly released and located so as not to endanger workers or obstruct the view of the operator;
- Platforms, cat walks, steps, and ladders used for access to equipment can present slip, trip fall hazards. Maintain (3) points of contact when climbing on or off equipment;
- Equipment backing up, swinging loads, buckets, booms, and counterweights pose serious hazards to ground personnel. Eye contact must be made with the operator before approaching moving machinery or equipment, always approach operator from the operator side of cab;
- Report all equipment malfunctions to your supervisor. Equipment checks shall be conducted before operating any equipment;
- Practice good housekeeping; keep your cab, deck, and walkways clean. Items brought on board, i.e. Thermos, lunch boxes, and tools must be properly secured to prevent injury to yourself or equipment damage;
- When parking or servicing equipment, be sure it is properly blocked to prevent movement and that all raised attachments or boxes are blocked and/or pinned to prevent them from coming down. Equipment must be locked out /tagged out while servicing to prevent damage to oneself and equipment;
- Operate only the equipment you are qualified to operate, and have been signed off by the superintendent to do so;
- Before starting or moving any equipment, walk all the way around it to be sure all persons and equipment are clear;
- At no time will any employee ride on or in the back of any equipment or vehicle unless designed for passengers. Seat belts will be worn at all times;;
- Look before backing, never trust just looking in your mirror. If possible utilize spotter, if spotter is not available get out of equipment and conduct walk around before backing to make sure nothing is behind you;;
- When parking equipment, lower all attachments before exiting cab, for wheeled equipment block the front and back of the wheel to prevent it from rolling.;
- Equipment shall not be started or left running unattended. Dependent upon site requirements a 3 minute idol rule will be followed.

4.0**EQUIPMENT REPAIR**

Recognizing that mechanics are more susceptible to injury by the nature of their work, Nordic / Magnus Pacific JV has established the following guidelines.

Heavy Equipment Mechanics

These items have previously been covered; however, due to mechanics being called out on site from using rental equipment it is very important to reiterate the potential hazards and control steps associated with this job;:

- Check tools for deficiencies before use. If they are not in a safe operable condition, and repairs cannot be made to make them operable tools will be tagged out and disposed of;;
- Lockout / Tagout equipment prior to working on it. Communicate to superintendent /SHSO that it will be out of service
- Block all elevated items you may be working on that could fall and injure you or anyone else. For example, when changing cutting edges on dozers or scrapers, block the apron so if there was a hydraulic failure it could fall and pose a crush or pinch point hazard.. Do not assume that the hydraulics will hold up;
- Check all the way around the piece of equipment before you start it or move it for a test run. Be sure all equipment and personnel are clear;
-
- safety glasses must be worn at all times, and utilize a face shield when when chipping, grinding, pressure washing or when in a position that would allow dirt to fall in your eyes;
- Use punches or bars as line-up tools. Keep your fingers away from pinch points, gloves will be worn at all times;
- Shut off your oxygen and acetylene bottles when not in use and roll up hoses, bottles will be stored with the proper caps on them when not in use;
- Place empty oxygen and acetylene bottles in rack with caps in place and secure them with the chain provided in the rack;
- Inspect fire extinguishers before conducting any hot work, at minimum fire extinguishers will be inspected monthly. Tag out any used or defective extinguishers and pull out of service and replace
- Housekeeping Clean up after yourself. Leaving welding rod, bits of iron, and small parts laying around creates tripping hazards and can lead to flat tires or injury to other employees;
- Seatbelts shall be worn at all times while operating or moving equipment;
- Maintain 3 points of contact mounting or dismounting equipment;
- Report all injuries promptly. Even minor cuts and bruises should be reported;
- Report any equipment damage ;
- When working on equipment, replace all guards and covers when done. This includes stationary and mobile equipment;
- Do not move / operate equipment unless you know proper operating procedure and the emergency stopping procedure. If you are not sure, get instructions from a superintendent;
- Do not assume anything has been done. Check for yourself. Operating or repairing equipment checks must be done prior to the start of task;;
- Do not get go under any suspended loads. All attachments will be lowered to the ground or properly blocked and guarded in case hydraulics fail;.

5.0**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

PPE is designed and provided to help ensure the safety and wellbeing of employees.

General PPE Requirements

Unless modified by site-specific requirements, the following general PPE requirements are mandatory in all work areas.

- Hard hats will be worn at all times when in the work areas;
- Seat belts will be worn when operating any equipment or vehicles ;
- ANZI approved hard toed boots;;
- Ear protection will be worn when working around operating equipment with a noise level at or above 85 dBA;
- Approved Z.87 safety glasses with side shields will be worn at all times worn;
- PPE will be worn in accordance with the Hazard Communication Program instructions and as provided for in the MSDSs for the hazardous material being used;
- Beards or long sideburns will not be allowed on sites since they interfere with respiratory protection. Trimmed sideburns and mustaches are acceptable. Employees must report to work clean-shaven when there is a potential need for the use of respiratory protection (Pertains to Hazmat sites);
- Particulate masks or cartridge respirators will be used when quantities of airborne particles dictate their use, or when handling or using chemicals requiring this PPE, any employee who is required or voluntarily chooses to wear respiratory protection must be cleared by physician and fit tested for the specific respirator worn;
- Any required PPE clothing for Nordic / Magnus Pacific JV employees will be supplied by the designated SHSO;
- Employees are responsible to inspect, clean, and maintain the protective equipment issued to them daily. Any noted defects in the equipment shall immediately be reported to the designated SHSO.

Site-specific Requirements

Nordic /Magnus Pacific JV projects will have site-specific requirements. These requirements will be documented in the site-specific Health and Safety Plan (HASP), Activity Hazard Analyses (AHA) or other similar/related documents. These documents are mandatory with regard to the PPE specified.

6.0**ELECTRICAL SAFETY**

Electrical hazards are present on most projects. These hazards include but not limited to electrical equipment, hand held equipment, overhead power lines and buried cables.

General

Following are some of the most basic safety requirements when dealing with electrical hazards:

- When working with electrical devices, employees will be properly trained and have been signed off by the SSHO and superintendent;
- Inspect electrical cables prior to use. Replace worn or frayed cables and tag them out for repair or replacement;
- Use tools with Ground Fault Circuit Interrupters (GFCI) switches. ;
- Check tool, equipment, and cables frequently for safe conditions;
- Disconnect tool before making adjustments or repairs;
- Electrical tools should not be used in or around standing water;;

- Extension cords used with portable electrical tools and appliances shall be of three-wire types. Grounds are never to be removed from the extension cord;
- Temporary lights shall be equipped with guards to prevent accidental contact with the bulb;
- Temporary lights shall not be suspended by their electrical cord unless cords and lights are designed for this means of suspension;
- Splices shall have insulation equal to that of the cable;
- Electrical and extension cords or cables are not to be laid on floor in walkways, etc. without proper protection;
- Panel boxes shall have a cover on them at all times;
- All portable electric hand tools must be grounded or double insulated;
- Never open any disconnecting switches or plugs unless the load has been removed;
- Access to electrical breakers or switches shall be unobstructed, (3 feet clearance in front of breakers or switches is recommended);
- Circuit breaker or fuse box must be legibly marked to indicate its purpose;
- Only qualified electricians are to perform electrical work;
- Portable ladders must be equipped with non-conductive material if used in areas where the employee or ladder could contact exposed energized parts;
- Covers shall be installed on all junction boxes, outlets, fittings, and switches to prevent accidental contact with live wires;
- When working in a confined or enclosed space that contains exposed energized parts if it is not possible to shut the energy source off:
  (1) Protective shields, barriers, and insulating materials will be provided and used to avoid inadvertent contact with energized parts; and
  (2) Doors and hinged panels must be secured to prevent swinging into an employee causing contact with exposed energized parts.
- Conductive materials and equipment must be handled in a manner to prevent contact with exposed energized conductors or circuit parts. If long dimensional conductive objects (such as ducts and pipes) must be handled in areas with exposed live parts, the following procedures must be followed:
  (1) A thorough inspection of the work area must be performed to identify all potential hazards;
  (2) An Activity Hazard Analysis (AHA) will be prepared and reviewed with affected employees prior to beginning work in the subject area, which includes:
    (a) The proper use of insulating materials, guards, protective shields and barriers
    (b) Proper material handling and work techniques
    (c) Site specific emergency response procedures in the event of an accident.
- Maintain minimum distances specified below in F.2.b. of this section from overhead power lines unless it has been verified by a qualified electrician that the lines are de-energized and appropriate lockout has been completed, or protective barriers or insulating material have been applied to the line by the local power authority. This applies to mobile equipment as well as manual handling of materials.

Employee Training

Basic employee training requirements for “unqualified” persons include, but are not limited to:

- All employees will be trained in the task that is required of them. Review of site specific AHA’s, Toolbox meeting (safety meeting), SOP’s, and review of the HASP are some

training to include but not limited to. Employees will be trained in and familiar with safety related work practices that pertain to their respective job assignments;

- When an employee is working on the ground or in elevated positions near overhead lines, the employee and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:
  (1) Voltages to ground 50kV or below - 10 feet (305 cm); and
  (2) Voltages to ground over 50kV - 10 feet (305 cm) plus 4 inches (10 cm) for every 10 kV over 50 kV.
- Employee training may be conducted in a classroom, or instruction may be performed on the job. The degree of training provided will be determined by the potential risk to the employee.

Standards for Equipment

- Approval

  All electrical conductors and equipment shall be approved for hard service or junior hard service (e.g., S, JS, SO, SOW, JSO, or JSOW).

- Examination

  Electrical equipment shall be free from recognized hazards that are likely to cause death or serious physical harm to employees. Equipment safety shall be determined on the basis of the following:

  (1) Suitability of equipment for an identified purpose or service shall be evidenced by listing, labeling, or certification for that identified purpose.
  (2) Mechanical strength and durability.
  (3) Electrical insulation.
  (4) Heating effects under conditions of use.
  (5) Arcing effects.
  (6) Classification by type, size, voltage, current capacity, specific use.
  (7) Other factors which contribute to the practical safeguarding of employees using or likely to come in contact with the equipment.

- Permanent Installations
  (1) Listed, labeled, or certified equipment shall be installed and used in accordance with instructions included in the listing, labeling, or certification.
  (2) Panel boxes shall have a cover panel on them at all times.
  (3) Each disconnecting means i.e., circuit breaker or fuse box must be legibly marked to indicate its purpose.
  (4) Covers shall be installed on all junction boxes, outlets, fittings, and switches to prevent accidental contact with live parts.
  (5) Equipment intended to break current shall have an interrupting rating at system voltage sufficient for the current that must be interrupted.
  (6) Electric equipment shall be firmly secured to the surface on which it is mounted. Wooden plugs driven into holes in masonry, concrete, plaster, or similar materials shall not be used.
  (7) Electrical equipment which depends upon the natural circulation of air and convection principles for cooling of exposed surfaces shall be installed so that room

air flow over such surfaces is not prevented by walls or by adjacent installed equipment. For equipment designed for floor mounting, clearance between top surfaces and adjacent surfaces shall be provided to dissipate rising warm air. Electrical equipment provided with ventilating openings shall be installed so that walls or other obstructions do not prevent the free circulation of air through the equipment.

(8) Conductors shall not be spliced excepted by a qualified electrician as follows.
   (a) Splices shall be joined with splicing devices designed for the use or by brazing, welding, or soldering with a fusible metal or alloy. Soldered splices shall first be so spliced or joined as to be mechanically and electrically secure without solder and then soldered.
   (b) All splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an insulating device designed for the purpose.

- Temporary and Portable Installations
  (1) Use tools with three-wire plug and make sure connections are tight.
  (2) Extension cords used with portable electrical tools and appliances shall be of three-wire types. Grounds are never to be removed from the extension cord.
  (3) Ground Fault Circuit Interrupters (GFCI) shall be used with all equipment and/or electrical service not connected directly to NEC permanent wiring. This includes such items as:
     (a) Equipment plugged into extension cords.
     (b) Equipment plugged into portable generators.
  (4) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb.
  (5) Temporary lights shall not be suspended by their electrical cord unless cords and lights are designed for this means of suspension.
  (6) Parts of electric equipment which in ordinary operation produce arcs, sparks, flames, or molten metal shall be enclosed or separated and isolated from all combustible material.
  (7) Electrical equipment shall not be used unless:
     (a) The manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product may be identified is placed on the equipment and
     (b) Other markings are provided giving voltage, current, wattage, or other ratings as necessary.
- Identification of disconnecting means and circuits.
  (1) Each disconnecting means required by this subpart for motors and appliances shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.
  (2) Each service, feeder, and branch circuit, at its disconnecting means or over-current device, shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident. These markings shall be of sufficient durability to withstand the environment involved.

7.0 MANUAL LIFTING

Injuries to the back and abdominal muscles from lifting heavy loads are one of the most common injuries reported. Such injuries can range from relatively mild strains to major permanently disabling injuries.

General

Lifting heavy objects should be approached with thought as to the following:

- Overall weight, utilize buddy system if over 50 LBS.;
- Distribution of weight;
- Unwieldiness or awkwardness;
- Distance to be carried;
- Obstacles to be negotiated such as wet, uneven surfaces, slippery banks, and rocks;
- Conditions such as wind, snow, ice, and slippery surfaces; and/or
- Visibility

Preparing to Lift

- Heavy items should be lifted by using the leg muscles rather than the back, stomach, or arm muscles;
- Never bend from the waist when lifting. The back should be kept straight and the arms nearly parallel with the body. The knees should be bent to grasp the load. Lifting should be done by straightening the legs, with the back remaining in a nearly vertical position. The procedure for setting down the load is the reverse of lifting the load;
- If the object is too bulky or too heavy to be handled by one person, two or more people should be assigned to the task. When two or more people carry one object, they should adjust the load so that it rides level and each person carries an equal part of the load. In addition, both people should know the destination and path where the object is to be carried;
- Prior to manual lifting of objects, employees should do the following:
  (1) Inspect materials for slivers, jagged or sharp edges, burrs, rough, or slippery surfaces;
  (2) Grasp the object with a firm grip;
  (3) When handling lumber, pipe, or other long objects, keep hands away from the ends to prevent them from being pinched;
  (4) Wipe off greasy, wet, slippery, or dirty objects before trying to handle them; and
  (5) Keep hands free of oil and grease.

8.0 EXCAVATION AND TRENCHING SAFETY

A trench is an excavation in which the depth exceeds the width. Excavations more than 15 feet wide at the bottom are not trenches despite depth. Trenches more than 5 feet in depth must either be shored supported or the excess height laid back. For more detailed information on excavation and trenching, please refer to OSHA Standard 1926.650 Subpart P. Before excavating, check with local utilities for sewer line, telephone line, water line, natural gas or fuel lines, and electric line locations (USA);

- All trenches more than 5 feet deep have to conform to OSHA regulations for sloping/shoring depending on soil type A, B, or C (see OSHA Standard 1926.650 Subpart P). Others less than 5 feet may require sloping/shoring based on a competent person's judgment;
- Access and egress (ladders, ramps, stairways) are to be provided within 25 feet of lateral travel along the trench;
- In excavations where employees may be required to enter, excavated or other materials shall be effectively stored and retained at least 2 feet or more from the edge of the trench;

- In excavations where employees may be required to enter, excavations of greater than 4 feet shall have the atmosphere tested before each entry and as conditions change;
- Employees exposed to vehicular traffic shall be provided with and instructed to wear warning vests made of reflective or high visibility materials;
- All employees in trenches shall wear the appropriate PPE, e.g., hard hats, safety glasses, hard-toed boots, high visibility safety vest etc;
- No employees will be permitted under loads handled by shovels, derricks, or hoist;
- If possible, dust conditions shall be kept to a minimum;
- Where employees or equipment are allowed to cross over excavations, all walkways and/or bridges will have guardrails;
- Adequate barrier protection will be provided at remotely located excavations (e.g., reflective cones or sawhorse barriers);
- Employees will be protected from water accumulation, including the use of shields, and must be inspected by a competent person before work begins;
- Daily inspections of excavations, adjacent areas, and protective systems will be conducted by a competent person in accordance with 29 CFR 1926.651(k); and
- The designated competent person must be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

9.0 WELDING AND CUTTING

General

- Always check oxygen-acetylene units prior to use for leaks or irregularities;
- Gas cylinders must always be stored, transported, and used in an upright position;
- **NEVER** use oil on or allow oil to come in contact with oxygen regulators -- oil and oxygen can explode;
- Always shut off cylinder and bleed hoses prior to leaving cutting unit for any length of time;
- Gas cylinders must always be chained or otherwise secured;
- Never stand in front of oxygen --acetylene regulators when opening gas cylinders. The correct position is to stand behind and to one side in case of regulator exploding;
- Always check for foreign objects in gas cylinder valves prior to connecting regulator and always "crack" the valve to remove any contamination;
- Never store oxygen and acetylene tanks together; they should be separated by 25 feet or fire wall;
- Anti-flashback devices are required by OSHA on all oxygen-acetylene units. The anti-flashback devices should be installed between the hose and the regulator;
- The proper type of hose fitting is required by OSHA. Hose clamps cannot be used on oxygen-acetylene hoses;
- Safety caps must be in place prior to moving any cylinders. The regulator, if attached, must be protected to prevent it from being struck or broken;
- Report to your supervisor any gas cylinders that have cuts, dents, welding strike marks, or other signs of damage;
- Wear proper PPE when welding and cutting;

- All flammable and combustibles are to be removed from the welding and cutting work area or at a minimum distance of 50 feet;
- A fire watch is to be performed during welding and cutting, and for 60 minutes after it ends if any potential for fire exists;
- ABC fire extinguishers are to be mounted on every welding and cutting unit, minimum of 10 LBS fire extinguisher;
- First aid equipment will be maintained and located in site vehicles and office trailers;

10.0 LADDER SAFETY

A ladder meeting OSHA requirements will be provided to all routine points of personnel access where there is a break in elevation greater than 19 inches.

General Requirements

- Ladder rungs, cleats, and steps must be level, parallel and uniformly spaced;
- Maintain ladders free of oils, grease, mud and ice, or other slip hazards;
- Keep the area around the top and bottom of the ladder free of debris and other obstructions;
- Persons using a ladder shall face the ladder and have both hands free when ascending or descending (three points of contact). Tools or other items shall be carried in pockets or tool belts unless a hand line is used for raising or lowering the item;
- All ladders that are broken, those are weak, or with missing rungs, shall not be used. Unless repairs are made immediately, they shall be tagged out and taken out of commission. If beyond repair, the ladder shall be removed and disposed of ;
- Ladders shall not be painted, doing so may hide defects;
- Metal ladders shall not be used around electrical equipment;
- Ladders will be inspected prior to use.

Straight Ladders

- Straight ladders shall be secured from slipping by:
  (1) Cleating in front of them;
  (2) Securing/tying them off at the top; and
  (3) Equipping them with safety feet
- Straight ladders should be placed at an angle of inclination of one foot horizontal for each four foot vertical rise;
- Straight ladders shall extend at least 3 feet above the platform to be reached. Both sides of the ladder must be resting on a support;
- The top of the ladder should be secured or the ladder held in place by another person if there is a danger of slipping; and
- Sections of ladders will not be lashed together to increase overall length.

Step Ladders

- Planks shall not be used on the top of stepladders;
- Stepladders shall not be used as straight ladders. Leaning or resting a step ladder against a support is prohibited;

- A metal locking device or spreader shall be used to hold the front and back section in an open position when in use; and
- Climbing above the second tread from the top of a step ladder is prohibited.

11.0 DRILLING OPERATIONS

All the safety provisions of normal site operations should be followed. The drilling inspector or supervisor is responsible for the safety of everyone on the crew.

General

- All the safety provisions of normal site operations should be followed. The drilling inspector or supervisor is responsible for the safety of everyone on the crew;
- Use any and all resources to locate underground utilities prior to any drilling or boring. . These resources include Underground Service Alert (USA), site maps and drawings, other locators, site markings and conditions, and site personnel. Be especially wary of electrical, natural gas, and product lines;
- Observe safe distances from overhead utilities of at least 10 feet;
- Properly mark the area with barricades, fencing, and/or flagging. Post warning and "No Smoking" signs conspicuously and enforce them;
- Fire extinguishers will be on site and readily accessible at all times, at a minimum each piece of equipment will contain a 5 LB ABC fire extinguisher, and a 20 LB fire extinguisher if fueling equipment;
- All drilling locations should be verified and marked by surveyor and superintendent;
- When drilling in active facilities, contact the area supervisor in advance to advise them of the activities;
- Locate emergency shut-off valves and switches, and ensure all members of the crew know where they are and how to use them;
- If an unknown substance is encountered during drilling, all operations will stop until the situation is evaluated. Augers should be left in the ground and cuttings and samples containerized;
- Cuttings should be containerized or covered whenever feasible, and especially at the end of each work day. Drums should be labeled and placed in a secured area. Cuttings left to be aerated should be bermed to prevent run-off in case of rain, (dependent upon site specifications);
- Drilling materials such as augers and grout should be stored in a secured area;
- Hearing protection should be worn as necessary, especially during drive sampling;
- NEVER get hands near moving augers;
- During the presence of airborne contaminants emanating from the borehole, safety barriers may have to be put in place to protect the operator;
- Steam-cleaning of equipment should be performed with the appropriate protective equipment, which should always include eye and face protection. Never attempt to clean any body parts with pressure washers. Prior to the use of steam cleaners or pressure washers employees will go over all applicable AHA’s

Health & Safety Division

INJURY & ILLNESS PREVENTION PROGRAM (IIPP)

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Table of Contents

1. SAFETY POLICY 3
2. SAFETY OBJECTIVES 3
3. RESPONSIBILITY 4
4. COMPLIANCE 4
5. COMMUNICATION 4
6. HAZARD ASSESSMENT 5
7. ACCIDENT/EXPOSURE INVESTIGATIONS 5
8. HAZARD CORRECTION 5
9. TRAINING AND INSTRUCTION 6
10. RECORDKEEPING 6
11. LIST OF TRAINING SUBJECTS 7
12. ORGANIZATION AND RESPONSIBILITY 8
13. REPORTING AND RECORDING OCCUPATIONAL INJURIES AND ILLNESSES 9
14. CONTINGENCY PLAN 11
15. IDENTIFYING AND EVALUATING WORK PLACE HAZARDS/INSPECTIONS 13
16. CORRECTING UNSAFE CONDITIONS AND WORK PRACTICES 14
17. SAFETY TRAINING 16
18. SAFETY COMMUNICATION 17
19. DISCIPLINE -- RIGHTS AND PROCEDURES 19

1. SAFETY POLICY

It is our objective to have a safe and healthful work place. While the Injury and Illness Prevention Program meets federal and state safety and health regulations, this is secondary to our main objective of preventing employee injuries and illness.
Outlined in the following pages are policies and programs for personal safety and health.

2. SAFETY OBJECTIVES

- Eliminate, or provide suitable protections against, all recognizable occupational hazards
- Maintain programs that ensure compliance with all State of Alaska, Federal, and MSHA regulations and requirements related to labor and employment standards.
- Enforce safety and health rules. Require that all employees adhere to these rules as condition of employment
- Instruct all employees in safe working techniques and maintain records of employee training
- Provide facilities or means for treating injuries and illnesses promptly and adequately
- Maintain up-to-date accident record keeping statistics and promptly investigate all accidents to initiate corrective actions to prevent recurrences
- Conduct periodic safety inspections to ensure safe working conditions
- Ensure the above objectives are properly coordinated and that all employees are adequately trained on safe work practices

GOAL: ZERO INJURIES AND ILLNESSES

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3. RESPONSIBILITY

The Injury and Illness Prevention Program (IIPP) administrator, (Corporate Health and Safety Director), has the authority and responsibility for implementing the provisions of this program for Magnus Pacific.

All managers and supervisors onsite are responsible for implementing and maintaining the IIPP in their work areas and for answering worker questions about the IIPP. A copy of this IIPP is available at the job site. Anyone who is to be performing work onsite must review and sign off on this IIPP, agreeing that they comply with its contents and will abide by them while onsite.

4. COMPLIANCE

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly.

All employees are responsible for using safe work practices, following all directives, policies and procedures, and assisting in maintaining a safe work environment.

Our systems of ensuring that all employees comply with the rules and maintain a safe work environment include:

- Informing employees of the provisions of our IIPP
- Evaluating the safety performance of all employees
- Recognizing employees who perform safe and healthful work practices
- Providing training to employees
- Citing employees for failure to comply with safe and healthful work practices

5. COMMUNICATION

We recognize that open, two-way communication between management and staff on health and safety issues is essential to an injury-free, productive workplace. The following system of communication is designed to facilitate a continuous flow of safety and health information between management and staff in a form that is readily understandable and consists of the following:

- New employee orientation including a discussion of safety and health policies and procedures
- Review of our IIPP
- Workplace safety and health training programs

- Scheduled safety meetings every day
- Activity Hazard Analysis (AHA's)
- Effective communication of safety and health concerns between employees and supervisors, including translation where appropriate

6. HAZARD ASSESSMENT

Periodic inspections to identify and evaluate workplace hazards shall be performed as described:

- When we initially established our IIPP
- When new substances, processes, procedures or equipment which present potential new hazards are introduced into our workplace
- When new, previously unidentified hazards are recognized
- When occupational injuries and illnesses occur
- When we hire and/or reassign permanent or intermittent employees to processes, operations, or tasks for which a hazard evaluation has not been previously conducted
- Whenever workplace conditions warrant an inspection

7. ACCIDENT/EMERGENCY/HAZARDOUS INCIDENT/EXPOSURE INVESTIGATIONS

Procedures for investigating workplace accidents and hazardous exposures include, natural or man-made: Provide to the client representative, his or her designate, within 24-hours after each occurrence, a written report providing details of all health and safety incidents.

- Visiting the accident scene as soon as possible
- Interviewing injured workers and witnesses
- Examining the workplace for factors associated with the accident/exposure
- Determining the cause of the accident/exposure
- Taking corrective action to prevent the accident/exposure from recurring
- Recording the findings and corrective actions taken

8. HAZARD CORRECTION

Unsafe or unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

- When observed or discovered

- When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers from the area except those necessary to correct the existing condition. Workers necessary to correct the hazardous condition shall be provided with the necessary protection
- All such actions taken and dates they are completed shall be documented

9. **TRAINING AND INSTRUCTION**

All employees, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices. Training and instruction shall be provided as follows:

- When the IIPP is first established
- To all new employees
- To all employees given new job assignments for which training has not been previously provided
- Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard
- Whenever the employer is made aware of a new or previously unrecognized hazard
- To supervisors to familiarize them with the safety and health hazards to which workers under their immediate direction and control may be exposed
- To all employees with respect to hazards specific to each employee's job assignment

Workplace safety and health training practices for include, but are not limited to, the following:

- Explanation of the IIPP, emergency action plan and fire prevention plan, and measures for reporting any unsafe conditions, work practices, and injuries
- Use of appropriate clothing, including gloves, footwear, and personal protective equipment
- Information about chemical hazards to which employees could be exposed and other hazard communication program information
- Availability of toilet, hand-washing and drinking water facilities
- Provisions for medical services and first aid including emergency procedures

In addition, we provide specific instructions to all employees regarding hazards unique to their job assignment, to the extent that such information was not already covered in other training.

10. **RECORDKEEPING**

We have taken the following steps to implement and maintain our IIPP:

- Records of hazard assessment inspections, including the person(s) conducting the inspection, the unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions and work practices, are recorded on a hazard assessment and correction form; and
- Documentation of safety and health training for each employee, including the employee's name or other identifier, training dates, type(s) of training, and training providers are recorded on an employee training and instruction form.

Inspection records and training documentation will be maintained according to the following:

- For one year, except for training records of employees who have worked for less than one
- At the facility for five (5) years following the end of the year to which they relate

11. **LIST OF TRAINING SUBJECTS**

We train our workers about the following training subjects:

- The employer's Standard Operating Procedures (SOP's)
- 30 CFR 48 MSHA Miner training and certification (when/where required)
- Site specific orientation, client-specific requirements
- Confined spaces, Lock-Out procedures, Fall Protection, Hot Work, Good housekeeping, fire prevention, safe practices for operating any construction equipment
- Safe procedures for cleaning, repairing, servicing and adjusting equipment and machinery
- Safe access to working areas
- Trenching and excavation work (Includes notification form)
- Proper use of powered tools
- Materials handling
- Chainsaw and other power tool operation
- Driver safety
- Slips, Trips, falls, and back injuries
- Ergonomic hazards, including proper lifting techniques and working on ladders or in a stooped posture for prolonged periods at one time
- Personal protective equipment
- Hazardous chemical exposures
- Hazard communication
- Sleep Deprivation
- Physical hazards, such as Biological, Heat Stress, Cold Stress, Noise, etc.

12. **ORGANIZATION AND RESPONSIBILITY**

This program has been organized in a manner to identify individual responsibility as well as clearly establish procedures and policies to handle general safety and health issues.

Executive Management

Directly responsible for establishing policy and ensuring companywide compliance this includes:

- Assign responsibility and accountability to individuals
- Review and evaluate results
- Review and approve corrective actions
- Provide active leadership by participation, example and an on-going interest in the program

Safety Compliance Manager

- Ensure compliance with company, OSHA, MSHA, and related safety policies and directives. Coordinate OSHA compliance programs by review, research and interpretation of OSHA, American National Standards Institute, and National Fire Protection Association standards and implementation of programs necessary for complete compliance
- Act as liaison with governmental agencies and customers in safety and environmental concerns
- Conduct and/or delegate periodic inspections to ensure safe work conditions are met. Take or recommend corrective actions to resolve any problems resulting from the inspections
- Administer evacuation program
- Develop, implement and monitor safety program (in accordance with established policies, procedures and laws to prevent industrial injuries and provide safe work environment)
- Ensure all supervisors are kept informed of any changes in policies and laws by counseling and implementing supervisory safety training
- Assist managers or supervisors with their group safety meetings by providing suggestions or tools (videos, books, written material, etc.)
- Assist with the development or updating of codes of safe practices.
- Develop, conduct or delegate safety training

Human Resources Manager

- Assist Safety Compliance Officer with various training and record maintenance as needed
- Establish and maintain all files and records
- Investigate all doctor referred injuries by gathering pertinent facts, interviewing all witnesses, and reviewing medical and accident reports concerning any work related injury or illness. Refer to safety committee as appropriate.
- Supervise and monitor the disposition of all workers compensation claims from inception to final closure by coordination with medical clinic, insurance carrier, participation in all legal hearings, and close medical follow-up
- Counsel and assist with safety related disciplinary action

Supervisors/Managers

- Fully support all safety policies and practices
- Train each employee in proper use of equipment
- Teach each employee what the hazards are on the job and how to avoid them
- See that needed safety equipment and protective devices are provided and used on each job
- Establish safety awareness in each employee through personal contact and commitment
- Maintain a safe work area through daily inspections, including an effective program of good housekeeping, and maintaining high standards of personal and operational cleanliness
- Ensure safety compliance throughout the facility
- Train and monitor employees on accident prevention
- Ensure that all injuries are promptly treated and reported to the Safety Department
- Implement prompt corrective action whenever unsafe conditions and/or unsafe acts are noted
- Communicate to each employee the understanding that violation of established safety policy and practices will not be tolerated
- Initiate disciplinary action for safety infractions as required by policy
- Active participation in safety related work when assigned
- Make safety recommendations to the Safety Officer
- Establish and review job safety analysis and codes of safe practices

Employees

- Participate in all safety activities:
  - Safety training
  - Safety inspections
  - Fire and/or evacuation drills
- Comply with all safety practices and policies:
  - Safe work practices
  - Safe use of equipment and tools
  - Safe use and handling of chemicals
  - Report injuries or unsafe conditions promptly

Every employee is personally responsible for their own safety while at work.

13. **REPORTING AND RECORDING OCCUPATIONAL INJURIES AND ILLNESSES**

Properly used, accident records are one of the most powerful tools we have to improve our safety program. Keeping accident records, investigating accidents and analyzing the results are simple, but effective, tools in our accident prevention program.

Maintenance of Log:

- Utilizing OSHA form No. 300, each recordable injury or illness will be recorded within seven (7) calendar days following the receipt of information that an injury or illness has occurred.
- An annual summary of the previous year's log, consisting of the last page, will be posted on bulletin boards each year during the month of February.

Report of Fatality or Multiple Hospitalization Accidents:

- Accidents that result in one (1) or more fatalities or in the hospitalization of three (3) or more employees
- Reports must be provided *orally within eight (8) hours and in writing within 24 hours after the occurrence of an employment accident*
- Information contained in the report should be based on the record of occupational injuries and illnesses, OSHA Form 300, plus any additional information requested by the appropriate authorities.

Retention of Records:

Records provided for in this document will be retained at the facility for five (5) years following the end of the year to which they relate.

Definitions:

- "Medical treatment" including treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even though provided by a physician or registered professional personnel.
- "First aid" is any one-time treatment and any follow-up visit for the purpose of observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care. Such onetime treatment and follow-up visits for the purpose of observation is considered first aid even through provided by a physician or registered professional personnel.
- "Lost Work Days" = the number of days (consecutive or not) after, but not including the day of injury or illness during which the employee would have worked, but was unable to work.

- Recordable occupational injuries or illnesses are defined as:
  - Fatalities, regardless of the time between the injury and death, or the length of illness; or
  - Lost work day cases, other than fatalities, that result in lost work; or
  - Non-fatal cases without lost workdays which required medical treatment.

Incident Report Packet for Supervisors:

- Upon notification of an injury or illness, the immediate or available supervisor should secure an "Incident Report Packet".
- Within the "Incident Report Packet" supervisors will find step-by-step instructions for handling both the medical and paperwork aspects of an accident. If Safety is available, they will assist supervisors as requested.

Incident Report Packet Contents:

Supervisor

- Instructions to Supervisors
- Supervisors Report of Occupational Injury or Illness
- Employers Report of Occupational Injury or Illness

Employee

- Guide to Workers Compensation
- Medical Treatment Referral
- Employees Claim for Workers Compensation Benefits

See Appendix A for forms

14. **CONTINGENCY PLAN**

Copies of the following emergency procedures will be kept in all office locations, site vehicles, and provided to personnel in charge at the site. Emergency information will also be included in any site specific addendums.

14.1 ***EMERGENCY ACTION/STANDARD OPERATING PROCEDURES***

The name and telephone number of the nearest medical treatment facility is located in each site-specific Health & Safety Plan (HASP).

Directions to Medical Facilities:

Prior to initiating field work, field personnel will attend a site briefing in which the route to and from the Medical facilities will be identified. . A map will be provided in in the HASP, and posted on-site, which outlines the routes to the Medical facilities.

Telephone numbers and procedures for obtaining emergency services are as follows, all phone numbers for, Fire, Ambulance (EMS) are the same. Direct all calls using 911

- Ambulance (911)
- Fire Department (911)
- Police/Law Enforcement (911)
- Work Care Case Management Hotline: (888) 449-7787

A 25-person emergency first aid kit that meets ANSI Standard Z308 1-1978 will be readily available on site, and designated personnel will have first aid training.
Sufficient water and/or dry chemical fire extinguishers (A, B, C fire extinguishers) and neutralizing agents will be maintained on site to cope with any situation until emergency services arrive.

A personal eyewash kit that meets ANSI Z358 1-1990, Fire Extinguisher (5LB A,B,C) will be available in each Magnus Pacific field vehicle at the site. The main purpose of the eyewash unit is to provide immediate flushing. With this accomplished, the individual may then be transported to the hospital for professional care.

14.2 *WORK AREA EMERGENCY PROCEDURES*

The Site Safety Person or the Construction Manager shall immediately notify the Magnus Pacific Project Manager and client Representative of any accident/incident.
It will be the responsibility of the Project Safety and Health Manager to thoroughly investigate the details of any accident or injury. Based on findings, corrective action relative to field procedures will be recommended to prevent recurrence.

14.3 *MEDICAL EMERGENCIES*

Any person who becomes ill or injured on site needs to be evaluated by the Site Safety Person. If first aid needs to be administered Magnus Pacific will ensure that there are a minimum of 2 individuals onsite that are trained in CPR/First Aid with current certifications.

If an injured victim is unconscious, notify emergency medical service (EMS). Inform the EMS dispatcher of the nature of the emergency. Do not move the victim unless it is absolutely necessary. Remain with the victim and wait for orders from the EMS dispatcher. The EMS dispatcher should determine what help is needed. Anyone transported to a clinic or hospital for treatment should be accompanied by information on the scene and what happened.
Onsite there will be an emergency packet contained in each Magnus Pacific vehicle. Inside the packet will be instructions on how to get to the hospital, and emergency contact numbers.

In the event that a major accident or injury occurs emergency first aid will be performed on injured persons by CPR and First Aid trained persons until emergency medical personnel arrive.

Injured personnel will not be moved from the site by non-emergency medical personnel, unless there is a high risk that severe injury or loss of life will occur if the injured person(s) is not immediately moved. Non- injured personnel at the site will be checked for symptoms of shock following a major accident or injury. Work will not resume at the site until the Site Safety Person, Construction Manager, and appropriate personnel approve.

14.4 *FIRST AID MEASURES*

In the event that personnel exposure to any harmful substances occurs, the following procedures will be used:

Eye Contact: Flush eye immediately with copious amount of water; repeat until irritation is eliminated. If irritation occurs for more than 15 minutes, seek medical attention.

Skin Contact: Thoroughly wash exposed area with soap and water. If dermatitis or severe reddening occurs, seek medical attention. Report all skin contact with materials and biological hazards to the Site Safety Person for medical monitoring.

Inhalation: Remove person into fresh air. If symptoms occur for more than 15 minutes, seek medical attention.

Ingestion: Do not induce vomiting; seek immediate medical attention.

15. **IDENTIFYING AND EVALUATING WORK PLACE HAZARDS/INSPECTIONS**

In order to maintain a safe and healthful work place, we need a way to effectively identify hazards. We recognize that unsafe work practices generally cause more accidents than unsafe physical conditions. However, to achieve our objectives, we will focus on both unsafe work practices and unsafe physical conditions.

It is our intention to eliminate, as quickly as possible, all unsafe conditions and work practices. However, some corrective actions require longer periods of time and/or larger expenditures of capital. Because of this, it is necessary to evaluate the seriousness of the hazards and focus our attention on those that have the potential to cause serious injury or illness.

Inspection of the work place is our primary tool to identify unsafe physical conditions and practices. Regular and periodic inspections by management, supervisors, safety committee, and employees are one of the principal means of locating hazards before accidents and injuries occur.

Inspection Responsibilities:

- **Employees** are responsible for inspecting their own work place on a daily basis and for promptly reporting unsafe or unhealthful conditions to their immediate supervisor, unless they are able to correct the situation themselves.
- **Supervisors** are responsible for routinely inspecting their area of responsibility and, where possible, correcting unsafe physical conditions and work practices. If

corrections cannot be done at the supervisor's level, the supervisor is responsible to ensure that corrections are completed by those assigned to the task.

- **Compliance Officer** will conduct an inspection of the work place on a monthly basis. The purpose of this inspection is to have is to insure inspection of the work place on a regular and frequent basis, looking for both unsafe physical conditions of the work place as well as unsafe job practices or acts of employees.
    - Re-inspections will be scheduled based on seriousness of hazard, but not longer than 30 days from initial inspection
    - It is the Safety Officer's responsibility to arrange for corrective action for any problems identified. Corrective action and completion should be noted on form prior to filing.

Accident Investigation:

All injury and illness reports will be reviewed and fully investigated to determine if any corrective action is required.

- **Immediate supervisor** --there are certain times when a more in-depth analysis of hazards or potential hazards is required by the supervisor. These are situations where a task is known to have caused accidents in the past, or when the supervisor is investigating the causes of a recent accident.
- **Human Resources Manager** will review both accident reports and OSHA log to identify any patterns or similarities between accidents. Safety Manager will conduct a post injury investigation of all accidents resulting in more than a minor injury; or any accident that bears a similarity to prior reported accidents. Investigation may include a review of records and/or interviews with employee, supervisor and witnesses.

16. CORRECTING UNSAFE CONDITIONS AND WORK PRACTICES

No supervisor will knowingly allow a hazardous condition
To exist which may result in injury or occupational illness

To maintain a safe and healthful work place requires correcting identified potentially hazardous work place conditions. Knowing and failing to correct a potential hazardous situation is not in keeping with Magnus Pacific policy.

Although it is our intention to eliminate all unsafe conditions and work practices as quickly as possible, some corrective action will necessarily require longer periods of time and/or larger expenditures of capital. Because of this, it is necessary to evaluate the seriousness of the hazards and focus our attention on those that have the potential to cause serious injury or illness.

One way to evaluate the seriousness of a potential injury is to use the same criteria OSHA, MSHA generally uses in deciding if a violation of a safety and health standard is a "serious" violation or a "non-serious" violation. To do this OSHA determines if resulting injury would

involve hospitalization, amputation of a limb or part of a limb, fracture, or permanent disfigurement or disablement. These kinds of injuries are serious, and conditions likely to cause them will receive immediate attention.

Once Magnus Pacific has determined that an unsafe physical condition or work practice exists and we have evaluated the seriousness of the hazard, we will determine the corrective action and initiate remedial actions.

All personnel have a responsibility for helping to make sure we all have a safe and healthful place to work.

Responsibility for Corrective Action

- **Employees** should make recommendations for changes in work conditions and practices which improve job safety and performance. Employees may make these changes when changes are within their level of authority and expertise, and changes do not adversely affect operations or personnel. Employees are encouraged to submit employee safety information forms to the Safety Compliance Officer.
- **Supervisors** are responsible for making changes in operations and work practices which improve the job safety and/or performance of the people in their areas of responsibility. When changes are not within their budget authority or expertise, they must ensure that the changes are acted on by others.
- **Safety Compliance Officer** is responsible for monitoring and ensuring that appropriate action has been taken on all identified safety hazards.
- **Executive Management** has overall responsibility to ensure efficient and safe operations within their area of responsibility.

Each person responsible for corrective action will:

- Correct within specified time frame

- Or -

- Establish a plan for correcting unsafe or unhealthful conditions or work practices.
- Determine priorities and correct hazards in order of potential seriousness.

Corrective Action generally falls into four categories:

- **Training** -- once a safe job procedure has been established, employees must be trained in the proper (safe) method to do the job. While training is always desirable (and is required by law), the problem with this solution is that it requires on-going supervision to make sure employees continue to do the job in the manner in which they have been trained.
- **Administrative Contro**l --limiting the amount of time an employee is exposed to a repetitive operation, or exposed to a noisy environment. This type of control involves rotating employees between jobs and is difficult to administer. However,

it can also mean training employees to take "breaks" (do other tasks) from any repetitive operation.

- **Personal Protective Equipment** --it is vital to provide proper equipment to protect employees from exposure to chemicals, flying objects, air born particles, noise, etc. (gloves, safety glasses, ear plugs, masks, etc.) This solution requires training and on-going supervision to make sure the equipment is consistently and properly used.
- **Physical changes** -- in some cases, equipment or physical plant changes are required to correct unsafe conditions. The Executive Management Team will prioritize the seriousness of problems and develop a long term corrective action program.

17. SAFETY TRAINING

It is Magnus Pacific's policy to provide training in safe work practices for all our employees. Employees should not do a job unless they know how to do it safely and understand the hazards involved.

The law requires that we provide several types of safety training to our employees. These requirements are based upon the assumption that when employees know how to do their job properly and know the hazards of the job, they will work safely.

Adequate training time must be allocated so that jobs can be done safely. Trainers will take time to prepare and present the programs. Participants must take the time to learn the material presented. It is recognized that some people may take longer to learn new material than others. All persons are to be allowed the time needed to learn the material presented in the training program.

IMPORTANT: All training will be documented with either a signed acknowledgment of training received or via written test results depending on the nature of training provided.

1. Supervisor Training
   - Supervisors are responsible for participating in training to familiarize themselves with safety and health hazards to which employees under their immediate direction and control may be exposed.
   - Additional training will be done for supervisors and employees when we are made aware of a new or previously unrecognized hazard.

2. New Hire Safety Orientation
   - Human Resources will issue appropriate "Codes of Safe Practices" to all new hires. New hires will also be shown all job pertinent safety videos. Safety will conduct training on general topics as noted in items # 3 & 4 below.

3. All Employees (including supervisors) will receive training on:
   - Injury and Illness Prevention Program

- Housekeeping

4. All Affected Employees will receive training on:
   - Personal Protective Equipment
   - Hazardous Material Identification (Hazardous Commutation)
   - Chemical Handling
   - Forklift Safety
   - Office Safety
   - Confined Space Policies
   - CPR/First Aid
   - Excavation Safety
   - Equipment Safety
5. Specific Job Training
   Utilizing the code of safe practices an immediate supervisor will cover the steps of the job; the hazards associated with each step, and correct job procedures for the employee to follow.

   After a person is assigned a job, the responsibility for on-going safety education and training passes to the immediate supervisor, this supervisor should continue the safety instruction by discussing the safety rules of the department in which the employee will work. This must be followed by training on the hazards associated with the specific job to which the worker is to be assigned. It is recommended that the supervisor review the initial instructions and follows up with a review within 10 working days after assignment to the job.

18. **SAFETY COMMUNICATION**

It is our policy to support open two-way communication between management and employees. No procedures, work practices, or any member of management will impede the communication process. Our IIPP allows and encourages employees to communicate with all levels of management on safety and health matters. The program also provides ways for management to keep employees informed about matters important to their health and safety.

All pertinent health and safety information must be forwarded to all involved.

All employees are encouraged to inform their supervisor of any concern they have about potential hazards in their work place. In addition, employees may also inform the Safety Compliance Officer, Safety Manager or any member of management about such concerns.

There are many methods that are used to ensure open and consistent communication throughout the company:

1. Method of Communication

   Management:
   - Written codes of safe practices
   - Safety bulletins & posters
   - Training
   - Safety meetings
   - Activity Hazard Analysis
   - Formal policies and procedures

   Safety Committee:
   - Meeting minutes
   - Inspection reports
   - Hazard correction citations
   - Behavior Based observer Report, Employees safety Suggestions

   Employees:
   - Direct input to supervisor or manager
   - Input to Safety Compliance Officer, Safety Manager or Construction Manager
   - Employee safety Observation forms

2. Common Area Bulletin Board
   Bulletin Boards bring attention to every employee that safety is a priority. In addition, Common Area Bulletin Boards are an effective means of communicating safety awareness as they are located throughout the company, job site.

3. Employee Safety Information Forms
   Magnus Pacific has established an employee safety information form to make it easy for any employee to report a safety hazard or make a suggestion to improve safety and health conditions in the work place. While it is true that supervisors traditionally act as the link between workers and management, sometimes employees have difficulty expressing a safety need to their immediate supervisor. We expect supervisors to encourage and welcome suggestions. We have provided the employee safety information forms as an alternate method for employees to communicate safety matters to management.

   Employee safety information forms will flow from the project staff and coordinators to the Safety Compliance Officer. The Safety Compliance Officer will copy appropriate department manager -- and follow-up with manager within a reasonable time frame (depending upon urgency of situation).

4. Training
   As mentioned in the previous section, training is one of our most important methods of communicating safety policies and procedures.

5. Code of Safe Practices
   Code of Safe Practices go hand-in-hand with company policy, if practices are adhered to, we will have a safe place to work, with fewer accidents, Codes of Safe Practices are also the basis for our disciplinary program as it applies to repeated violations of safe work practices.

   Code of Safe Practices will be re-issued annually to all employees as a reminder. Copies are posted n the employee information room and kept on file in the Safety Department.

19. **DISCIPLINE -- RIGHTS AND PROCEDURES**

It is the intention of Magnus Pacific to provide all employees a work place as free as possible from safety and health hazards. Doing so will minimize occupational injuries and illnesses which can have tragic effects on the lives of our employees and also reduce our company profits.

Alaska State law requires us to have a system for ensuring that employees comply with safe and healthful work practices. This includes disciplinary action.

All supervisors must enforce Magnus Pacific's safety rules and ensure that all employees comply with established safety practices (including use of personal protection equipment).

Magnus Pacific's system of ensuring compliance starts with this policy. Our system relies on good management practices and utilizes discipline as a last resort.

When disciplinary measures must be used, supervisors are to follow standard disciplinary steps.

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Appendix – C

Activity Hazard Analyses (AHAs)

Overall Risk Assessment Code (RAC)	L

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Mobilization/Demobilization ; General and Physical Site Hazards	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job No. 150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures	RAC
1. <u>General/Physical Job Site and Task Hazards</u> *All Managers and Employees Responsible*	A. Lack of appropriate PPE	A. Site employees will be required to wear minimum **<u>Level-D</u>** PPE including hard hat, safety glasses, work gloves, safety-toed work boots, and high visibility Class-II vest/apparel for work conducted during mobilization, establishing work area(s), and delivery of equipment resources. A. The toxicological and exposure hazards for all COCs will be reviewed with all crew members as a component of initial site orientation/HASP training.	L
	B. Chemical contact - Chemicals of Concerns (COCs)	B. Safety Data Sheets (SDSs) will be obtained for chemicals brought on site. B. SDSs will be reviewed, as necessary, with project personnel before using the chemical material (HAZ-COM) training will be provided to all personnel, documented, and filed.	L
No smoking policy: No smoking is permitted within the work zones. No smoking is permitted while operating company vehicles or equipment. Smoking is permitted in designated area(s) <u>only</u>.	C. Slips, trips, falls	C. Avoid routing cords, ropes, and hoses across walking pathways. All cords, ropes, and hoses will be rolled accordingly and stored in the conex. Work areas will have electrical cords up off the ground to avoid trip hazards. C. Flag or cover holes to protect against falls. C. Use 3-points of contact when getting on or off equipment to prevent falling.	L

Overall Risk Assessment Code (RAC)	L

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Mobilization/Demobilization ; General and Physical Site Hazards	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job No. 150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures	RAC
	D. Poor housekeeping	D. Work areas will be kept clean and orderly. D. Garbage will be disposed in approved and covered refuse containers. D. Tools and accessories will be properly maintained and stored. D. Work areas and floors will be kept free of dirt, grease, and slippery materials. D. Materials will be stored to allow clear access to aisles, pathways, and travel routes. D. Field vehicles will be kept clean and orderly (i.e., cab, truck beds, tool boxes, trunk, and camper shells).	L
	E. Biological Hazards	E. Where mosquitoes pose a biological problem in the area, ensure that you review the SDS for DEET/DEEP WOODS OFF and use it! Mosquitoes in this project area have been known to carry West Niles virus, so please protect yourself. E. Watch out for wasps, bees, and other type insects. If you are allergic, notify PM Team staff and make sure you have the necessary equipment (EPPI Pen) and contact numbers in case of an allergic reaction.	L
	F. Manual lifting	F. Size up the material which is to be lifted. Look to see if a verification of weight is provided on the outside of the material to be lifted. The preferred method of lifting is by mechanical means. Take the time and effort to use equipment to move heavy objects whenever possible.	L

MAGNUS Pacific

Overall Risk Assessment Code (RAC)	L

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Mobilization/Demobilization ; General and Physical Site Hazards	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job No. 150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures	RAC
		F. If the weight of the object is over 50lbs. then utilize the buddy system to lift it. Leverage your legs, not your back. Use mechanical equipment whenever possible to lift materials. F. Get assistance when manually lifting awkwardly-sized items.	
	G. Inadequate or defective tools	G. Tools not functioning properly, or with broken handles or working faces, shall be removed from service immediately and tagged for repair.	L
	H. Minor cuts and bruises	H. Workers shall wear cut resistant work gloves when handling equipment/materials or anytime hand hazards are present.	L
	I. Non-emergency response personnel	I. Have at least two (2) persons on site trained in First Aid/CPR.	L
	J. Lack of Buddy System	J. All personnel on site shall use the buddy system (working in pairs or teams).	L
	K. Heat Stress	K. Adequate breaks will be provided to the crew as needed to replenish all the loss of fluids in the body. Cool potable water will be provided for all site employees. Electrolyte replacement fluids are offered periodically throughout the shift. K. Employees will be trained in the signs and symptoms of heat stress and heat related injuries and prevention of such injuries. Employees	L

MAGNUS Pacific

Overall Risk Assessment Code (RAC)	L

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Mobilization/Demobilization ; General and Physical Site Hazards	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job No. 150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures	RAC
		will be encouraged to refrain from hot or caffeinated drinks which can dehydrate the body. K. Work/rest regimens in shaded area(s) will be scheduled based on the temperature, type of work activity, and PPE worn by the employee.	
2. Exposure hazards adjacent to the work site.	A. Public roadways and vehicular and pedestrian traffic	A. Work site perimeter controls will be established and maintained to prohibit unauthorized encroachment to the job site. A. Flagger personnel will be furnished, as necessary, at all site access points where traffic must be controlled.	L
	B. Railroad crossings	B. Warning barricades and/or signage will be furnished and installed adjacent to rail crossings to alert personnel/drivers/operators. B. Flagger personnel will be furnished, as necessary, at all rail crossing when traffic must be controlled.	L
	C. Security breach – unauthorized persons attempting to access work area(s).	C. An immediate work stoppage and grounding of equipment will be implemented should unauthorized persons enter the work zone(s). C. Supervisory staff will attempt to intercept and escort unauthorized persons off the site as quickly as possible. C. Local law enforcement officials will be summoned to the site, as necessary, to manage any uncooperative intruders.	L

Overall Risk Assessment Code (RAC)	L

ACTIVITY HAZARD ANALYSIS (AHA)

Equipment to be Used:	**Inspection Requirements:**	**Training Requirements:**
Excavators Dozers Loaders Haul Trucks Orange cones Caution/danger tape Rope Signs K-Rails (Jersey Barriers)Barricades High visibility spray paint T-posts Zip ties Post pounder Shovels Miscellaneous tools and equipment Personal protective equipt (PPE) Communications equipment Potable water/cups/bottles Electrolyte replacement fluids Emergency contact information for client representatives and allied agencies.	Magnus Pacific initial inspection form will be utilized for all support vehicles. Inspections will be completed on tools before work has been initiated.	Employees will be trained and familiar with the following. Site orientation HASP review Activity Hazard Analysis applicable: SOP HS-001 Safety Policy SOP HS-003 General Information and Responsibility SOP HS-004 Hazard Evaluation Analysis SOP HS-006 Hazard Communication Program SOP HS-007 Employee Safety Training Requirements SOP HS-008 Medical Surveillance Program SOP HS-009 Site Control Program SOP HS-10 Respiratory Protection Program SOP HS-011 PPE Program SOP HS-013 Hearing Conservation SOP HS-015 Heat Stress SOP HS-018 Excavation and Trenching Safety SOP HS-020 Lockout and Tag out SOP HS-021Vehicle and Heavy Equipment Operations SOP HS-024 Driver Fleet Safety SOP HS-025 Emergency Response and Contingency Program SOP HS- 026Spill and Discharge Control Program SOP HS-027 Fire Protection Program SOP HS-028 Biological Hazards SOP HS-032 Hand and Power Tools Safety Program SOP HS-034 Back Injury Prevention Program SOP HS-036 Accidents Incidents/Near Miss SOP HS-037 Weather Hazards SOP HS-045 Stop Work Authority Program

Overall Risk Assessment Code (RAC)	L

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: General and Physical Site Hazards

Print Name	*Signature*	Date	Print Name	*Signature*	Date

Reviewed by: _____ *Date:*_____

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Site Preparation | Zone Delineation	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
1. Collect delineators & pylons, safety fencing, t-posts/pounder, caution/danger tape, warning signage and miscellaneous tools *Laborer Responsible* **Low Risk** **No smoking policy:** No smoking, eating or drinking is permitted within the work zones. No smoking is permitted while operating company vehicles or equipment. Smoking is permitted in designated area(s) only.	A. Personal Injury- Muscle pulls, strains during loading/unloading materials, cuts to hands, impalement	A. Employees will conduct a stretch and flex before bending/lifting objects, use required lifting techniques, with mechanical means being the preferred method. (Reference: **Magnus Pacific SOP HS-034** Back Injury Prevention Program). A. Buddy system will be utilized when mechanical methods are not available; allowing no more than 50 lbs. to be lifted by one employee. (Reference: **Magnus Pacific SOP HS-034** Back Injury Prevention Program; **SOP HS-004** Hazard Evaluation Analysis/Buddy System). A. Three points of contact when climbing in/out of truck beds, jumping is prohibited from equipment/trucks. (Reference: **Magnus Pacific SOP HS-021** Vehicle and Heavy equipment Operations. A. When hammering on wooden stakes, watch for cracks or breaks. These can split and break free, causing the hammer or debris to fly towards the individual performing the work. Hand Protection; **05.B** Eye and Face Protection; **Magnus Pacific SOP HS-011** PPE Program; **SOP HS-032** Hand and Power Tool Safety Program; **SOP HS-004** Hazard Evaluation Analysis). A. Leather will be utilized to protect the hands. Some instances may require the use of a utility knife, during this process Kevlar or cut resistant gloves will be utilized. Safety utility knife with automatic spring back will be utilized. No open fixed blades. Hand Protection; **Magnus Pacific SOP HS-011** PPE Program).
	B. Uneven terrain	A. Safety caps will be placed on top of all t-posts or protruding objects which can cause an impalement hazard. B. Take the clearest path to your destination, path of least resistance without blocking your view.
	C. Lack of communication	C. Two way radios will be utilized to inform employees in equipment/ground of their surroundings or before approach. (Reference: **Magnus Pacific SOP HS-021** Vehicle and Heavy Equipment Operations).

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Site Preparation | Zone Delineation	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
	D. Defective or inadequate tools	C. Equipment operators will keep their view clear of obstacles, and clean windows as needed, ground personnel are only to approach equipment from the front, never the rear or side. (Reference: **Magnus Pacific SOP HS-021** Vehicle and Heavy Equipment Operations). D. Inspect all tools and equipment prior to use. Take out any defective tools or "Red Tag them out of service. Defective tools will be turned over to the safety department for disposal. **Magnus Pacific SOP HS-032** Hand and Power Tools). D. When installing T-posts, a T-post post pounder is the right tool for the task. Do not use a hammer, rock, or other means to install the post.

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ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Site Preparation | Zone Delineation	Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett	Date 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
2. Survey the work area Laborer Responsible **Low Risk**	A. Underground utilities	A. Utility locates will have been completed and identified (2) two working days prior to beginning work. If trenching or excavation is necessary, obtain a copy of the corporate Excavation Permit and schedule a USA utility locate service. If underground utilities are present, ensure that they are marked and de-energized prior to digging. Implement hand digging where necessary. (Reference: **Magnus Pacific SOP HS-018** Excavation and Trenching Safety Programs, **(Section 2.1 Notification Procedures)** Underground Service Alert).
	B. Biological hazards	B. Employees will use caution when working in areas with vegetation, stay clear of poison ivy. (Reference: **Magnus Pacific SOP HS-028** Biological Hazards).
	C. Chemicals hazards	C. The **Dublin PRB job site** may contain hazardous contaminants related to soils contaminated with petroleum products , therefore work zones will be established in compliance with HAZWOPER protocols as outlined in **Magnus Pacific SOP HS-009** Site Control Program, as deemed necessary based on atmospheric monitoring results. C. Levels of PPE utilized will be adjusted for each task and determined by the Site Safety & Health Officer (SHSO). Reference: **Magnus Pacific SOP HS-011** PPE Program).
Establish controlled work areas: Hazard Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) with DECON Area, and Support Zone (SZ) as necessary to support HTRW work.		
	D. Heavy equipment	D. Equipment operators will follow the path of direction which has been established by the superintendent, delineators will be utilized to barrier off areas where equipment could potentially make contact with buildings, other equipment, or surveyors while they are in travel.
	E. Lack of communication	E. Two way radios will be utilized so that laborers may communicate their intensions and direction of travel.
	F. Struck by equipment	F. Laborers will approach equipment from the front. Attachments will be in zero energy state if laborer is approaching the operator. (**Magnus Pacific SOP HS-021** Vehicle and Heavy Equipment Operations).

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Site Preparation | Zone Delineation	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
3. Placing delineators, silt fence (SWPPP materials), warning signage, safety fence, t-posts/pounder, caution/danger tape *Laborer Responsible* **Moderate Risk**	A. Personal Injury during unloading, cuts to hands, muscle strains to back, hearing loss	A. Laborers will use caution when unloading not to bend at the back. Utilize the correct bending techniques. (Reference: **Magnus Pacific SOP HS-034** Back Injury Prevention Program). A. Leather or mechanics gloves will be utilized when handling all materials and pounding t-posts. (Reference: **Magnus Pacific SOP HS-011** PPE Program). A. Laborers will not hurry or over exert their bodies to get the t-posts in the ground. A. Keep your back straight and your chin clear of the t-post pounder during the lift; keep all fingers away from the bottom when coming down. Employees will stay clear of the laborer when in movement so they are not struck by a body part or tool. A. Laborers will not exceed the 50 lb. weight limit when placing cones, lift t-posts, concrete bags, or any additional materials which are utilized in the set-up and preparation of delineating the work site. A. (HPD) Hearing protection devices will be utilized during installation of t-posts. (Reference: **Magnus Pacific SOP HS-013** Hearing Conservation).
	B. Chemicals/aerosols under pressure	B. Efforts will be made to secure cans from rolling and clear of sharp objects. (Reference: **Magnus Pacific SOP HS-**026 Spill and Discharge Control Plan, and **SOP HS-027** Fire Protection Program).
	C. Spray paint fumes may cause upper respiratory irritation due to inhalation, dermal irritation from contact of the spray on body parts or extremities, contact with eyes.	C. Employees will stay upwind when spraying paint so that in is not directly inhaled, keep body parts away from the direction of spray, do **NOT** point paint cans in the direction of others while spraying, nitrile gloves may be utilized when spraying, safety glasses with side shields will be utilized at all time to protect the eyes. (Reference: **Magnus Pacific SOP HS-004** Hazard Evaluation Analysis; **SOP HS-011** PPE Program).

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Site Preparation | Zone Delineation	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
	D. Poisonous plants (Poison Ivy), Bird fecal material (Hanta Virus) scratches/cuts, bites.	C. Employees will review the M.S.D.S. on the cans of spray paint so they are aware of what to do in case of an emergency. (Reference: **EM 385-1-1 06.B.03e** Hazardous or Toxic Agents; **Magnus Pacific SOP HS-006** Hazard Communication Program). D. Employees will use caution when working in areas with vegetation, stay clear of poison ivy, Employees are not to disturb or interact with any wildlife, or animal's onsite. Report and stay clear of any fecal matter which may be in your designated work areas. Caution should be taken when walking in vegetated areas due to ticks. Self-evaluation checks will be conducted by each employee, training will be provided. (Reference: **Magnus Pacific SOP HS-028** Biological Hazards). D.
4. Housekeeping and clean-up *Laborer Responsible* **Low Risk**	A. Personal Injury- Muscle pulls, strains during loading/unloading materials, cuts to hands	A. When possible every effort will be made to utilize a site vehicle, equipment with a pallet, or skid steer to clean up the remaining supplies and debris left over from the task to avoid strains to the body. A. Utilize required bending techniques during lifting, buddy system, and not to exceed more than 50 lbs. of weight for one person when lifting. (Reference: **Magnus Pacific SOP HS-034** Back Injury Prevention Program). A. Leather or mechanics gloves will be utilized at all times during this task to protect the hands from cuts. (Reference: **Magnus Pacific SOP HS-011** PPE Program).

ACTIVITY HAZARD ANALYSIS (AHA)

Equipment to be Used:	**Inspection Requirements**:	**Training Requirements**:
Support truck Orange cones Caution/danger tape Rope Warning signage Barricades Safety fencing High visibility spray paint Jersey barriers T-posts Zip ties Post pounder SWPPP materials Personal protective equipt (PPE)	Magnus Pacific initial inspection form will be utilized for all support vehicles. Inspections will be completed on tools before work has been initiated.	Employees will be trained and familiar with the following. Site orientation HASP review Activity Hazard Analysis applicable: SOP HS-004 Hazard Evaluation Analysis SOP HS-006 Hazard Communication Program SOP HS-007 Employee Safety Training Requirements SOP HS-008 Medical Surveillance Program SOP HS-009 Site Control Program SOP HS-010 Respiratory Protection Program SOP HS-011 PPE Program SOP HS-013 Hearing Conservation SOP HS-015 Heat Stress SOP HS-021Vehicle and Heavy Equipment Operations SOP HS-024 Driver Fleet Safety SOP HS-028 Biological Hazards SOP HS-032 Hand and Power Tools Safety Program SOP HS-034 Back Injury Prevention Program SOP HS-037 Accidents Incidents/Near Miss SOP HS-038 Weather Hazards SOP HS-045 Stop Work Authority Program

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Site Preparation | Zone Delineation

Print Name	*Signature*	Date	Print Name	*Signature*	Date

Prepared by: T. McAndrew, HSM *Date:_____*

Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment | Fuel Truck	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job No. 150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures	RAC
1. <u>Fuel truck on-site</u> *Operator, Spotter Responsible*	A. Property damage from backing into fences, tanks, buildings, equipment, and trucks.	A. Every effort will be made to not back a fuel truck on-site. Forward motion is the preferred method of travel. If backing should be required, a spotter will be assigned when the fuel truck is backing. A. Back-up alarms will be operable and part of the daily inspection.	L
	B. Equipment damage from uncertain haul patterns leading to collisions.	B. Qualified fuel truck operator will check with the site Superintendent regarding any changes of conditions in the work area, or haul patterns/traffic control plan, before entering the work site. B. Fuel Truck driver will obtain a site traffic pattern map (i.e. haul route change(s) before proceeding to fueling destination.	L
	C. Personal injury to ground personal when eye contact or communication is not obtained when entering a work zone(s).	C. Preferred method for moving vehicles and equipment is always forward, rather than backing. Establish direct eye contact and communicate clearly between all personnel and the fuel truck driver.	L

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Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment | Fuel Truck	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job No. 150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures	RAC
2. Traveling to equipment/equipment traveling to fuel. *Operator Responsible*	A. Traffic/Road hazards from speeding on wet roads, wildlife, ditches, and uneven terrain, oncoming traffic on haul roads.	A. Comply with all site speed limits established in the work area(s). A. Watch for traffic coming from opposite direction(s); verify traffic patterns before going into the field. Alert equipment operators via radio. A. Make sure entire route is on stable ground along designated driving areas.	L
	B. Personal injury while approaching equipment if Operator and ground personnel to don't make eye contact or have a radio for verbal communication of approach.	B. Approach equipment Operators from the front or side view, never from the rear. Radio communication and/or direct eye contact will be made before ground approach is attempted. ***Note: Determine best method to fuel equipment based on configuration of work zones so that the fuel truck does not enter restricted areas.***	L
	C. Exposures to site Contaminants of Concern (COCs)	C. The fuel truck (and driver) will be restricted to the Support Zone and staged at the edge of the Contamination Reduction Zone to avoid exposures. Equipment operators will track their equipment to the edge of the CRZ and refuel by passing the fuel hose over the perimeter barrier.	L
3. Fueling Equipment *Operator Responsible*	A. Personal injury to mechanics or personnel on the ground may occur from congested work areas or high traffic areas	A. Cones will be placed around the fuel truck when in the work zone. Buffer zones will be established to allow adequate room for personnel to walk. A. Equipment operators will reduce speed in or around the fueling areas.	L
	B. Equipment damage may occur if fuel truck is not	B. Fuel truck shall be parked on even ground, parking brake is set, and wheel chocks must be placed.	L

MAGNUS Pacific

Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment | Fuel Truck	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job No. 150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures	RAC
	chocked, or is parked on uneven ground able to roll.		
	C. Trash, debris, rocks, nails, supplies in path of travel while walking. Slip, trips, falls from poor house-keeping of lubricants on the ground, fuel truck, or fueling station.	C. Make sure pathway towards the equipment is clear of debris. All miscellaneous tools will be stored as required to keep up good housekeeping practices. C. Place all trash in covered receptacles or site dumpster.	L
	D. Hand injury from sharp edges, open wounds not covered and exposed to fuels and lubricants	D. Unwind the fuel hose using small movements, look for sharp edges that may cut or tangle the fuel hose. Wear the required hand protection when handling the hose and nozzle during fueling process. Chemical resistant gloves are the preferred hand protection of choice when handling petroleum products.	L
	E. Eye injury from back splash of fuel, debris, lubricants.	E. All personnel will wear ANSI Z-87 compliant eye protection with side shields during fueling. Personnel that wear prescription glasses will also comply with the ANSI standard and have inserted side shields or over-goggles/face shield.	L
	F. Overfill of tank may occur if fueling to fast or overfilling the tank. Fuel expands in warm weather conditions.	**F.** When fueling have an absorbent pad ready to capture drips or splash. All nozzles and hoses must be firmly secured during fueling. Maintain hand contact with nozzle at all times and proceed with caution. Do not over fill fuel tank, particularly in warm weather when fuel may expand. (Reference: **HS-026** Spill and Discharge Control Program).	L

Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment | Fuel Truck	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job No. 150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures	RAC
	G. Ingestion from hand to mouth contact when fueling and lubricating equipment or trucks. Not washing hands and face before contact with food, beverages, cigarettes, chewing tobacco products in the safe zone.	G. Do not eat or drink when fueling equipment. After fueling is completed personnel will wash their hands and face prior to hand-to-face contact and any other support functions.	L
	H. Spark, fire, combustion	H. Prior to fueling, personnel will utilize a grounding cable to prevent sparks. **Smoking is not permitted near any fueling station, or during fueling operations.**	M
	I. Adverse weather, lightning, high wind, earthquakes.	I. In the event of adverse weather conditions employees will seek shelter and wait until the weather has passed before continuing work including fueling operations. (Reference: **HS-037** Weather).	L

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Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment | Fuel Truck	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job No. 150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures	RAC
4. Magnus Emergency Response, Spill and Discharge Control for Fire, Spill, or Release *Entire Crew Responsible*	A. Smoking in un-designated areas	A. **Smoking is not permitted near any fueling station, or during fueling operations.**	L
	B. Fuel spills from leaking nozzles and attachments.	B. Spill kits will be present at all times; personnel will be trained in the appropriate methods in collection and containment of spilled materials. (Reference: **HS-026** Spill and Discharge Control Program). B. Refueling nozzles will not be equipped with locking mechanisms, the person refueling must maintain hand contact with the nozzle at all times. No stones, sticks, or fuel caps will be placed between the handle to continue fueling. B. All spills or releases shall be immediately reported to the Site Superintendent and Health and Safety Officer immediately. (Reference: **HS-036** Accidents/Incidents/Near Miss).	M
	C. Personal injury from chemical contact, fuels, burns, contact with eyes, and saturated clothing.	C. Maintain required PPE at all times, including chemical resistant gloves and protective eyewear. Upgrade to full face shields as necessary. C. If an employee is splashed with fuel during the task, fueling will stop and the operator will proceed to the decontamination shower/station and change clothing.	L
	D. Lack of communication/ information during fire or emergency,	D. Discuss emergency evacuation plan. Make sure entire crew understands where the rally points are located. (i.e. Job Trailer or Outside Main Entrance of the Site). D. DO NOT congest the radio with chatter as management proceeds to give instructions on evacuation routes and information on upwind rally points. D. The Superintendent or SSHO will be designated to contact the Fire	L

Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment | Fuel Truck	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job No. 150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures	RAC
		Department by calling 9-1-1 when a fire or emergency occurs.	
	E. Fire out of control.	E. Personnel will make an effort to extinguish a fire and prevent fire spread with the nearby fire extinguisher. Workers will maintain a safe distance to avoid thermal burns. E. If a fire is out of control and the worker is not able to extinguisher the fire, all personnel will retreat to a safe place of refuge and await Fire Department arrival. E. Evacuate site (as necessary) and maintain a safe distance to ensure personnel safety.	M
	F. Inadequate fire prevention systems in place.	F. Minimum 20lb ABC fire extinguisher will be present at all fuel storage/fueling sites. Appropriate signage shall also be present. F. All debris and vegetation will be cleared away from fueling areas.	L

Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Equipment to be Used: Heavy equipment, supplies, materials, tools, support vehicles, and personnel. Fuel truck Portable fuel cans Fuel materials (gas/diesel) Spill kit/spill control materials Fire extinguishers Radios/communications Personal protective equipt (PPE) First aid kit Eye wash station	**Inspection Requirements:** Magnus Pacific initial inspection form will be utilized for all support vehicles. Inspections will be completed on tools before work has been initiated.	**Training Requirements:** Employees will be trained and familiar with the following. Site orientation APP review Activity Hazard Analysis applicable: SOP HS-004 Hazard Evaluation Analysis SOP HS-006 Hazard Communication Program SOP HS-007 Employee Safety Training Requirements SOP HS-008 Medical Surveillance Program SOP HS-009 Site Control Program SOP HS-011 PPE Program SOP HS-012 Decontamination SOP HS-013 Hearing Conservation SOP HS-015 Heat Stress Monitoring SOP HS-020 Lockout and Tag out SOP HS-021 Vehicle and Heavy Equipment Operations SOP HS-023 Fall Protection Program SOP HS-024 Driver Fleet Safety SOP HS-025 Emergency Response and Contingency Plan SOP HS-026 Spill and Discharge Control Plan SOP HS-027 Fire Protection Program SOP HS-028 Biological Hazards SOP HS-036 Accidents Incidents/Near Miss SOP HS-036 Weather Hazards SOP-045 Stop Work Authority Program

Overall Risk Assessment Code (RAC)	M

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Fueling Equipment

Print Name	*Signature*	Date	Print Name	*Signature*	Date

Reviewed by: _____ *Date:*_____

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures
1 Inspect Equipment *Equipment Operator Responsible* **Low Risk**	A. Slips, trips and falls	A. Be aware of wet, muddy, or slippery ground conditions. A. Remove soils from steps and top of tracks before mounting. A. Keep 3 points of contact when mounting and dismounting. Place items on track instead of carrying up or down, or ask for assistance.
	B. Hand injury	B. Always wear cut-resistant gloves. Maintain awareness of hand positioning to avoid pinch points when opening or closing hatches and doors.
	C. Equipment damage	C. Conduct daily equipment inspection. If leaks or deficiencies are observed immediately notify supervisor and maintenance, do not start equipment until authorized by mechanic or supervisor. Back up alarms will be checked daily.
	D. Danger to ground personnel because of failed warning systems and poor visibility	D. Clean mirrors and windows. Adjust mirrors and seat for adequate visibility. Check lights and back up alarms.

No smoking policy: No smoking, eating or drinking is permitted within the work zones. No smoking is permitted while operating company vehicles or equipment. Smoking is permitted in designated area(s) only.

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ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
2 Operating Equipment *Excavator Operator Responsible* **Moderate Risk**	A. Equipment damage and personal injury from lack of training or skill	A. Only qualified operators will operate equipment. Operators will review equipment manual. Operators and laborers will have a knowledge of the same hand signals to communicate. A. Do not place a body part beneath a suspended load, hydraulic supported equipment. A. Coordinate/communicate with other operators involved in mixing activities.
	B. Equipment damage from collisions with other equipment, soft soils, and sinking	B. Work off closely spaced wooden mats to avoid sinking in soft spots.
	C. Distractions	C. Operator and ground personnel will be aware of equipment blind spots. Ground personnel to maintain a distance of full extension swing radius plus 15 feet. Since this is not easily obtained through visual inspection the Construction Manager has requested that no employees enter this area. C. Operator will not wear any device (e.g. MP3 player) that could distract them from radio or other communications.
	D. Equipment damage/operator injury during loading activities towards window	D. Operators will operate equipment in a manner which will eliminate damage to the front windshield and/or cause injury to the operator through engineering controls.
	E. Hearing damage	E. Operator will utilize hearing protection devices in equipment which exceed 85 dB (A) of noise.

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
3 <u>Operating Equipment under Power Lines</u> *Construction Manager/ Equipment Operator Responsible* **Moderate Risk**	A. Overhead electrical hazards	A. Maintain a minimum clearance of 15-20 feet from overhead utilities. Use spotter when operating within 50 feet of overhead electrical hazard. A. Where overhead power lines are present and energized lines cannot be verified or conducted, excavators must maintain clearance from overhead power lines in accordance with 29 CFR 1926.550(a)(15), or verify from owner of utilities there required recommendations. The more stringent standard will be followed. ~~A. An option of a locking mechanism which will be placed on the boom that will not allow the boom to exceed 30 ft. above ground, or a spotter will be utilized.~~ ~~A. It is preferred to use a competent employee in a man basket to spot for the excavator. It is also recommended that a strap, chain, or tape is used to stop the excavator boom from going any higher, once the appropriate height has been established.~~
	B. Crane Mats (if applicable)	B. When utilizing crane mats the height of the crane mat will be considered into the equation of the height of the boom. B. Personnel will stay clear of all machinery when mats are being placed. B. While using the crane mats, it is possible for the trench to collapse, keep everyone away from the trench and machine.
	C. Loose rock and soils	C. Spoil piles from excavation are at least two feet from the edge of the excavation

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures
4 <u>Operating Equipment around Underground Utilities</u> *Construction Manager/Equipment Operator Responsible* **Moderate Risk**	A. Underground Utilities (i.e. sewer lines, gas lines, water, electric, fiber optic, storm drains.	A. An underground Services Alert (USA) utility check shall be performed before excavation is permitted, at least two days before excavating. A. An Activity Notification Form will be sent to Cal-DOSH 24-hours before excavating. A. USA location points will be flagged according to the underground utilities. When excavating in these areas operators will utilize a laborer to conduct hand digging if within the area of the located utilities. A. Extreme caution and supervision will be maintained at the location where 12 kV lines run underground. Scratching the surface soils and shoveling by hand will be required in these areas until locations are clearly identified. Construction Manager will conduct a pre-safety meeting on his approach and expectations before digging in these areas of concern.
5 <u>Backing Equipment</u> *Operator Responsible* **Moderate Risk**	A. Injury to ground personnel and damage to other equipment (including property damage)	A. Before backing up, communicate your intentions to ground personnel and other operators in your work area. Always look in the direction of travel. A. Maintain clear view in mirrors. If obstructed in any way, stop, and re-evaluate before continuing your task.

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
6 Operating Equipment in Weather *Construction Manager/Equipment Operator Responsible* **Moderate Risk**	A. Poor Weather conditions, Lightning, Earthquake, and Heavy winds **Note: Stop Work actions may be necessary based on dust conditions. Action levels for respiratory protection will be based on dust levels.*	A. Supervisors and operators both will monitor for lightning conditions. Within a 15 second period that lightning strikes until the time you hear thunder occurs, high profile equipment (i.e. Long Reach, Dozers, and all other tracked equipment) will cease operations and employees will go to the trailer. A. After 30 minutes of time has passed and all weather (lightning) has cleared, **ONLY** then will the Supervisor instruct employees to go back to work. A. In the event that an earthquake should occur all work will cease. Operators will remain in their equipment until the Earthquake has ceased. The Supervisor will then re-evaluate the project and re-assess all excavation areas for inspection. A. In the event of high wind advisory the Supervisor or Safety Officer will evaluate the conditions and monitor the weather. If winds pose a high risk hazard then all work will cease at the discretion of the Site Supervisor.
7 Soils Operations *Construction Manager/Equipment Operator Responsible* **Moderate Risk**	A. Exposure to vehicular and heavy equipment traffic B. Exposure to potential toxic hazards.	A. Set up activity to minimize equipment interference with established foot and vehicle traffic. A. Ground personnel will wear PPE ensembles with high visibility safety vests. A. Signs, barricades, flashers, flagmen and other traffic control devices will be used as necessary. A. Make eye contact with vehicle operators **before** approaching/crossing within 25-feet. A. Do not turn back on equipment in traffic areas or high-noise areas. Stay alert for the sound of back-up alarms and immediately determine the equipment and likely path when an alarm sounds. B. Don required level of PPE (see side note pertaining to PPE selection) B. Designated work areas and control zones areas will be clearly demarcated. Only authorized personnel will be permitted in the Exclusion Zone (EZ) and CRZ areas

PPE Ensembles and Respiratory Protection : Modified Level-D or Level-C ensembles with full face APRs will be required when handling contaminated material on the Dublin PRB job site when action levels (ALs) are reached. The level of PPE required will be determined by the SHSO and adjusted as necessary based upon field analytical test results. (Reference the HASP for ALs).

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
		B. Establish site control as soon as possible with limited and designated points of access. B. Require site briefing for all visiting personnel not continuously under Magnus Pacific employee escort. B. Level D construction site PPE required for visitors and/or site vendors engaged in materials or equipment offloading, service or repair. Modified Level-D may be necessary for portable restroom vendors who need to perform limited services within the Contamination Reduction Zone (CRZ). B. Demarcate hazard areas to prevent access by non-essential ground personnel or traffic. B. Unfamiliar personnel/traffic will be requested to leave the site or report to Magnus Pacific administrative offices.
	C. Cold/Heat Stress	C. Site Construction Manager and HSM shall monitor weather forecasts and ambient temperatures, wind speeds and employee working conditions for thermal extremes. C. Personnel shall be trained to monitor for indications of heat and cold stress and empowered to take appropriate preventative and recovery measures.
8 <u>Excavations of Soils</u> *Construction Manager/Equipment Operator Responsible* **Moderate Risk**	A. Collapse of occupied excavation - Fall into excavation	A. Barricades and warning signs must be in place to protect pedestrians and vehicles. A. Pile excavation spoils a minimum of 2 feet (preferably 4-feet where conditions permit) back from the edge of the excavation. A. Surfaces surrounding open excavations must be free of hung boulders etc., which could fall into open excavations. A. No personnel will be allowed into an excavation when heavy equipment is working next to the edge. A. For excavations that are greater than 4 feet deep a ramp or ladder must be no more than 25 feet from any worker.

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
		A. Protective systems must be used whenever excavations are greater than 4 feet in depth or for any depth if unstable soils could be a hazard to workers (i.e., trench boxes, sloping). A. Employees exposed to the leading edge of an unprotected excavation wall, must maintain at a minimum a distance from the edge equal to the distance and depth to the bottom of the excavation. A. Prior to the commencement of excavation work, all employees involved with the activity will be advised of and trained on the hazards that may exist in their particular work area. A. Assure any bermed area is adequate for material stored taking into account weather conditions, including rain. Areas of standing water (from rain) will need to be removed as soon as possible. A. Never discharge liquid without prior permission.
I. <u>Soils Operation Using Loaders and Trucks</u> *Truck Driver Responsible* **Moderate Risk**	A. Struck by or against Motor Vehicles/ or Operating Heavy Equipment (Yellow Iron) B. Struck by falling materials	A. Personnel on the ground in the vicinity will be kept to a minimum number, and only for interim that is necessary to complete a task. A. Avoid/Isolate activities in high traffic areas. A. Understand and review hand signals. A. Do not place a body part beneath a suspended load, hydraulic supported equipment. A. Do not repair equipment when it is in operation. A. Equipment will not be left unattended with hydraulic attachments elevated. B. Haul equipment must have cab protection **– Truck drivers are to remain inside the cab within EZ/CRZ areas.** B. **GROUND PERSONNEL ARE NOT ALLOWED** alongside equipment being loaded. B. Pickups or other light equipment without cab canopy protection shall not be allowed

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
		alongside loading or unloading equipment.
J. Excavation, Backfill, Compaction, and Grading Activities *Equipment Operator Responsible* **Moderate Risk**	A. Excavation, Backfill, Compaction and Grading Activities	A. Only trained and qualified personnel will operate heavy equipment. A. Ground personnel and operators will be familiar with appropriate hand signals in the work area. A. All heavy equipment will be equipped with roll over protection and back up alarms. A. Personnel are not permitted inside of the boom radius of heavy equipment. A. Modifications to driver restraint system, roll-over-protection, and any other safety feature prohibited. A. Seat belts will be worn at all times a vehicle is in motion. A. Backing up a vehicle with obstructed view, around ground personnel, near above-ground utilities, drop-offs, low light conditions or other hazard will require use of a spotter. A. Power poles, guy wires, vulnerable subsurface utilities, any utility stick-up or hydrant, and low overhead obstructions shall be identified, marked and protected against contact with heavy equipment traffic.
	B. Fire hazards	B. All Equipment will be fitted with either a five or ten pound fire extinguisher. Fire extinguishers will be located so that the operator can easily access them. B. Fires should be reported immediately to Safety Superintendent and Field Supervisor. B. Magnus Pacific employees are not Fire Fighters, once you have used the entire contents of the fire extinguisher evacuate the area. B. Maintenance of the fire extinguishers will be documented as required (Monthly).

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: Tim McAndrew	Reviewed By: H&S Department

Principle Steps	Potential Hazards	Control Measures
	C. Equipment Failures/Leaks	C. Equipment will be kept in new or like new condition, hoses and fittings will be inspected daily for signs of wear and breakage. Items that have been identified as damaged will be replaced immediately. C. No amount of leakage on a piece of equipment is considered to be acceptable. C. Ensure adequate containment, spills must be reported and cleaned up immediately. C. Spill control devices (Spill Kits) will need to be close to each work location.
	D. Poor Housekeeping	D. Housekeeping will be covered in Safety Briefings routinely and good housekeeping procedures will be followed.
	E. Operator slips, trips and falls	E. Personnel travel routes will be designated so as to avoid muddy ground. E. Three points of contact climbing onto or off of equipment. E. No jumping off of equipment. E. Appropriate illumination will be maintained, minimum 5-foot-candles in a working or travel area. -- **(Not anticipated on the this job site)** E. Face ladders when ascending/descending .Tag out equipment with damaged ladders.
	F. Noise	F. Hearing protection will be worn as necessary by all individuals working within the vicinity of functional heavy equipment. F. Load charts of all equipment will be maintained and consulted as necessary.
	G. Overloading capacity	G. Vibratory Drums/ Rollers shall not be used near the edge of excavations where personnel are working.
	H. Compaction Equipment Hazards	H. Compaction equipment shall be operated in a vertical direction up and down slopes or embankments. Operators will not operate machinery horizontally across slopes.

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation and Placement of Soils	***Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett***	**Date: 09/25/2015**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared by: Tim McAndrew**	**Reviewed By: H&S Department**

Principle Steps	Potential Hazards	Control Measures
K. Truck Operations, Fill Work, Unloading Material, Gate Opening *Construction Manager/Truck Driver Responsible* **Moderate Risk**	A. Vehicle accident	A. Avoid operation near sidewalls of open excavation unless on cribbing or excavation inspection by competent person has assessed site conditions. A. Set barricades, stop-blocks or spotter for equipment backing towards open excavation. A. If traveling on a steep slope is a possibility, training will address safe methods for moving, carrying load and turning.
	B. Pinch points	B. No employee(s) will place body parts near or around equipment which would potentially cause a pinch point situation.
	C. Falling materials	C. All employees will stay clear of loading areas and haul routes where truck beds may slough off materials from the sides and rear.
	D. Equipment tip over	D. Maintain an adequate amount of space between trucks at the tipping location (this should be at a minimum, the bed length of the truck and ten feet) so that in the event a truck tips on its side, it does not hit an adjacent truck, or piece of equipment
	E. Truck loading hazards	E. **Truck drivers are to remain inside the cab within EZ/CRZ areas to avoid contamination.** E. Prior to unloading your truck, ensure that your truck is parked on stable ground in the orientation of the grade and that there are no personnel who are located directly adjacent to your truck. E. Allow material to clear your tailgate prior to exiting the waste tipping area. E. Ensure that the truck bed is down and securely locked into position prior to placing the truck in motion.

ACTIVITY HAZARD ANALYSIS (AHA)

Equipment to be Used: Excavators Dozers Loaders Haul Trucks Orange cones Safety fencing Caution/danger tape Rope Warning signs K-Rails (Jersey Barriers)Barricades High visibility spray paint T-posts Zip ties Post pounder Shovels Personal protective equipt (PPE), including Level-D and Level-C ensembles with full face Air Purifying Respirators (APRs) will be available. Multi-gas monitor/PID and FID	**Inspection Requirements:** Magnus Pacific initial inspection form will be utilized for all support vehicles. Inspections will be completed on tools before work has been initiated.	**Training Requirements:** Employees will be trained and familiar with the following. Site orientation HASP review Activity Hazard Analysis applicable: SOP HS-001 Safety Policy SOP HS-003 General Information and Responsibility SOP HS-004 Hazard Evaluation Analysis SOP HS-006 Hazard Communication Program SOP HS-007 Employee Safety Training Requirements SOP HS-008 Medical Surveillance Program SOP HS-009 Site Control Program SOP HS-011 PPE Program SOP HS-013 Hearing Conservation SOP HS-015 Heat Stress SOP HS-018 Excavation and Trenching Safety SOP HS-020 Lockout and Tag out SOP HS-021Vehicle and Heavy Equipment Operations SOP HS-024 Driver Fleet Safety SOP HS-025 Emergency Response and Contingency Program SOP HS- 026Spill and Discharge Control Program SOP HS-027 Fire Protection Program SOP HS-028 Biological Hazards SOP HS-032 Hand and Power Tools Safety Program SOP HS-034 Back Injury Prevention Program SOP HS-036 Accidents Incidents/Near Miss SOP HS-037 Weather Hazards SOP HS-045 Stop Work Authority Program

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Excavation of Soils/Loading Trucks

Print Name	*Signature*	Date	Print Name	*Signature*	Date

Prepared by: Tim McAndrew *Date:*_____

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Batch Plant Mixing Operations	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: T. McAndrew, HSM	Reviewed By: Corporate H&S Department

Principle Steps	Potential Hazards	Control Measures
1. Open water source (hydrant) to start water flow. *(Laborer)* **Low Risk**	a. Slips, trips, falls b. Struck-by traffic	a. Watch footing while walking on terrain and/or streets b. Look all directions for vehicle and equipment traffic
2. Start generator for mixing tank. *(Plant operator)* **Low Risk**	a. Noise hazard b. Electrocution	a. Use hearing protection/earplugs, as needed b. Ensure equipment is properly grounded
3. Start agitators on mixing tank *(Plant operator)* **Low Risk**	a. Noise hazard	a. Use hearing protection/earplugs, as needed
4. Add material super sack into screw conveyor • Lift material super sack with forklift • Cut open sack bottom	a. Struck-by hazard w/forklift b. Dropped super sack due to severed sack straps c. Hand/arm injuries while cutting sack open d. Dust inhalation hazard	a. Maintain safe distance from moving equipment, typically 6-feet or greater. b. Apply softeners to forklift tines to avoid severing super sack straps c. Use extension cutting tool to avoid placing arms/hands beneath super sack d. Don N-95 particulate respirator mask, as needed based on wind conditions.

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ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Batch Plant Mixing Operations	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	**Prepared by: T. McAndrew, HSM**	**Reviewed By: Corporate H&S Department**

Principle Steps	Potential Hazards	Control Measures
5. Begin mixing operations • Start water flow with remote switch • Start material flow with remote switch • Open valve to send water thru jet shear • Check viscosity by pulling a sample and pouring thru marsh cone. *(Laborer/Equipt Operator)* **Low Risk**	a. Struck-by failure/breach of pressurized hose lines b. Dust inhalation hazard c. Skin contact and splash hazard	a. Ensure whip-checks are in place on pressurized hose lines a. Maintain safe distance from pressurized hose lines, typically 6-feet or greater as space permits. b. Don N-95 particulate respirator mask, as needed based on wind conditions. c. Use PPE at all times, including gloves, eyewear, face shields d. Rinse skin with copious water to neutralize chemical irritation—flush eyes with copious water if eyes are exposed.
6. Start mixture flow • Start flow with by opening valve. *(Plant operator)* **Low Risk**	a. Struck-by hazards from failed pressurized hose lines b. Noise hazard c. Dust inhalation hazard d. Skin contact/splash hazard with reagents e. Back injury/strain while	a. Ensure whip-checks are in place on pressurized hose lines a. Maintain safe distance from pressurized hose lines, typically 6-feet or greater as space permits. b. Use hearing protection/earplugs, as needed c. Don N-95 particulate respirator mask, as needed based on wind conditions. d. Use PPE at all times, including gloves, eyewear, face shields e. Rinse skin with copious water to neutralize chemical irritation—flush eyes with copious water if eyes are exposed.

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ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Batch Plant Mixing Operations	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	Prepared by: T. McAndrew, HSM	Reviewed By: Corporate H&S Department

Principle Steps	Potential Hazards	Control Measures
	lifting material bags f. Hand injuries while opening material bags	f. Use properly lifting technique/body mechanics while lifting g. Don cut resistant gloves while using cutting tools
8. Open valve to transfer finished batch of product *(Plant operator)* **Low Risk**	a. Struck-by hazard from failed pressurized hose lines	a. Ensure whip-checks are in place on pressurized hose lines a. Maintain safe distance from pressurized hose lines, typically 6-feet or greater as space permits.
9. On command from the Drill Rig Operator: • Shut-off recirculation valves, • Then open valve to transfer mixture to the drill rig *(Plant operator)* **Low Risk**	a. Struck-by hazard from failed pressurized hose lines	a. Ensure whip-checks are in place on pressurized hose lines a. Maintain safe distance from pressurized hose lines, typically 6-feet or greater as space permits.
Additional Maintenance Steps:		
10. End of shift line purging. • Flush lines with slurry • Insert foam cleaning ball into 4" port on transfer line (located	a. Noise hazard b. Stuck-by failed pressurized hose lines	a. Use hearing protection/earplugs, as needed b. Ensure whip-checks are in place on pressurized hose lines b. Maintain safe distance from pressurized hose lines, typically 6-feet or greater as space permits.

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Batch Plant Mixing Operations	*Competent Person(s): Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett*	Date: 09/25/2015
Project Location: Dublin Apartments PRB | Job #150019	**Prepared by: T. McAndrew, HSM**	**Reviewed By: Corporate H&S Department**

Principle Steps	Potential Hazards	Control Measures
@ top of batch plant) • Connect air compressor lines (Chicago fittings) to port on transfer pump (located @ bottom of batch plant) • Blow ball thru transfer line to the trench *(Plant operator)* **Low Risk**		
11. <u>Shut-down operations</u> • Shut-off all pumps • Shut-off power to all generators • Secure all valves in closed positions • Shut-off water source (hydrant) *(Laborer/Plant operator)* **Low Risk**	a. Struck-by failed pressurized hose lines b. Struck-by traffic while shutting off hydrant	a. Ensure whip-checks are in place on pressurized hose lines a. Maintain safe distance from pressurized hose lines, <u>typically 6-feet or greater as space permits</u>. b. Watch footing while walking on terrain and/or streets b. Look all directions for vehicle and equipment traffic

ACTIVITY HAZARD ANALYSIS (AHA)

12. <u>End of shift housekeeping:</u> • Clean-up/cover any slurry spills around work area • Clean-up any trash, water bottles, etc. *(Laborer/Plant operator)* **Low Risk**	a. Slips, trips, falls b. Ground debris hazards	a. Watch footing while walking on terrain and/or streets b. Beware of debris and slippery surfaces due to slurry mixture on ground and surfaces

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ACTIVITY HAZARD ANALYSIS (AHA)

Equipment to be Used: • Batch plant components • All-terrain forklift • Material supersacks • Reactive agents • Vinegar on stand-by • Hand tools • Cutting tools • Fall protection • Personal protective equipment (PPE) including hearing and respiratory protection, as needed	**Inspection Requirements:** Magnus Pacific initial inspection form will be utilized for all support vehicles. Inspections will be completed on tools before work has been initiated.	**Training Requirements:** Employees will be trained and familiar with the following. Site-specific orientation Site-specific HASP review **Activity Hazard Analysis applicable:** SOP HS-001 Safety Policy SOP HS-003 General Information and Responsibility SOP HS-004 Hazard Evaluation Analysis SOP HS-006 Hazard Communication Program SOP HS-007 Employee Safety Training Requirements SOP HS-008 Medical Surveillance Program SOP HS-009 Site Control Program SOP HS-010 Respiratory Protection Program SOP HS-011 PPE Program SOP HS-013 Hearing Conservation SOP HS-015 Heat Stress SOP HS-020 Lockout and Tag out SOP HS-021 Vehicle & Heavy Equipment Operations SOP HS-022, Hoisting and Crane Operation SOP HS-025 Emergency Response and Contingency Program SOP HS-027 Fire Protection Program SOP HS-028 Biological Hazards SOP HS-032 Hand and Power Tools Safety Program SOP HS-034 Back Injury Prevention Program SOP HS-036 Accidents Incidents/Near Miss SOP HS-037 Weather Hazards SOP HS-045 Stop Work Authority

ACTIVITY HAZARD ANALYSIS (AHA)

Batch Plant Mixing Operations

Print Name	*Signature*	Date	Print Name	*Signature*	Date

Prepared by: _____*Date:*_____

Approved by: _____*Date:*_____

Overall Risk Assessment Code (RAC)	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity:	***Competent Person(s):***	**Date:**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared By:**	**Reviewed By: Site Safety Health Officer**

Principle Steps	Potential Hazards	Control Measures	RAC
		No smoking policy: No smoking is permitted within the work zones. No smoking is permitted while operating vehicles or equipment. Smoking is permitted in designated area(s) only.	

Overall Risk Assessment Code (RAC)	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity:	***Competent Person(s):***	**Date:**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared By:**	**Reviewed By: Site Safety Health Officer**

Principle Steps	Potential Hazards	Control Measures	RAC

Overall Risk Assessment Code (RAC)	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity:	***Competent Person(s):***	**Date:**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared By:**	**Reviewed By: Site Safety Health Officer**

Principle Steps	Potential Hazards	Control Measures	RAC

Overall Risk Assessment Code (RAC)	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity:	***Competent Person(s):***	**Date:**
Project Location: Dublin Apartments PRB | Job #150019	**Prepared By:**	**Reviewed By: Site Safety Health Officer**

Principle Steps	Potential Hazards	Control Measures	RAC

Overall Risk Assessment Code (RAC)	

ACTIVITY HAZARD ANALYSIS (AHA)

Equipment to be Used:	**Inspection Requirements:**	**Training Requirements:**
Personal protective equipt (PPE) Communication equipment	An initial inspection form will be utilized for all support vehicles. Inspections will be completed on tools and equipment before work has been initiated.	Employees will be trained and familiar with the following. Site orientation APP review Activity Hazard Analysis (AHAs) applicable:

Overall Risk Assessment Code (RAC)	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: _____

Print Name	*Signature*	Date	Print Name	*Signature*	Date

Reviewed by: _____ *Date:_____*

Appendix – D

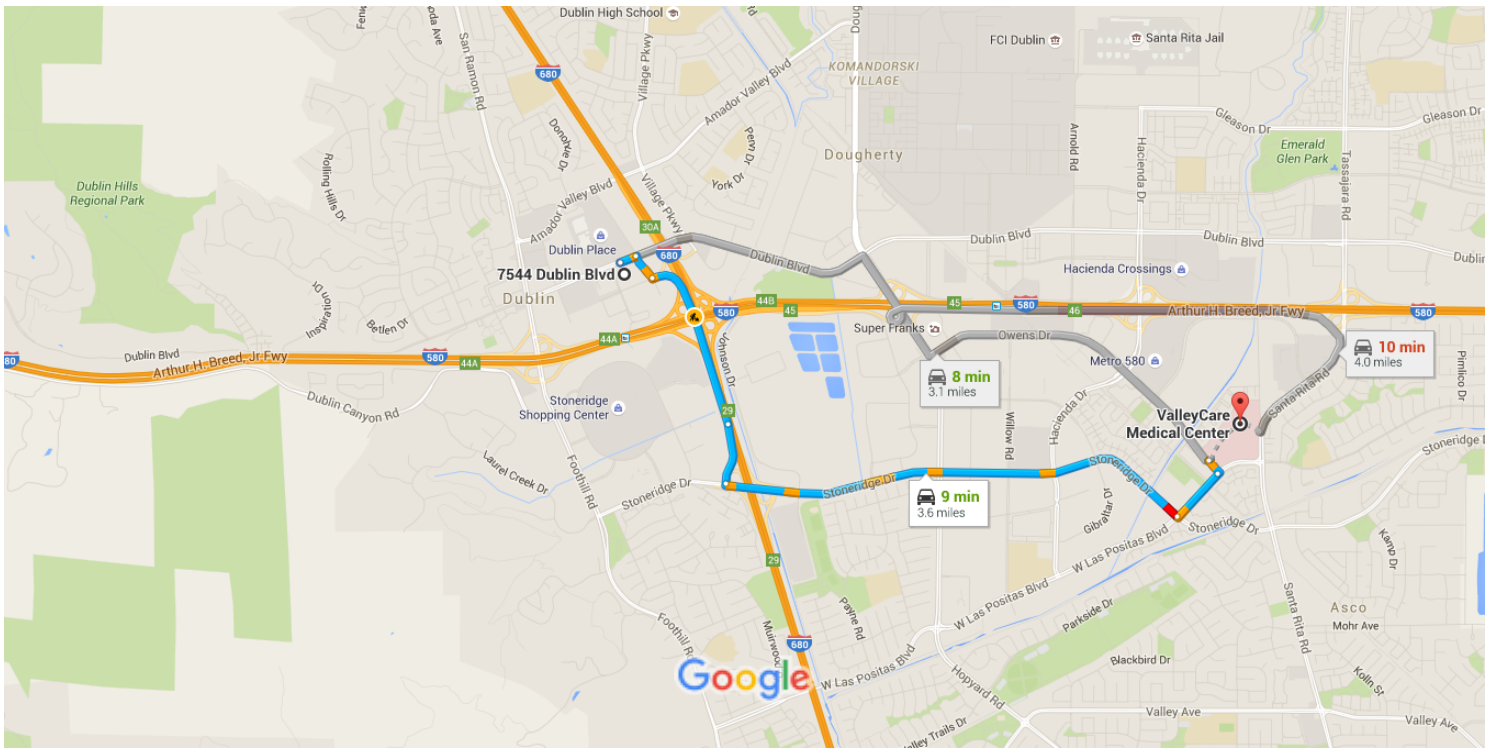
General Site Forms and Maps

HOSPITAL MAP

Google Maps

7544 Dublin Blvd, Dublin, CA 94568 to ValleyCare Medical Center

Drive 3.6 miles, 9 min



Map data ©2015 Google 2000 ft

7544 Dublin Blvd

Dublin, CA 94568

Take I-680 S and Stoneridge Dr to your destination in Pleasanton

9 min (3.6 mi)

1. Head east on Dublin Blvd toward Amador Plaza Rd

390 ft

2. Turn right at the 1st cross street onto Amador Plaza Rd

0.1 mi

3. Use any lane to turn left to merge onto I-680 S

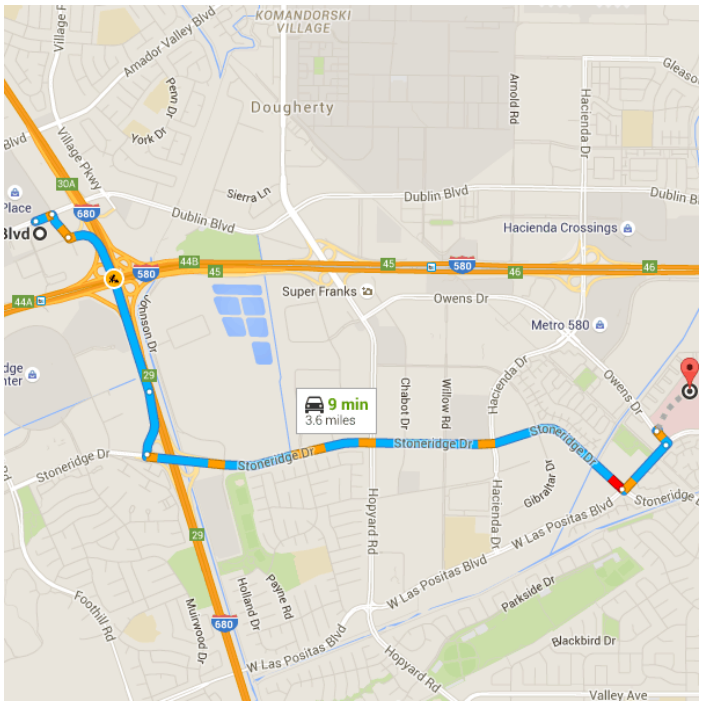
0.8 mi

4. Use the 2nd from the right lane to take exit 29 for Stoneridge Dr

0.3 mi

5. Use the left 2 lanes to turn left onto Stoneridge Dr

2.1 mi



6. Use the left 2 lanes to turn left onto W Las Positas Blvd

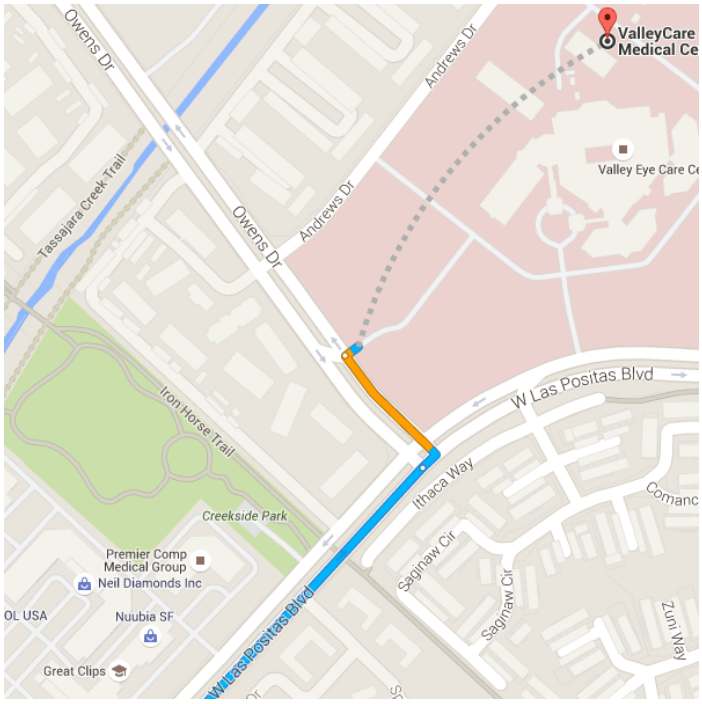
0.3 mi

7. Turn left onto Owens Dr

410 ft

Turn right at the 1st cross street

5 s (43 ft)



ValleyCare Medical Center

5555 West Las Positas Boulevard, Pleasanton, CA 94588

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

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Health and Safety Mobilization Checklist

Materials, Supplies and Postings

- ❒ Site Specific Health & Safety Plan (including relevant Activity Hazard Analyses)
- ❒ OSHA reference books/manuals
- ❒ Company Health & Safety Program manual
- ❒ Company employee handbook (by State)
- ❒ Federal OSHA and labor law postings
- ❒ State OSHA and labor law postings
- ❒ OSHA Form 300A (required Feb 1 thru April 30)
- ❒ Emergency contact telephone list posting
- ❒ Site emergency information cards for employees
- ❒ Hospital map
- ❒ Work Care clinic map
- ❒ Employee files (as required by job type)
- ❒ Operator performance qualifications
- ❒ Site visitor log
- ❒ First-aid log
- ❒ Dry erase board(s) and supplies
- ❒ Office supplies (misc)
- ❒ (Material) Safety Data Sheets
- ❒ Fire extinguisher(s)
- ❒ Spill kit(s) and extra absorbent pads
- ❒ Lock Out/Tag Out supplies (LOTO)
- ❒ Eye wash station(s)
- ❒ First aid kit(s)
- ❒ Aspirin/Tylenol (self-administration)
- ❒ Benadryl (self-administration)
- ❒ Epi-Pen (self-administration)
- ❒ Water and electrolyte replacement packets
- ❒ Insect repellant
- ❒ Sunblock
- ❒ Wasp/hornet spray
- ❒ Warning signage (routine & site specific)
- ❒ Caution/Danger tape
- ❒ Delineator barricades/cones/tubes

Mobilization Duties

- ❒ Review Site Specific HASP/AHAs (see list) and obtain employee signatures
- ❒ Select and announce radio communication channel(s)
- ❒ Select and announce emergency evacuation route(s) and assembly point(s)
- ❒ Obtain employee Emergency Contact Information
- ❒ Delineate site access/egress points
- ❒ Verify traffic plan, speed limit(s) and equipment "right-of-way" policies – Railroad crossing hazards?
- ❒ Verify employee qualifications and assemble site employee files in a lockable box or file cabinet
- ❒ Post copy of Excavation Activity Notification and Annual Excavation Permit (as required by State)

Spare PPE Cache:

- ❒ Hard hats
- ❒ Vests, high-visibility (Class-II or III, as required)
- ❒ Gloves, leather cut resistant
- ❒ Gloves, PVC coated
- ❒ Gloves, nitrile
- ❒ Ear plugs (and muffs as required)
- ❒ Eyewear (amber, clear, tinted)
- ❒ Eyewear cleaner towelettes
- ❒ Face shields and mounting frames
- ❒ Hard-toe boot covers
- ❒ Headlamps (as required)
- ❒ Hand lights/flashlights (as required)
- ❒ Fall protection harnesses/lanyards (as required)
- ❒ Leather apron/chaps/jacket (as required)
- ❒ Respiratory protection (as required)

Miscellaneous Forms (as required)

- ❒ Daily *Tailgate Safety Meeting* forms
- ❒ Crew Activity Plan (CAP) and/or TRACK forms
- ❒ Activity/Job Hazard Analysis (blank forms)
- ❒ Air monitoring and calibration forms
- ❒ Confined space entry forms
- ❒ Crane/critical lift forms
- ❒ Excavation inspection forms
- ❒ Exclusion zone entry forms
- ❒ Hot work permits

Project Management Staff Verification Initials:

- ❒ PM/CM/Superintendent _____
- ❒ Health & Safety Dept. _____

Project Health and Safety Plan
Orientation Training Checklist

Project:_____ **Date:** _____

Project Introduction

- ☐ Project Description/Tour
- ☐ MPC Safety Culture
- ☐ Project Leadership Personnel Responsibilities & Contacts

Project Logistics

- ☐ Working Days/ Hours
- ☐ Water and Shade
- ☐ Security Issues
- ☐ Access the Work Areas
- ☐ Car Parking Area
- ☐ Job Trailer & Storage Areas
- ☐ Toilet/Sanitation Facilities
- ☐ Traffic Flow
- ☐ Designated Smoking Area(s)
- ☐ Access to Safety Information
- ☐ First Aid Station and Supplies
- ☐ Project Speed Limits

Administrative

- ☐ Time Cards
- ☐ Mentoring Program
- ☐ Sign in/out and Visitor Log
- ☐ Safety Recognition Program
- ☐ HR Personnel and Information
- ☐ Use of Company Vehicles

Safety Expectations

- ☐ Immediate Reporting (ALL)
- ☐ Substance Abuse Program
- ☐ Stretch and Flex
- ☐ Housekeeping
- ☐ Stop Work Authority
- ☐ Prohibited Articles/Behaviors
- ☐ Smoking, Eating and Drinking
- ☐ Cell Phone Use
- ☐ PPE Requirements
- ☐ Tailgate and Toolbox Training
- ☐ Personal Vehicle Use on Project
- ☐ Always Ask Questions

Emergency Actions Plans

- ☐ Emergency #s/Posting
- ☐ Medical Treatment Facility
- ☐ Threating Behaviors
- ☐ Notification System
- ☐ Spills and Spill Kits
- ☐ Lightening and Weather
- ☐ Assembly Area(s)
- ☐ Fire and Fire Extinguishers
- ☐ Other

Mobile Equipment

- ☐ Qualification Program
- ☐ Haul Routes
- ☐ Visibility and Communication
- ☐ Right of Way
- ☐ Inspection
- ☐ Seat Belts

Site-Specific Hazards and Hazard Assessment

- ☐ Trips, Slips and Falls
- ☐ Excavations
- ☐ Welding and Cutting
- ☐ Hoisting and Rigging
- ☐ Material Handling/Lifting
- ☐ Railways and Water
- ☐ Utilities (Above / Below)
- ☐ Contaminants of Concern
- ☐ Compressed Gas Cylinders
- ☐ Chemicals on Site (HAZCOM)
- ☐ Ladders
- ☐ Signs, Barricades, and Tape
- ☐ Biological -Insects/Animals
- ☐ Exclusion Zones
- ☐ Flammable Materials
- ☐ Noise Areas (Hearing Protection)
- ☐ Hand Tools/Hand Safety
- ☐ JHAs/AHAs/Others

Environmental Concerns

- ☐ Habitat /Protected Species
- ☐ Waste (Haz and Non-Haz)
- ☐ Contamination Control
- ☐ Wildlife/Endangered Species
- ☐ Refueling
- ☐ Dust
- ☐ Archeological Sites/Artifacts
- ☐ SWPPs Program
- ☐ Noise

Permit Required Activities

- ☐ Hot Work
- ☐ Crane Work
- ☐ Lockout/Tagout
- ☐ Electrical Work
- ☐ Confined Spaces
- ☐ Client-specific Permits

Client-Specific Requirements

_____

_____

Safety Trainer (***Name/Initials***)**:**_____

Participant Name_____ **Signature**_____ **Date**_____

DAILY TAILGATE SAFETY MEETING RECORD
Document Control Number:

DATE_____

1. **Job(s) Location(s):** Dublin CA	**Project:** Dublin Apartments PRB	**Job No:** 150019
2. **Name of project oversight:** ZCON Builders	**Company(s):** Magnus Pacific, LLC	
3. **Multi-Crew Activity** ☐Yes ☐No If yes, describe;		
Has the work plan been communicated to all work crew? ☐Yes ☐No		
4. **Name of Supervisor and Competent Safety Person(s):** Val Martinez, Tim McAndrew, Scott Maxey, Mike Blewett		
5. **Does the work activity require a Management of Change?** ☐Yes ☐No		
If yes, has it been authorized by Magnus Pacific Management for start-up? ☐Yes ☐No (If No, Stop Work and consult Magnus Pacific Management		
6. **Does a valid risk-assessed SOP/AHA for this job exist?** ☐Yes ☐No (Which one(s))		
If yes, have person(s) performing work been trained in that procedure? ☐Yes ☐No (If No, conduct AHA.)		
7. **List any safety discussion topics covered:**		
8. **List all jobs to be performed today (Scope of work for day):**		
9. **Identify if there are any permitted activities and document the permit number:**		
10. **Does each job and task have a valid, associated risk assessment assigned to each listed job above?** ☐Yes ☐No		
If yes, what are the Risk Factors for each task?		
11. **Have newly identified risks been documented in the Magnus Pacific AHA?** ☐Yes ☐No ☐N/A		
12. **Has a member of the workforce conducting each task participated in the Magnus Risk Assessment for that task?** ☐Yes ☐No		
13. **Have all members of the workforce confirmed understanding of the work scope, hazards, risk controls and mitigation?** ☐Yes ☐No		
14. **Was a competent person involved in this or any other risk assessment pertaining to these tasks?** ☐Yes ☐No		
15. **Has everyone reviewed the current Magnus Pacific Emergency Response Plan?** ☐Yes ☐No		
16. **Have equipment checks been completed, documented and reviewed?** ☐Yes ☐No ☐N/A		
(Do not proceed unless the answer to all of the above questions is Yes or N/A)		
17. **Will any conditions change the emergency rally points for today?** ☐Yes ☐No (If Yes, describe)		
18. **Who is the "Safety Observer"**		
What were their comments?		
19. **Post Daily Review:**		
20. **Were there any Incidents/Near Miss/First Aid Reports for the day?** ☐Yes ☐No (If Yes, name them)		
21. **Were there any 'Stop Work' interventions?** ☐Yes ☐No (If Yes, describe them)		
22. **Area for improvement Practice/Activity(s) Observed**: ☐Yes ☐No (If Yes, name them)		

MAGNUS Pacific

DAILY TAILGATE SAFETY MEETING RECORD

Document Control Number:

DATE_____

Signature Page

I know the hazards:

By signing here, you are stating the following:

A. You have been involved in the Magnus Pacific Activity Analysis and understand the hazards and risk control actions associated with each task you are about to perform.
B. You understand the permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
C. You are aware that no tasks or work (that is not risk-assessed) is to be performed.
D. You also are aware of your obligation to "**Stop Work Authority".**

I arrived and departed fit for duty:

A. You are physically and mentally fit for duty.
B. You are not under the influence of any type of medication, drugs or alcohol that could affect your ability to work safely.
C. You are aware of your responsibility to bring any illness, injury (regardless of where or when it occurred) or fatigue issue to your supervisor or site competent safety person
D. You signed out uninjured unless you have otherwise informed the project management or designated safety person onsite.

Individual Name/Company	Initials & Sign in Time	Initials & Sign out Time
	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____
_____	In & Fit _____	Out & Fit _____

At the conclusion of the day, I certify that the job site is being left in a safe condition and there were no reports of injury or first aid.

☐Yes ☐No

Signature of Magnus Pacific Competent Safety Person:

_____

(If above answer is No, inform the Magnus Pacific Project Management as soon as possible.)

I will STOP the job any time anyone is concerned or uncertain about safety.

I will STOP the job if anyone identifies a hazard or additional mitigation not recorded on the AHA.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original AHA.

If it is necessary to **STOP THE JOB**, I will reassess the task, hazards and mitigations; and then amend the AHA as needed.

Names of site visitors not involved in the work activities:

_____
In / Out

_____
In / Out

_____
In / Out

_____
In / Out

_____
In / Out

EQUIPMENT INSPECTION FORM

EQUIPMENT INFORMATION	SHIPPING INFORMATION
Unit Number:	Project Name:
Make / Model:	Date Inspected:
Hour Meter Reading:	***Inspected By:***
Certified By:	
Note recent repairs and problems in *Comments*	
ATTACH PHOTOS OF THE EQUIPMENT	

EQUIPMENT INSPECTION			
ENGINE/ELECTRICAL	***Good***	***Bad***	***Comments***
Oil Pressure			
Water Temperature			
Air Cleaner			
Exhaust System			
Oil Leaks			
Hour Meter			
Belts			
Cooling System			
Fuel System			
Wiring/Work Lights			
Alternator			
Starting System			
Batteries			
CAB/CANOPY			
Windows/Doors/Glass			
Hand Rails/Steps			
BLADE/DOZER			
Cutting Edges			
Push Arms			
Cracked/Patched			
Hoses/Guards			
Ripper/Winch			
BUCKET/BOOM			
Cutting Edges/Teeth			
Thumb			
Cracked/Patched			
Pins and Bushings			
WHEELS/TIRES/BRAKES			
Cracks/Splits/Wear			
UNDERCARRIAGE			
Tracks/Rollers/Guards			
Damage			
HYDRAULICS/HYDROSTATICS			
Leaks/Seepage			
MISCELLANEOUS			
Fire Extinguisher			
Operation and Maint. Manual			
Other Manuals			
Components/Extra Filters/Etc.			
Seats and seat belts			
Heater/Defroster/AC			
Articulation Lock Bars			
Bed Safety Stands			
Backup Alarm/Horn			
ADDITIONAL COMMENTS			

Close Proximity Permit

(Overhead/Underground Energy)

Permit requested By:			
Date of Work:		Time of Work:	
Work Location:			
Description of Work:			
Communication Method:			

This permit is Valid for 1 day

Requirements (Overhead/Underground Power)

Check Applicable Conditions below:

- ☐ Work inside a fenced substation
- ☐ Work inside an area where electrical buses are exposed
- ☐ Working or traversing within 20 feet of power lines must utilize one of the three options below:
  - ☐ Option 1 de-energize and ground
  - ☐ Option 2 utilize spotter, visual aid, or proximity alarm
  - ☐ Option 3 utilize ***MINIMUM APPROACH DISTANCE (MAD)*** seen below

Working Within	Traversing Within
☐ 10 feet (If Voltage is up to 50 KV)	☐ 4 Feet (If over voltage is up to 0.75 KV)
☐ 15 feet (if Voltage is over 50 up to 200 KV)	☐ 6 Feet (If voltage is over .75 up to 50 KV)
☐ 20 feet (if Voltage is over 200 up to 350 KV)	☐ 10 Feet (If voltage is over 50 up to 345 KV)
☐ 25 feet (if Voltage is over 350 up to 500 KV)	☐ 16 Feet (If voltage is over 345 up to 750 KV)
☐ 35 feet (if Voltage is over 500 up to 750 KV)	☐ 20 Feet (If voltage is over 750 up to 1000 KV)
☐ 45 feet (if Voltage is over 750 up to 1000 KV)	

☐ Over 1000 KV (To be established by utility owner/operator or registered Professional Engineer who is a qualified person with respect to electrical power transmission

If Voltage is unknown MPC will not work with in close proximity of the energy source

Risk & Safety Review

	Yes	No	NA
Has an Activity Hazard Analysis (AHA) been completed :	☐	☐	☐
Has operator read the close proximity permit and understand task :	☐	☐	☐
Has spotter read the close proximity permit and understand task:	☐	☐	☐

Required Signature

Operator:	..... *Print*	..... *Signature*	..... *Date*
Spotter:	..... *Print*	..... *Signature*	..... *Date*
Authorized By:	..... *Print*	..... *Signature*	..... *Date*

DAILY EXCAVATION / TRENCH INSPECTION FORM

PROJECT INFORMATION		Date: Click to enter date.
Competent Person:	*Weather Conditions:*	
Project Name:	*Rainfall for Previous 24 Hours:*	
Excavation Location:		

ACCESS/EGRESS			
Is access and egress located within 25 feet (7.6 meters) of entrants?	☐ *Yes*	☐ *No*	☐ *N/A*
If ladders are used, do they extend 3 feet (0.9 m) beyond the top of the excavation?	☐ *Yes*	☐ *No*	☐ *N/A*

SOIL CHARACTERISTICS			
Is any water seepage noted in trench walls or bottom?	☐ *Yes*	☐ *No*	☐ *N/A*
Are pumps in place, or available if needed?	☐ *Yes*	☐ *No*	☐ *N/A*
Is there evidence of significant fracture planes in soil or rock?	☐ *Yes*	☐ *No*	☐ *N/A*
Are there any zones of unusually weak soils or materials not anticipated?	☐ *Yes*	☐ *No*	☐ *N/A*
Have tension cracks been observed along the top on any slopes?	☐ *Yes*	☐ *No*	☐ *N/A*
Are there any noted dramatic dips or bedrock?	☐ *Yes*	☐ *No*	☐ *N/A*
Is there any evidence of caving or sloughing of soil since the last inspection?	☐ *Yes*	☐ *No*	☐ *N/A*

PROTECTIVE SYSTEMS			
Are slopes cut at design angle of repose?	☐ *Yes*	☐ *No*	☐ *N/A*
Is the shoring system installed in accordance with the design?	☐ *Yes*	☐ *No*	☐ *N/A*
Is the shoring being used secure?	☐ *Yes*	☐ *No*	☐ *N/A*
Does the design include an adequate safety factor for equipment being used?	☐ *Yes*	☐ *No*	☐ *N/A*
Is traffic being adequately kept away from the excavation/trenching operation?	☐ *Yes*	☐ *No*	☐ *N/A*
Are hydraulic shores pumped to design pressure?	☐ *Yes*	☐ *No*	☐ *N/A*
Is vibration from equipment or traffic too close to the trenching operation?	☐ *Yes*	☐ *No*	☐ *N/A*
Are trench box(s) certified?	☐ *Yes*	☐ *No*	☐ *N/A*

HAZARDOUS ATMOSPHERE & CONFINED SPACES			
Is the hazardous atmosphere testing being conducted on a regular basis?	☐ *Yes*	☐ *No*	☐ *N/A*
Have rescue procedures been established, and is equipment immediately available?	☐ *Yes*	☐ *No*	☐ *N/A*

DAILY EXCAVATION / TRENCH INSPECTION FORM

MISCELLANEOUS			
Are utility markings in place?	☐ *Yes*	☐ *No*	☐ *N/A*
Are trees, boulders, or other hazards located in the area?	☐ *Yes*	☐ *No*	☐ *N/A*
Are barricades or covers in place and in good condition?	☐ *Yes*	☐ *No*	☐ *N/A*
Is excavated material and equipment at least 2 feet (0.6 m) from the edge of the excavation?	☐ *Yes*	☐ *No*	☐ *N/A*
Are GFCI's used on all temporary electrical cords?	☐ *Yes*	☐ *No*	☐ *N/A*
Is the excavation within the original scope of the excavation permit?	☐ *Yes*	☐ *No*	☐ *N/A*
Is a valid excavation permit executed for the excavation/trenching activity?	☐ *Yes*	☐ *No*	☐ *N/A*

NOTES

RESPONSIBILITY

I hereby attest that the above conditions existed and that the above items were checked or reviewed during this inspection.

All unsafe conditions must be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation must be immediately evacuated, and no one is allowed to re-enter until corrective action has been taken.

Daily Excavation/Trenching Inspection completed by:

Signature of Competent Person ***Date***

Hot Work Permit

THIS PERMIT IS GOOD FOR ONE DAY OR UNTIL EXPIRATION DATE AS NOTED

Description of Work:			
Location of Work:		Work Area Supervisor:	
Date and Time Issued:		Date and time of Expiration:	

Hot Work Check List

	Yes	No	NA
Emergency reporting procedures reviewed (911, radio, fire alarm located):	☐	☐	☐
Fire extinguisher available and inspected: (10lbs min., Type A-B-C)	☐	☐	☐
Water hose available:	☐	☐	☐
Equipment in good working order (gas leads, flashback arrestor fitted, etc.):	☐	☐	☐
Containers/enclosed equipment purged of flammable liquids/vapors:	☐	☐	☐
Housekeeping requirements met:	☐	☐	☐
35' clear of all Combustibles, Flammables, and hazardous materials:	☐	☐	☐
Vegetation removed or wet down:	☐	☐	☐
Explosive atmosphere eliminated/Adequate ventilation around work area:	☐	☐	☐
Confined Space Permit issued (if necessary):	☐	☐	☐
Sparks/slag contained:	☐	☐	☐
Shielding around work (Welding Screens):	☐	☐	☐
Fire watch trained on use of firefighting equipment:	☐	☐	☐
30 minute fire watch in place:	☐	☐	☐
Adjacent work areas are affected by hot work activities:	☐	☐	☐

PPE Requirements

Fire Retardant Clothing (FRC)

☐	Jacket	☐	Pants	☐	Goggles
☐	Sleeves	☐	Apron	☐	Welding Hood
☐	Coveralls	☐	Leather Gloves	☐	Hearing Protection
				☐	Face Shield Safety Glasses

Fire Watch Responsibility

- Obtain and inspect fire equipment
- Have fire extinguishing equipment readily available
- Inspect area for flammable/combustible materials
- Maintain line of sight contact with hot work activities
- Control access to work area
- Know emergency procedures for fires
- Attempt to extinguish the fire only within the capacity of available equipment
- Monitor hot work area for at least 30 minutes after hot work operations stop

Fire Watch:	----------	----------	----------
	Print Name	***Signature***	***Date***
Hot Work Operator:	----------	----------	----------
	Print Name	***Signature***	***Date***
Authorized By:	----------	----------	----------
	Print Name	***Signature***	***Date***

LOCKOUT/TAGOUT INSPECTION FORM

NOTE TO EMPLOYERS/SUPERVISORS		
Use this form to document an inspection of a written lockout or tagout procedure.		
INSPECTION/EQUIPMENT INFORMATION		
Department Enter Dept. Here	**Equipment Type/Serial #**Enter Equip. Type/Serial #	
Inspection Conducted By Enter Name	**Inspection Date** Drop Down Menu for Date	
Equipment Location Enter Location Here		
AUTHORIZED EMPLOYEE INFORMATION		
List Authorized Employees Using This Procedure	***Has the employee been trained in the procedure?***	
Employee Name	☐Yes	☐No
Employee Name	☐Yes	☐No
Employee Name	☐Yes	☐No
Employee Name	☐Yes	☐No

PROCEDURE CHECKLIST		
Do authorized employees know the location of the procedure?	☐Yes	☐No
Do authorized employees have access to the written procedure?	☐Yes	☐No
Are affected employees notified when the procedure is being used?	☐Yes	☐No
Have affected employees been trained to recognize when the procedure is being used and instructed not to remove lockout/tagout devices or start de-energized equipment?	☐Yes	☐No
LOCKOUT/TAGOUT DETAILS		
Can energy-isolating devices be locked out?	☐Yes	☐No
Note: When you replace, renovate, or modify machines and equipment, ensure that the energy-isolating devices will accept lockout devices. New equipment and equipment renovated or modified after January 2, 1990, must be capable of being locked out.		
Did each authorized employee lock out all energy sources?	☐Yes	☐No
Does this procedure involve group lockout/tagout?	☐Yes	☐No
Did the authorized employees follow this lockout/tagout procedure?	☐Yes	☐No
Does this lockout/tagout procedure adequately protect employees?	☐Yes	☐No

LOCKOUT/TAGOUT INSPECTION FORM

DEFICIENCIES/CORRECTIVE ACTION	
If this lockout/tagout procedure does not adequately protect employees, list and describe the deficiencies required corrective action.	
1.Click here to enter text.	
2.Click here to enter text.	
3.Click here to enter text.	
4.Click here to enter text.	
5.Click here to enter text.	
If this is a lockout procedure, did the inspector review with all authorized employees their responsibilities under the procedure? ***Note:*** *A review can be accomplished by meeting with employees individually or in a group.*	☐Yes ☐No ☐N/A
If this is a tagout procedure, did the inspector review with all authorized employees their responsibilities under the procedure? ***Note:*** *A review can be accomplished by meeting with employees individually or in a group.*	☐Yes ☐No ☐N/A
ADDITIONAL INFORMATION	
Click here to enter text.	

Job #_____

Site Visitor Briefing Log

By signing this form, I certify that I have been made aware of the hazards associated with this project and the minimum level of PPE required. I also understand that I may not go into the work area unless escorted by Project Superintendent or designated representative.

Date	Name (Print)	Signature	Company	Time In	Time Out	Briefed By

Project # _____

EMPLOYEE VOLUNTARY EMERGENCY INFORMATION SHEET

The following information is being gathered to help us respond to an emergency. *All questions are optional*. The original copy is sent to the corporate office, and a copy will be maintained on site. Please submit a new sheet if any information changes.

EMPLOYEE INFORMATION					
Name:			***DOB:***		
Employer:					
Emergency Contacts *Who do you want us to contact if you are involved in an emergency?*					
Contact #1			**Contact #2**		
Name			***Name***		
City/State			***City/State***		
Phone Number			***Phone Number***		
Relationship To You			***Relationship To You***		
List additional contacts on the reverse side.					
Emergency Contact Information For *US* To Use In Reaching *YOU* ! *How can we get in touch with you for project recalls, shutdowns, emergencies etc.?*					
Local Site Residence *(Where are you staying?)*					
Residence Number					
Alternate Number					
Medical Information – Allergies*					
Allergies to Medications? □ **Yes** □ **No**					
Please List					
Allergies to bites or stings? □ **Yes** □ **No**					
Please List					
Medical Information – Conditions* *Do you have any of the following?*					
Hypertension	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Asthma	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Diabetes	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Hypoglycemia	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Epilepsy/Seizures	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Fainting Spells	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Irregular Heartbeat	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
Narcolepsy (sleeping spells)	**☐Yes**	**☐No**	***Controlled?***	**☐Yes**	**☐No**
***Please List Any Medications Or Treatments That You Carry And Their Location**					
Safety Officer's Notes:					

Appendix – E

Contractor's HAZWOPER Training Certifications

OSHACAMPUS.com™
powered by 360training

CERTIFICATE OF COURSE COMPLETION

Mike Blewett	40 Hr HAZWOPER	10/15/2011 10:10 CST
Student's Name	Course Title	Course Completion Date MM / DD / YYYY

2115781

Certificate Number

	40
Student's Signature	Approved # of Hours

I hereby attest and certify that I personally took the above named safety lesson in accordance to Osha Campus guidelines. I further state that I have paid for the course and that I did not use another's work (Plagiarism). Students should retain certificates and refer to course instructions to receive official certification where necessary.

360training
Corporate Headquarters
13801 N. Mo-Pac, Suite 100
Austin, Texas 78727
tel: 888-360-8764
fax: 512-727-7683
email: support@360training.com

MAGNUS Pacific

Certificate of completion

This is to certify that

Mike Blewett

8-Hour Refresher Hazardous Waste Operations and Emergency Response

In compliance with the

Department of Labor occupational Safety & health Administration (OSHA) 29 CFR 1910.120(e)

On This / 19th day of / March 2015

Scott Maxey
Corporate Director of Safety & Risk Management

Authorized Training Instructor

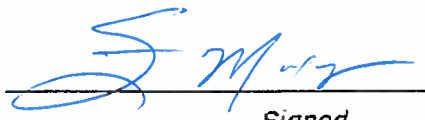
Certificate of Completion

This is to certify that

James Browning

has successfully completed training on:

HAZWOPER 40 Hour Training - Online Training
Course: Magnus Pacific, 3001 Lava Ridge Ct., Roseville, CA 95661



Signed

3/3/2014

Date

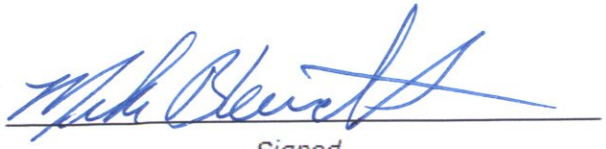
Certificate of Completion

This is to certify that

James Browning

has successfully completed training on:

8-Hour Hazardous Waste Operations and Emergency Response 29 CFR 1910.120 (e) - Online Training Course



Signed

4/21/2015

Date

J. J. Keller's Training on Demand

Certificate of Completion

Zachary Colburn

Has completed the online, interactive training course

HAZWOPER 40-Hour Training Online Training Course

Magnus Pacific
Company Name

3001 Lava Ridge Ct.
Company Address

Roseville, CA 95661
City, State, Zip

6/11/2013
Date of Completion

Signature of Company Representative Date

Note: It is the responsibility of the trainer and the trainer's company (named as Company, left) to determine and verify a student's competency. Course completion certificates do not state or imply competency on any given subject, only that the student has completed the online training.

J. J. Keller & Associates, Inc.®
Since 1953

MAGNUS Pacific

Certificate of completion

This is to certify that

Zachary Colburn

8-Hour Refresher Hazardous Waste Operations and Emergency Response

In compliance with the

Department of Labor occupational Safety & health Administration (OSHA) 29 CFR 1910.120(e)

On This / 19th day of / March 2015

Scott Maxey
Corporate Director of Safety & Risk Management

Authorized Training Instructor

Certificate of Completion

This is to certify that

Derrick Dingeman

has successfully completed training on:

HAZWOPER 40 Hour Training - Online Training Course: Magnus Pacific, 3001 Lava Ridge Ct., Roseville, CA 95661

2/21/2014

Signed | *Date*

Certificate of Completion

This is to certify that

Derrick Dingeman

has successfully completed training on:

8-Hour Hazardous Waste Operations and Emergency Response 29 CFR 1910.120 (e) - Online Training Course

Signed

4/15/2015

Date

Certificate of Completion

This certifies that

VALENTINO MARTINEZ

has successfully met the requirements of

HAZWOPER GENERAL SITE AWARENESS 40 HOUR

COMPANY TRAINED FOR: Envirocon

On this 18 day of August 2003

Certification: 500-201H

MAGNUS Pacific

Certificate of Completion

This is to certify that

Valentino Martinez

8-Hour Refresher Hazardous Waste Operations and Emergency Response

In compliance with the

Department of Labor occupational Safety & health Administration (OSHA) 29 CFR 1910.120(e)

On This / 19th day of / March 2015

Scott Maxey
Corporate Director of Safety & Risk Management

Authorized Training Instructor

CERTIFICATE OF TRAINING

SCOTT MAXEY

HAS COMPLETED TRAINING IN

HAZARDOUS WASTE OPERATIONS &

EMERGENCY RESPONSE (HAZWOPER)

GENERAL SITE WORKER COURSE

IN COMPLIANCE WITH THE REQUIREMENTS OF

TITLE 8, CALIFORNIA CODE OF REGULATIONS SECTION 5192

AND 29 CFR 1910.120

ISSUED MARCH 10, 2013 BY THE SAFETY CONNECTION

17698 SAN FRANCISCO ST.

FOUNTAIN VALLEY, CA

MAGNUS Pacific

Certificate of completion

This is to certify that

Scott William Maxey

8-Hour Refresher Hazardous Waste Operations and Emergency Response

In compliance with the

Department of Labor occupational Safety & health Administration (OSHA) 29 CFR 1910.120(e)

On This / 19th day of / March 2015

Scott Maxey
Corporate Director of Safety & Risk Management

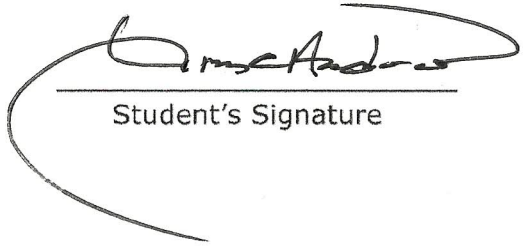
Authorized Training Instructor

OSHACAMPUS™
powered by 360training

CERTIFICATE OF COURSE COMPLETION

Tim McAndrew	40 Hr HAZWOPER	09/28/2011 00:00 CST
Student's Name	Course Title	Course Completion Date MM / DD / YYYY

2097791
Certificate Number



Student's Signature

40
Approved # of Hours

I hereby attest and certify that I personally took the above named safety lesson in accordance to Osha Campus guidelines. I further state that I have paid for the course and that I did not use another's work (Plagiarism). Students should retain certificates and refer to course instructions to receive official certification where necessary.

360training
Corporate Headquarters
13801 N. Mo-Pac, Suite 100
Austin, Texas 78727
tel: 888-360-8764
fax: 512-727-7683
email: support@360training.com

MAGNUS Pacific

Certificate of completion

This is to certify that

Timothy McAndrew

8-Hour Refresher Hazardous Waste Operations and Emergency Response

In compliance with the

Department of Labor occupational Safety & health Administration (OSHA) 29 CFR 1910.120(e)

On This / 19th day of / March 2015

Scott Maxey
Corporate Director of Safety & Risk Management

Authorized Training Instructor

CERTIFICATE

May it be known by all who read this that

JOSHUA THURMON

Diligently and with merit completed off-site training requirements in

"40 Hour HAZARDOUS WASTE OPERATIONS"

conducted in accordance with the requirements of

29 CFR 1910.120 (e)

& TITLE 8, of the California Code of Regulations (Section 5192)

Presented this 12th day of JANUARY, 2001

ENVIRONMENTAL COMPLIANCE SERVICES INC.

ORGANIZATION

Signature

011201-2273-40E

Control #

MAGNUS Pacific

Certificate of completion

This is to certify that

Joshua Thurmon

8-Hour Refresher Hazardous Waste Operations and Emergency Response

In compliance with the

Department of Labor occupational Safety & health Administration (OSHA) 29 CFR 1910.120(e)

On This / 19th day of / March 2015

Scott Maxey
Corporate Director of Safety & Risk Management

Authorized Training Instructor

Appendix – F

Table – 1 | Contaminants of Concern and Action Levels

Table-1 | Contaminants of Concern (COC) Action Levels and Responses
Dublin Apartment PRB (Project #150019)

COC	PEL	Action Level	Response
BTEX (Work Zone) Benzene Ethyl Benzene Toulene Xylene BTEX (Perimeter)	 1.0 ppm (TWA) 5.0 ppm (STEL) 5.0 ppm (TWA) 30 ppm (STEL) 10 ppm (TWA) 150 ppm (STEL) 500 ppm (Ceiling) 100 ppm (TWA) 150 ppm (STEL) 300 ppm (Ceiling) NA	 0.5 ppm 5.0 ppm 10 ppm 100 ppm 0.5 ppm (Benzene) 1.0 ppm (E,T,X)	 < Site Action Level continue work = 1ppm Draeger tube >Site Action Level upgrade to Level C; implement control measures <0.5 ppm continue work >0.5 ppm Stop Work; implement control measures < 1.0 ppm continue work >1.0 ppm Stop Work; implement control measures
Heavy Metals Arsenic Copper Lead Mercury Silver Zinc	 0.010 mg/m^3 1.0 mg/m^3 0.05 mg/m^3 0.1 mg/m^3 0.01 mg/m^3 5.00 mg/m^3	 0.005 mg/m^3 0.5 mg/m^3 0.025 mg/m^3 0.05 mg/m^3 0.005 mg/m^3 2.5 mg/m^3	 Increased water sprays will be applied whenever Action Levels are detected for heavy metal concentrations. Modified Level-D PPE including Tyvek coveralls glove and boot covers will be donned to prevent topical exposures.