WELL CAPACITY AND AQUIFER TEST, 
McCROSKEY WS-12 WATER WELL, 
EAST CAT CANYON DEVELOPMENT, 
SANTA BARBARA, CALIFORNIA

Prepared for: 
AERA ENERGY, LLC

October 2012 
Fugro Job No. 04.62120157
October 19, 2012
Project No. 04.62120157

Aera Energy, LLC
10000 Ming Avenue, 3B51
Bakersfield, California 93311

Attention: Mr. Eric Paulsen, P.E., Sr. Staff Facilities Engineer

Subject: Well Capacity and Aquifer Test, McCrosky WS-12 Water Well, East Cat Canyon Development, Santa Barbara, California

Dear Mr. Paulsen:

In accordance with the general scope of work outlined in our proposal to Mr. Dean Taormina with Sturgeon Services International (Sturgeon), dated August 16, 2012 (Attachment A), Fugro has completed a well capacity, aquifer test, and related assessment of the so-called McCrosky WS-12 water well located along Long Canyon Road on the western boundary of the Aera Fee of the East Cat Canyon Development in Santa Barbara County. The location of the subject water well is shown on an air photo of the "Aera Fee," which is included with this letter report as Attachment B. Pursuant to certain recommendations contained in our report to Aera LLC on groundwater supply sources in the East Cat Canyon Field (March 28, 2012), the purpose of the well capacity testing was to determine the current condition of the McCrosky WS-12 water well (depth, water level, well depth, location, and condition of perforations, etc.) and based on the condition assessment, perform pump testing of the well to assess yield, water quality, and the groundwater production potential of the Paso Robles formation aquifer in the "Aera Fee" area of the East Cat Canyon field. We understand that groundwater is one source of water supply being considered by Aera LLC for the generation of steam to develop the oil and gas resources of the East Cat Canyon Oilfield.

With this report we include documentation of health and safety measures that were followed during the field work (Attachment C), the results of a downhole video-log of the water well (Attachment D), various photographs that document the field work (Attachment E), daily field memoranda, which document preparation for and conduct of the well testing procedures (Attachment F), various graphs of the aquifer test results (Attachment G), and the results of a water quality analysis performed on the produced groundwater (Attachment H). As you are aware, the McCrosky WS-12 well was reportedly drilled in the late 1970s for use as a groundwater supply source. Certain hand-written tabulations of use from that period (1977) indicate that it was pumped at 4,000 barrels per day (about 110 gpm pumped continuously over a 24-hour period) and that the well was originally 700 feet in depth and produced groundwater

A water quality analysis of groundwater produced dating from 1975 indicates the groundwater was of good quality (i.e., fresh water) with a calcium sulfate mineral character and total dissolved solid concentration of about 1,000 milligrams per litre (mg/l). Design of the well is unknown (other than reported depth). Records indicate it apparently was provided with a 40 hp submersible pump capable of producing 130 gpm from an unknown pump setting and total lift.

The McCroskey WS-12 well is currently being used by two ranchers in the area (Mr. Joe Jorge and Mr. Marvin Teixeira) under an agreement with Aera. We are informed and as documented in this study, the well is used intermittently to fill a 10,000 gallon water tank for cattle watering. Mr. Jorge informed us that the well had at sometime in the last 10 years been provided with a small submersible pump and is pumped at a rate of about 10 gpm. Mr. Jorge had no information relative to past use and pumpage of the well, water level data, water quality data, or well service records. Based on geologic information we provided in our report dated March 28, 2012 to Aera LLC, we concluded that as much as 300 feet of potentially saturated Paso Robles Formation is present in the northerly half of the Aera Fee area and, pending further study of the McCroskey WS 12 well (described below), it is possible that properly designed and constructed wells in the northerly boundary of the "Aera Fee" could produce significant amounts of groundwater.

Subject to the completion of various health, safety, and environment (HSE) meetings and documentation which were coordinated by staff of Sturgeon and discussions with the operators of the well (Mr. Joe Jorge and Marvin Teixeira), Fugro initiated field work on October 1, 2012 by having Fisher Pump of Santa Maria remove the existing submersible pump from the well and perform a downhole video-log of the well. As documented in the daily reports of field observations by Fugro (Attachment E), the existing pump in the well was used to initially fill a portable 1,000 gallon tank (existing pump flow rate of 17 gallons per minute (gpm)) and the existing pump which was installed to a depth of 461 feet was removed. The 1,000 gallons of stored water was then released back into the well at a rate of about 2 gpm to help settle solids and clear the water for the video-log. The video-log was performed on October 2, 2012 and indicated the static water level in the well was at a depth of 247 feet below top of casing and that the well was of a depth of 491 feet. As indicated in the video-log (Attachment D), water clarity was fairly good and indicated the well was heavily incrusted with a carbonate precipitate, with randomly visible vertical slot (likely mills knife or gun perforated installed) present at depths below a depth of 350 feet. Discussions were then held with Mr. Eric Paulsen at Aera LLC and concurrence received that the condition of the well was acceptable relative to proceeding with the intended well capacity test. Fisher Pump then installed a sounding tube to a depth of 473 feet for purposes of providing a water level pressure transducer in the well, followed by the installation of a 25 hp submersible pump to a depth of 479 feet. Background water level data were then collected and the pump was turned on at about 2 pm on October 3, 2012 to perform an initial specific capacity or variable discharge test at rates ranging from 42 to 125 gpm for a period of 400 minutes. Discharge water for the duration of the 400 minutes of specific capacity testing remained cloudy with a slight orange-brown color (refer to Attachment F).

Following an overnight period of water level recovery (refer to Attachment D) on October 4, 2012 a constant discharge test was started at 11 a.m. at a discharge rate of approximately
125 gpm. The test continued for a period of 12 hours with a maximum drawdown (water level below the static water level) of about 146 feet, indicating a specific capacity for the well of about 0.85 gpm per foot of drawdown. During the last 4 hours of the constant discharge test the pumping water level remained stable. At the end of the 12 hour constant discharge test a sample of the produced groundwater was collected for analysis of general mineral constituents. The analytical results are contained in Attachment H. Upon cessation of pumping, recovery water levels were monitored for a period of 500 minutes and indicate essentially full recovery to the pre-test static water level within the first 60 minutes after cessation of pumping. The temporary test pump was then removed by Fisher Pump, and the existing submersible pump reinstalled to the same depth, and start-up of the well was then performed. Demobilization from the site was completed by Fisher Pump on Friday, October 5, 1012.

Analysis of the groundwater produced (refer to Attachment H) indicates it to be of a calcium sulfate chemical character with total dissolved solids (TDS) concentration of 900 milligrams per litre (mg/l). The groundwater is considered somewhat hard and, based on this analysis, contains a dissolved iron concentration of 1.3 mg/l. The analytical results appear to be grossly similar to groundwater quality analysis form this well performed in the late 1970s. The groundwater is considered to be a freshwater source that would be generally suitable for the intended industrial uses by Aera LLC, subject to review by a chemical engineer relative to use for steam production.

Based on the results of the capacity testing of the McCrosky WS-12 well presented above, it is apparent that the Paso Robles formation which underlies the northerly portion of the “Aera Fee” is saturated, and that properly designed and constructed wells at the locations recommended in our report of March 2012 should be able to produce fresh groundwater at rates in the range of 250 gpm each. The existing McCrosky WS-12 well is considered to be in fairly poor condition, and, given its age and relatively inefficient and unknown design, affected by significant incrustation of the perforated openings. Detailed analysis of the aquifer properties (i.e., transmissivity) is not considered appropriate given the poor condition of the well. Nonetheless, the well capacity testing and analysis provides guidance on a suggested preliminary depth and design of additional freshwater source wells on the “Aera Fee” lease. Such wells should be drilled to approximate depths of 750 feet, geophysically electrically logged, mud logged, and as appropriate, completed with 12-inch diameter mild steel casing with perforations placed from depths of about 300 to 700 feet. The wells should be gravel packed, provided with surface seal, and generally follow construction standards that would be contained in well construction permits to be obtained from e County of Santa Barbara. Pending the decisions of Aera LLC on the use of groundwater as a supply source for the proposed project (subject to a variety of engineering, conveyance, environmental, and cost issues) we would be pleased to continue to assist Aera LLC on the next steps in this process.

Anticipating that some form of environmental review will be associated with the permits for the project and that use of groundwater as a source will be subject to environmental review, we suggest that the McCrosky WS-12 well be instrumented with a downhole pressure transducer to collect water level readings on an hourly basis. Such data could then be downloaded on a quarterly basis to assess current use, seasonal water level variations, and potential recharge to the aquifer associated with precipitation and streamflow in the northerly...
Santa Maria River. The well should also be provided with a small totalizer meter to document production.

It has been our pleasure to assist Aera LLC on this project and we remain available to continue our work at your direction.

Sincerely,

FUGRO CONSULTANTS, INC.

Timothy Nicely, P.G., C.H.g.
Senior Project Hydrogeologist

David Gardner, P.G., C.H.g.
Principal Hydrogeologist

Copies: (4) Addressee and Pdf

Attachments:
Attachment A - Proposal Sturgeon Services International, Dated August 16, 2012
Attachment B - Air Photo of The "Aera Fee"
Attachment C - Documentation of Health and Safety Measures
Attachment D - Results of a Downhole Video-Log of the Mccrosky WS-12 Water Well
Attachment E - Various Photographs that Document the Field Work
Attachment F - Report of Field Operations
Attachment G - Various Graphs of the Aquifer Test Results
Attachment H - Constant Discharge Test Results General Mineral Constituents Analysis
ATTACHMENT A
PROPOSAL STURGEON SERVICES INTERNATIONAL
DATED AUGUST 16, 2012
August 16, 2012
Proposal No. 04.62120024

Sturgeon Services International
3511 Gilmore Avenue
Bakersfield, California 93308-6205

Attention: Mr. E. Dean Taormina, Central Coast Division Manager

Subject: Proposal to Conduct Well Capacity and Aquifer Test, McCrosky WS-12 Water Well

Dear Mr. Taormina:

As requested, Fugro Consultants, Inc. is pleased to submit this proposal to Sturgeon Services International to assist Aera Energy LLC (Aera) in an evaluation of the condition and production capacity of the existing McCrosky WS-12 water well located in the East Cat Canyon Development, Aera Fee property east of Long Canyon Road near the town of Sisqoc in Santa Barbara County. As discussed in a recently prepared groundwater source study (March 28, 2012) for Aera, this water supply well was reported in the late 1970s to have pumped groundwater in the range of about 130 gallons per minute (gpm) from aquifers contained in the Paso Robles formation. The well is reported to have been drilled to a depth of 700 feet and over the years has been retrofitted with a series of successively smaller pumps. The well is currently being used by a Mr. Joe Jorge and several other ranchers under a use agreement with Aera. Actual pumpage from the well is believed to be somewhat intermittent and in the range of 10 gpm.

The purpose of performance testing this well is to determine the well’s current condition (depth, water level, and depth of perforated casing, etc.) and to perform a 24 to 48 hour constant discharge test to better understand the production potential of aquifers of the Paso Robles formation in this area of the lease. The well was inspected in March 2012 and found to be operable with a power drop to the well from a nearby power pole. To test the well in the range of the historic reported yield (i.e., in the range of 125 gpm) the existing pump in the well will need to be removed (pump setting depth unknown) and a temporary submersible pump of suitable capacity and lift installed. At that time, the well would be video logged to determine depth, water levels, condition of the casing, and perforations. The well would initially be pumped to assess specific capacity (range in well yields and drawdown) followed by a 24 to 48 hour constant discharge test at an appropriate production rate. A water sample would be collected for analysis of general mineral constituents. The well would be equipped with a downhole pressure transducer to record water-level variations at regular intervals (on the order of every minute). A recovery test would be conducted for a duration of 12 hours following the pump test. The temporary pump would then be removed and the existing small pump reinstalled. Fugro would provide oversight of the entire task and prepare a summary report of the findings. The report would comment on the results relative to the groundwater resources of the Paso Robles formation in the lease area relative to the needs of Aera.

To perform the above work, Fugro would work directly for Sturgeon who would coordinate the overall field services consistent with their current contracts with Aera. Fugro in
turn would retain the services of a qualified well-pump contractor (Scott Fisher Pumps located in Santa Maria) to assist in the pump removal and installation of a temporary test pump, coordinate the electrical connections, and surface discharge of the produced water. Fugro would retain Welenco to perform the well video log, and use Capco Analytical to perform the water quality analysis. To coordinate the work we would need to meet at the site with Mr. Jorge to understand his well use requirements and the approximate 3 day interruption of use of the well during the performance testing. Based on a meeting with Scott Fisher at the well site in early August 2012, the electricity at the site can be used for the pump test (i.e., a generator will not be required) and that discharge of the produced water will be directed to an appropriate drainage swale along Long Canyon Road. We assume that Sturgeon will provide details to Fugro and the other subcontractors relative to HSE requirements associated with the proposed work.

The work outlined above is estimated to cost $22,000, to be performed in accordance with the hourly rates by labor category shown on the attached Fee Schedule. The quote by Fisher Pumps to perform their work is attached to this proposal. The work should require about 3 days in the field to complete, and another 2 weeks to analyze the acquired data, obtain the results of the water quality analysis, and prepare the report documenting the findings.

We appreciate the opportunity to continue to assist Aera on this project. Please call should you have any questions.

Sincerely,

FUGRO CONSULTANTS, INC.

David Gardner, P.G., C.H.g.
Principal Hydrogeologist

Copies:  (Pdf) Addressee
(Pdf) Eric Paulson, Aera Energy LLC

Attachments:  Fisher Pump Quote
ATTACHMENT B
AIR PHOTO OF THE "AERA FEE"
ATTACHMENT C
DOCUMENTATION OF HEALTH AND SAFETY MEASURES
1. General Information

Project Title: East Cat Canyon Hydrogeologic Well Source Study; McCrosky Well WS12
Project No.: 04.6212 0024
Site Name: East Cat Canyon, Cat Canyon Oil Field
Site Address: 6516 East Cat Canyon Road, Santa Maria, California

Project Manager: 805-289-3826
Activity Center Mgr: 62
Site HSE Officer: Timothy Nicely

Facility HSE Officer (if applicable):
FCL HSE Officer: Cathy Morris
Office (713) 346-4016; Cell (805) 432-3115
Fugro 24-Hr Emergency # 888-333-4577

Client: Sturgeon Services
Client Contact: Dean Taormina
Subcontractor: Fisher Pump, Scott Fisher
USA Ticket #: None needed

Site Thomas Bro. Nos. 345 H11
Client Phone No: 661-343-6580
Subcontractor Phone No.: 805-310-2576
Exp. Date: N/A

Current on FCL Approved Subcontractor List? Yes ☑ No ☐

If answered No, Business Unit Manager Approval Necessary:

2. Emergency Information

Fire: 911 or Local:
Police: 911 or Local:
Ambulance: 911 or Local:

Nearest Medical Facility: Marian Medical Center
Address: 1400 East Church Street, Santa Maria, CA
Phone: 805-739-3000

This form may be used for those site activities that do not pose a significant threat of exposure to site contaminants or hazards. If unsure which form to use check with the HSE Manager. It is the responsibility of the Project Manager to ensure that this plan is complete and sign the Health Safety and Environmental Plan (HSEP). All project personnel must receive a copy of this form, familiarize themselves with its contents and sign the signature page before work begins.

Approved by QHSE Manager, Fugro Consultants, Inc., May 2012
Note: If this is a printed or downloaded copy, please check the online QHSE-MS to ensure that it is the latest version.
Directions: From well site: Drive north on Long Canyon Road;
    Turn left onto Foxen Canyon Road;
    Turn right onto Philbric Road;
    Continue onto E Main Street;
    Turn Left onto Palisade Drive;
    Take 1st Right onto E Church Street; Hospital is on the right

From site office: Drive NW on Cat Canyon Road;
    Turn Left onto Palmer Road;
    Take 1st Right onto Dominion Road;
    Turn Left onto E Clark Ave.;
    Merge onto US 101 North;
    Take exit 171 toward CA-166 W/Main Street/Guadalupe;
    Turn Right onto Cypress Street/Nicholson Ave;
    Turn left onto Stratford Ave;
    This becomes Church Street; Hospital is on the right

3. Planned Site Activities
   a. Pull existing pump (Fisher Pump)
   b. Perform video log, install pump, electrical and plumbing
   c. Perform pumping test

4. Restricted, Exclusion and/or Protected Habitat Areas
   None

5. Local and/or Physical Hazards
   (Address physical, environmental or health hazards such as high traffic areas, rough terrain, severe
   weather conditions, excessive dust or pollutants. Note: If there is a significant threat of exposure to
   site contaminants use the ES-F60 Environmental Site Health and Safety Plan)

   Lockout/Tagout procedures apply (HS-R49 is appended)
   Heat illness prevention may apply in the canyon (HS-R35 is appended)
   Fire prevention associated with vehicular exhaust and/or electrical work for
   well pump may apply (HS-R36 is appended)

6. Project Specific Training Requirements
   ☒ First Aid / CPR
H₂S (Hydrogen Sulfide/Sulfur Dioxide)
HAZWOPER 40-Hour
California Oil Producers Contractor Orientation

7. Attached JSAs and/or Procedures
☐ GEO 101 Hand Sampling
☐ GEO 102 Drilling / Sampling
☐ GEO 103 Downhole Logging
☐ GEO 104 Exploration Pits
☐ GEO 105 Seismic Refraction Survey

8. Health Safety and Environmental Procedures Required by the Facility
(Such as On-Site Safety Orientation, Site Access Procedures, etc.)

On site safety training is required at Aera's East Cat Canyon site office prior to any site work

9. Project Safety Equipment List
(List all applicable PPE from JSA's, add any project specific requirements such as barricades, 2-way radios, etc.)

☐ Hard Hat ☐ Goggles
☐ Safety Shoes ☐ Face Shield
☐ Hearing Protection ☐ Safety Harness
☐ Cotton Gloves ☐ Sun Screen
☐ Leather Gloves ☐ Insect Repellent
☐ Rubber Gloves ☐ Drinking Water
☐ Safety Glasses w/Side Shields ☐ First Aid Kit
☐ Safety Vest ☐ Fire Extinguisher

Approved by QHSE Manager, Fugro Consultants, Inc., May 2012
Note: If this is a printed or downloaded copy, please check the online QHSE-MS to ensure that it is the latest version.
(For PPE Requirements of Level C* or above use the GeoEnvironmental Site HSE Plan Template)

*See Onshore Guidebook Page 37 for a description of PPE Levels of Protection
By my signature below, I hereby indicate that I have reviewed and understand this HSEP and I agree to follow the guidelines therein.

Fugro Employees

Name (Print)       Name (Signature)       Date

Tim Nicely

Subcontractors

Name (Print)       Name (Signature)       Date

E. Dean Taormina

David S Fisher

TO THE SUBCONTRACTOR: This plan has been prepared solely for the use of Fugro Consultants, Inc. personnel. It is supplied to you for informational purposes only. You are responsible for your own health safety and environmental program.

Timothy Nicely

Project Manager       Date

10/1/2012

10-1-12 SSF

10-1-12 FPS

10-1-12 FPS

16/1/2012
1. Head **west** on **Cat Canyon Rd** toward **Long Canyon Rd**  
   About 5 mins  
   go 2.2 mi  
   total 2.2 mi
2. Turn left onto **Palmer Rd**  
   About 1 min  
   go 0.5 mi  
   total 2.6 mi
3. Take the 1st right onto **Dominion Rd**  
   About 6 mins  
   go 3.5 mi  
   total 6.1 mi
4. Turn left onto **E Clark Ave**  
   About 6 mins  
   go 2.7 mi  
   total 8.8 mi
5. Slight right to merge onto **US-101 N**  
   About 7 mins  
   go 6.2 mi  
   total 15.0 mi
6. Take exit **171** toward **CA-166 W/Main St/Guadalupe**  
   go 0.2 mi  
   total 15.2 mi
7. Turn right onto **Cypress St/Nicholson Ave**  
   go 0.1 mi  
   total 15.4 mi
8. Turn left onto **Stratford Ave**  
   go 358 ft  
   total 15.4 mi
9. **Stratford Ave** turns slightly right and becomes **E Church St**  
   Destination will be on the right  
   go 0.1 mi  
   total 15.6 mi

**Marian Medical Center**  
1400 East Church Street, Santa Maria, CA 93454

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.

Map data ©2012 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.
1. Head north on Long Cyn Rd toward Foxen Canyon Rd
   About 2 mins
   go 0.7 mi
total 0.7 mi

2. Slight left onto Foxen Canyon Rd
   About 3 mins
   go 1.4 mi
total 2.1 mi

3. Turn right to stay on Foxen Canyon Rd
   About 13 mins
   go 7.4 mi
total 9.4 mi

4. Turn right onto Philbric Rd
   About 3 mins
   go 1.5 mi
total 11.0 mi

5. Continue onto E Main St
   About 5 mins
   go 2.4 mi
total 13.3 mi

6. Turn left onto Palisade Dr
   go 318 ft
total 13.4 mi

7. Take the 1st right onto E Church St
   Destination will be on the left
   go 7 ft
   total 13.4 mi

Marian Medical Center
1400 East Church Street, Santa Maria, CA 93454

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.

Map data ©2012 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.
ENERGY ISOLATION (LOCKOUT TAGOUT)
HS-R49

1.0 PURPOSE

The purpose of this procedure is to establish to help maintain the safety of all employees and to comply with the OSHA regulation 29 CFR 1910.147. It establishes the minimum safety requirements for work being performed where energy sources can be a hazard.

2.0 APPLICATION

This procedure establishes minimum requirements for the lockout of energy isolating devices when maintenance or servicing is done on machines or equipment. It is essential that the machine or equipment is stopped and isolated from all potentially hazardous energy sources and locked out before employees perform any service or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

This program and its procedures shall apply to all activities under the direct control of the Company.

3.0 DEFINITIONS

Affected Employee - An employee whose job requires him/her to operate to use a machine or equipment on which services or maintenance is being performed under lockout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee - An employee, by department designation, which locks or implements a system procedure on machines or equipment for the purpose of performing the service or maintenance on that machine or equipment.

Cord and Plug-connected Equipment - Equipment that is powered by an electrical energy source that can be shut down by removing the cord and plug from the energy source.

Energized - Connected to an energy source or containing residual or stored energy.

Energy Isolation Device - A mechanical device that is part of a piece of equipment, machinery or system that physically prevents the transmission or release of energy. Some examples include manually operated electrical circuit breakers; disconnect switches, slide gates, line valves, and blocks. This term does not include a push button; selector switch, and other control circuit type devices.

Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.
Locks - An individually keyed padlock personally assigned to an Authorized Person or Affected Person that is used with a lock out device to control and isolate energy sources.

Lockout - The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated, until the lockout device is removed.

Lockout Device - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energization of a machine or equipment.

Tag Out - Posting a prominent warning tag with durable string onto the energy isolation device and/or lock out device of the piece of equipment, machinery or system being controlled. The tag must state "DO NOT OPERATE" and document the Authorized Person taking the equipment out of operation, as well as the date. It is a warning to others that the equipment cannot be put back into operation until the tag and/or lock have been removed by the Authorized Person.

4.0 RESPONSIBILITIES

4.1 MANAGEMENT

Management is responsible for making sure that all hazardous energy sources are identified and that all applicable employees receive training consistent with their level of lockout/tag-out responsibility.

4.2 ON SITE SUPERVISOR

The on-site supervisor must ensure that all employees follow the requirements or guidelines making up these procedures.

4.3 EMPLOYEE

The employee is required to comply with the restrictions and limitations during the use of lockout. Only authorized employees are to perform the lockout in accordance with this procedure. Upon observing a machine or piece of equipment that is locked out to perform servicing or maintenance, employees must not attempt to start, energize, or use that machine or equipment.

5.0 TRAINING

All authorized, affected, and incidental personnel shall receive training consistent with their level of lockout/tag-out responsibility.

An authorized employee is one who has been designated to perform service or maintenance. Training for authorized employees will include:

2 of 6
• Recognition of applicable hazardous energy sources (i.e., electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravitational, magnetic, tension, kinetic, etc.)

• Type and magnitude of the energy available in the workplace

• Methods and means necessary for energy isolation and control.

An affected employee is one who operates or uses a machine on which servicing is being performed, or one who is required to work in an area in which such servicing is being performed. Affected individuals will be instructed in the purpose and use of the energy control procedure.

Incidental employees are those who may work in an area where energy control procedures are used. These individuals will be instructed about the procedure and the prohibition against restarting or reenergizing machines or equipment which are locked out or tagged out.

Retraining will be provided for all authorized and affected individuals whenever there is a change in their job assignments; a change in machines, equipment, or processes that present a new hazard; or when there is a change in the energy control procedures. Additional retraining will be conducted whenever a periodic inspection or other evidence reveals that there are inadequacies in the individual’s knowledge or use of the energy control procedures.

Awareness training will be documented and retained within the Clarity Training by using course LOTOEFV Lockout/Tagout for affected employees.

Outside training shall be conducted for authorized employees.

6.0 JOB PLANNING

Prior to permitting and commencing the work, survey equipment to locate and identify all isolating devices to be certain which switch(es), valve(s), or other energy isolating devices apply to the equipment to be locked out. More than one energy source (electrical, mechanical, stored, or other) may be involved.

7.0 LOCKOUT PROCEDURES

Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

The authorized employee shall identify the type and magnitude of the energy that the machine or equipment utilizes. The employee shall understand the hazards of the energy, and shall know the methods to control the energy.

If the machine or equipment is operating, shut it down by normal stopping procedure, i.e., depress stop button, open switch, close valve, etc.
De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

Lock out the energy isolating device(s) with assigned individual lock or tag (if using the tagout system, fasten a "DO NOT OPERATE" tag) that is available from the on site supervisor or the HSE department.

- Lockout and/or tagout device shall include the name of the individual applying the device.
- Lockout devices, where used shall be affixed in a manner that will hold the energy isolating devices in a safe or off position.
- Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devise(s) from the safe or off positions.
- Where tagout devices are used with energy isolation devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.
- Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, air, gas, steam or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

Ensure that equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the switch or other normal operating control(s) or by testing to make certain the equipment will not operate.

Return operating control(s) to neutral or "OFF" position after verifying the isolation of the equipment.

Prior to starting work on machines or equipment that have been locked or tagged out; the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

**8.0 PROCEDURES FOR TESTING**

When temporarily removing lockout devices for the purpose of performing a test on machinery or equipment, the following steps should be taken:
• Check the machine or equipment, as well as the immediate area around the machine or equipment, to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.

• Check the work area to ensure that employees have been safely positioned or removed from the area.

• The employee that will be performing the test shall remove the lockout/tagout device(s) in conjunction with the individual that initially attached the lockout/tagout device(s)

• Procedure with testing machine or equipment.

• De-energize machine or equipment and reapply lockout/tagout device(s)

• Ensure that equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the switch or other normal operating control(s) or by testing to make certain the equipment will not operate.

• Return operating control(s) to neutral or "OFF" position after verifying the isolation of the equipment.

• Prior to starting work on machines or equipment that have been locked or tagged out, the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

• The test has been performed and the machine or equipment is now locked out again.

9.0 RESTORING TO SERVICE

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps should be taken:

• Check the machine or equipment, as well as the immediate area around the machine or equipment, to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.

• Check the work area to ensure that employees have been safely positioned or removed from the area.

• Verify that controls are in "OFF" or neutral position.

• Remove the lockout devices and re-energize the machine or equipment.

• Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

Note: This procedure does not apply to cord or plug connected equipment when the equipment is in exclusive control of the employee who is performing the service or maintenance of the equipment.
10.0 PROCEDURES INVOLVING MULTIPLE PERSONS (GROUP LOCKOUT)

If more than one authorized employee is required to lockout the same equipment, each shall place his/her own personal lockout device on the energy isolating device(s). When an energy isolating device cannot accept multiple locks, a multiple lockout device (hasp) may be used.

The authorized employee who has the primary responsibility for the work being performed under the protection of a group lockout/tagout device shall ascertain the exposure status of individual group members.

11.0 REFERENCES

29 CFR 1910.333 SUBPART S - ELECTRICAL

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6 of 6
HEAT ILLNESS PREVENTION PLAN

HS-R35

Prepared for:
EMPLOYEES OF FUGRO CONSULTANTS, INC.
HEAT ILLNESS PREVENTION PLAN

APPROVED BY: Cathy Morris DATE: May 2012
Cathy Morris, Fugro Consultants, Inc.
HSE Manager
CONTENTS

1.0 PURPOSE........................................................................................................... 1

2.0 SCOPE .................................................................................................................. 1

3.0 HEAT ILLNESS PREVENTION ........................................................................... 1
   3.1 Recognize the Hazard ....................................................................................... 1
   3.2 Water .................................................................................................................. 2
   3.3 Shade .................................................................................................................. 2
   3.4 Acclimatization ................................................................................................. 3
   3.5 Prompt Medical Attention .................................................................................. 3
   3.6 Other Information .............................................................................................. 3

4.0 GENERAL SIGNS AND CARE FOR HEAT EMERGENCIES ..................... 3
   4.1 Heat Cramps ...................................................................................................... 3
   4.2 Heat Exhaustion .................................................................................................. 4
   4.3 Heat Stroke ........................................................................................................ 4
1.0 PURPOSE

The purpose of the Heat Illness Prevention Plan (HIPP) is to meet the requirements set forth in California Code of Regulations, Title 8, Section 3395 as well as address Heat Illness concerns relating to employee’s safety throughout Fugro Consultants, Inc., and also to serve as a supplement to the Fugro Consultants Injury and Illness Prevention Program (IIPP). The information is intended to be used in conjunction with the IIPP. The HIPP establishes procedures and provides information necessary to ensure that employees of Fugro Consultants, Inc. (Fugro), are knowledgeable in the prevention and recognition of heat stress, in order to ensure their own safety and the safety of others.

2.0 SCOPE

This HIPP provides information regarding safe work practices for Fugro employees working in conditions where heat-related illness can be a serious to life-threatening occurrence.

3.0 HEAT ILLNESS PREVENTION

Heat-related illnesses are avoidable if training is in place and the right actions are taken before, during, and after working in hot conditions. High temperatures and humidity can stress the body’s ability to cool itself, making heat illness a concern during hot weather months. Working outdoors, especially during summer months, exposes personnel to elevated heat conditions, creating the potential for heat illness. The three primary forms of heat illness are heat cramps, heat exhaustion, and heat stroke. Heat stroke can be a life-threatening condition.

3.1 RECOGNIZE THE HAZARD

Learn the signs and symptoms of heat-induced illness and how to respond. All Fugro Consultants employees will receive supervisory and non-supervisory training, as outlined in CCR Title 8, Section 3395 (Heat Illness Prevention). Cal/OSHA and OSHA Heat Illness Prevention and Heat Equation Guidelines are provided in Appendix A of this HIPP.

Employee training topics will include:

- The environmental and personal risk factors for heat illness
- Review of this HIPP and procedures
- The importance of staying hydrated, drinking water frequently throughout the day, up to 4 cups per hour
- Importance of acclimatization (allowing the body to adjust gradually to the work in high heat)
- Types of heat illness and the signs and symptoms
- Necessity of immediately reporting to Fugro, directly or through the employee’s supervisor any signs or symptoms of heat illness
Heat Illness Prevention Plan
HS-R35
Revision 0

➢ Fugro’s procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided if they become necessary

➢ Fugro’s procedures for emergency communications. This includes the emergency response procedures such as locating local medical services and communication alternatives

➢ Fugro’s procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided, as needed, to emergency responders

**Supervisory Training.** Prior to assignment to supervision of employees working in the heat, training on the following topics shall be provided:

➢ The information required for employee training listed above

➢ The importance of preventing heat illness and how to recognize the symptoms

➢ The procedures the supervisor is to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures

➢ Procedures for acclimatization

➢ Modifying working hours where necessary/possible to work during cooler hours of the day

➢ Providing a “buddy system” to allow employees to watch each other closely for signs of heat illness

### 3.2 WATER

There will be an adequate supply of clean cool potable water available at all job sites. The Fugro Site Safety Representative or designated person will ensure that an adequate supply of drinking water is available at each location and that employees are encouraged consume an adequate amount of water.

It is recommended that each employee drink 4 8-ounce glasses of water per hour, including at the start of shift.

### 3.3 SHADE

Fugro will provide shade for recovery periods when employees need relief from the heat. The direct heat of the sun can add as much as 15 degrees to the heat index. Rest breaks are important to provide time for cooling and provide an opportunity to drink water. Breaks should be taken in cooler, shaded areas. The Fugro site safety representative or designate will be responsible for ensuring that adequate shade is available at work sites where the temperature is expected to exceed 85 degrees. The location of shade areas and the need to rest and get into
the shade if any heat illness symptoms are present will be discussed daily at the tailgate meeting.

3.4 ACCLIMATIZATION

People need time for their bodies to adjust to work in the heat. Acclimatization is particularly important for employees returning to work after a prolonged absence or recent illness, recently moving from a cool climate to a hot climate, or working during the beginning stages of a heat wave.

For heavy work under extremely hot conditions, at least the first 2 or 3 days of work in the heat should be limited to 2 to 4 hours.

Monitor employees closely for signs and symptoms of heat illness, particularly when they have not been working in the heat for the last few days or when a heat wave occurs.

3.5 PROMPT MEDICAL ATTENTION

Recognizing the symptoms of heat illness and providing an effective response requires promptly acting on early warning signs. These signs are covered in the information provided in Appendix A and in Section 4 of this HIPP. Any of these symptoms require immediate attention.

All Fugro field personnel are first-aid/CPR trained. However, if workers show any abnormal response to the heat and first-aid trained personnel are not immediately available onsite, call 911 immediately. A site-specific safety plan is written for all Fugro field projects. These plans include an emergency action plan that details the site location and alternative communication methods if cell phone coverage is not available at the work site. How to contact emergency services and guide them to the work location will be discussed daily at the tailgate meeting.

3.6 OTHER INFORMATION

- Dress for the heat. Wear lightweight, loose fitting, light colored clothing.
- Eat small meals and eat more often. Avoid foods that are high in protein, as they tend to increase metabolic heat.

4.0 GENERAL SIGNS AND CARE FOR HEAT EMERGENCIES

4.1 HEAT CRAMPS

Description: Heat cramps are a common type of heat-related injury that most people have experienced at one time or another. Heat cramps are muscle spasms that usually affect the arms, legs, or stomach. Frequently, they do not occur at the time of exposure, but later at night or when relaxing. Heat cramps are caused by heavy sweating, especially when water is not replaced quickly enough. Although heat cramps can be painful, they are not considered serious.
Heat Illness Prevention Plan
HS-R35
Revision 0

Prevention/First Aid: Drink electrolyte solutions such as Gatorade and plenty of water during the day, and try eating more fruits, like bananas, to help keep your body hydrated during hot weather. Contact your supervisor, Fugro safety personnel, or call 911 if you or a coworker becomes ill.

4.2 HEAT EXHAUSTION

Description: Heat exhaustion is a more serious condition than heat cramps. It occurs when the body’s internal temperature-regulating system is overworked, but has not completely shut down. In heat exhaustion, the surface blood vessels and capillaries, which enlarge to cool the blood, collapse from loss of body fluids and necessary minerals. This happens when you do not drink enough fluids to replace what you are sweating away.

Symptoms Include: Headaches, dizziness or lightheadedness, weakness, mood changes such as irritability, confusion, or the inability to think straight, upset stomach, vomiting, decreased or dark colored urine, fainting or passing out, and pale, clammy skin.

Prevention/First Aid: Act immediately. If not treated, heat exhaustion may advance to heat stroke or death. Move the victim to a cool, shaded area to rest, and don’t leave the person alone. If symptoms include dizziness or lightheadedness, lay the victim on his or her back and raise the legs 6 to 8 inches. If symptoms include nausea or upset stomach, lay the victim on his or her side. Loosen and remove any heavy clothing. Have the victim drink cool water (about a cup every 15 minutes) unless sick to the stomach. Cool the person’s body by fanning and spraying with a cool mist of water or applying a wet cloth to the person’s skin. Call 911 for emergency help if the person doesn’t feel better within a few minutes.

4.3 HEAT STROKE

Description: Heat stroke is a life-threatening illness with a high death rate. It occurs when the body has depleted its supply of water and salt and the victims’ core body temperature rises to deadly levels. A heat stroke victim may suffer heat cramps and/or heat exhaustion before progressing into the heat stroke stage, but this is not always the case. It should be noted that heat stroke is sometimes mistaken for a heart attack. It is therefore very important to be able to recognize the signs and symptoms of heat stroke and to check for them anytime an employee collapses while working in a hot environment.

Symptoms Include: A high body temperature (103 degrees F); a distinct absence of sweating (usually), hot red or flushed dry skin, rapid pulse, difficulty breathing, constricted pupils, any or all of the signs or symptoms of heat exhaustion including dizziness, headache, nausea, vomiting or confusion, and possibly more severe symptoms including bizarre behavior and high blood pressure. Advanced symptoms can be seizure or convulsions, collapse, loss of consciousness, and a body temperature of over 108 degrees F.

Prevention/First Aid: Call 911 for emergency help immediately. Move the victim to a cool, shaded area, and don’t leave the person alone. Lay the victim on his or her back. Move any nearby objects away from victim if symptoms include seizures or fits. If symptoms include
nausea or upset stomach, lay the victim on their side. Loosen and remove any heavy clothing. Have the person drink cool water (about a cup every 15 minutes) if alert enough to drink something, unless person is sick to their stomach. Cool the person’s body by fanning and spraying with a cool mist of water or wiping with a wet cloth or covering him or her with a wet sheet. Place ice packs under the armpits and groin area.

For additional information on Heat Illness Prevention, please contact your supervisor or the Fugro HSE Department.
### Document Revision Record

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Approved by QHSE Manager, Fugro Consultants, Inc., May 2012

Note: If this is a printed or downloaded copy, please check the online QHSE-MS to ensure that it is the latest version.
Heat Stroke—A Medical Emergency

What are the symptoms?
Dry, pale skin with no sweating; hot, red skin that looks sunburned; mood changes such as irritability, confusion, or the inability to think straight; seizures or fits; and unconsciousness with no response.

What should you do?
- Call 911 for emergency help immediately.
- Move the victim to a cool, shaded area. Don't leave the person alone. Lay the victim on his or her back. Move any nearby objects away from the person if symptoms include seizures or fits. If symptoms include nausea or upset stomach, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Have the person drink cool water (about a cup every 15 minutes) if alert enough to drink something, unless sick to the stomach.
- Cool the person's body by fanning and spraying with a cool mist of water or wiping the victim with a wet cloth or covering him or her with a wet sheet.
- Place ice packs under the armpits and groin area.

Heat Exhaustion

What are the symptoms?
Headaches; dizziness or lightheadedness; weakness; mood changes such as irritability, confusion, or the inability to think straight; upset stomach; vomiting; decreased or dark-colored urine; fainting or passing out; and pale, clammy skin.

What should you do?
- Act immediately. If not treated, heat exhaustion may advance to heat stroke or death.
- Move the victim to a cool, shaded area to rest. Don't leave the person alone. If symptoms include dizziness or lightheadedness, lay the victim on his or her back and raise the legs 6 to 8 inches. If symptoms include nausea or upset stomach, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Have the person drink cool water (about a cup every 15 minutes) unless sick to the stomach.
- Cool the person's body by fanning and spraying with a cool mist of water or applying a wet cloth to the person's skin.
- Call 911 for emergency help if the person does not feel better in a few minutes.

How can you protect yourself and your coworkers?
- Learn the signs and symptoms of heat-induced illnesses and how to respond.
- Train your workforce about heat-induced illnesses.
- Perform the heaviest work during the coolest part of the day.
- Build up tolerance to the heat and the work activity slowly. This usually takes about 2 weeks.
- Use the buddy system, with people working in pairs.
- Drink plenty of cool water, about a cup every 15 to 20 minutes.
- Wear light, loose-fitting, breathable clothing, such as cotton.
- Take frequent, short breaks in cool, shaded areas to allow the body to cool down.
- Avoid eating large meals before working in hot environments.
- Avoid alcohol or beverages with caffeine. These make the body lose water and increase the risk for heat illnesses.

What factors put you at increased risk?
- Taking certain medications. Check with your health care provider or pharmacist to see if any medicines you are taking affect you when working in hot environments.
- Having a previous heat-induced illness.
- Wearing personal protective equipment such as a respirator or protective suit.
FIRE PREVENTION
HS-R36

1.0 PURPOSE

The purpose of the fire prevention and protection plan is to eliminate the causes of fire and prevent loss of life and property by fire. It provides employees and contractors with information and guidelines which will assist them recognizing, reporting and controlling fire hazards. This plan is in compliance with OSHA 29 CFR 1910.39.

2.0 SCOPE

Company-wide.

3.0 BASICS OF FIRE

3.1 THE FIRE TETRAHEDRON

In order to understand fire safety, you must first understand fire chemistry. These four basic elements are needed to produce a fire:

1. Fuel - Paper, wood, rags, oil, or grease.
2. Oxygen - Air, ventilation, stored oxygen.
3. Heat - Ignition sources, hot surfaces, sparks, open flames, electrical arcs.
4. Chemical Reaction - A sustained chemical reaction

To eliminate the potential for a fire or to extinguish a fire, you must remove 1 or more of the 4 components of the Fire Tetrahedron.

3.2 FOUR GENERAL CLASSES OF FIRE

The four general classes of fire are as follows:

1. Class A fires are those that have paper, wood, trash, and other solid material for fuel.
2. Class B has a flammable liquid or gas as a fuel; an example of a Class B fire would be gasoline that has ignited (In a Class B fire vapor suppression is of primary importance).
3. Class C fires are electrical in nature.
4. Class D fires result from a combustible metal such as magnesium.
3.3 TYPES OF FIRE EXTINGUISHERS

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<tbody>
<tr>
<td>A</td>
<td>Water</td>
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<tr>
<td>AB</td>
<td>Chemical Foam or Gel</td>
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<tr>
<td>BC</td>
<td>Carbon Dioxide</td>
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<td>BC</td>
<td>Dry Chemical</td>
</tr>
<tr>
<td>BC</td>
<td>Liquefied Gas</td>
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<tr>
<td>ABC</td>
<td>Dry Chemical or Halon</td>
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4.0 POTENTIAL FIRE HAZARDS: IDENTIFICATION AND CONTROL

4.1 COMMON CAUSES OF FIRES

- Overloaded electrical circuits, unsafe wiring and defective extension cords
- Appliances such as coffee pots/makers, hot plates and other heating devices left on not in use.
- Unattended cooking
- Overheated motors and other equipment not maintained properly
- Improper use of non-electrical heating systems (space heaters)
- Improper disposal of smoking material such as emptying ash trays in trash cans and/or coming in contact with other combustible material.
- Not using an ash tray - leaving a lighted cigarette on combustible material such as furniture
- Improper use, handling and storage of flammable material (gasoline, solvents, paints)
- Improper use of candles, Christmas tree lights and associated electrical cords
- Poor housekeeping which results in accumulation of combustibles such as paper, boxes, oil-soaked rags, and flammable liquids
- Improper use of welding torches and equipment

4.2 CHEMICAL HANDLING AND STORAGE

- Leaks, spills, and overflows must be avoided. Storage of flammable and combustible liquids in open containers is not permitted
- Chemicals, specifically, flammable and combustible liquids, should be stored in appropriate cabinets.
- Incompatible materials in storage areas must be segregated. Specifically, separate ignitable material from oxidizers or sources of ignition. In general, do not store different types of Incompatibles in the same container.

5.0 FIRE PREVENTION GUIDELINES

The following fire prevention guidelines should be adhered to in an effort to mitigate the hazards of fire, explosions, and the dangers associated with flammable materials.
• Work locations, vehicles, and the inside and outside of buildings shall be kept clean and orderly at all times.

• Discarded packing material or scrap should not be accumulated.

• Portable electric heaters must be used with caution, away from ignition sources, furniture and other flammable materials.

• Portable electric heaters must be equipped with an auto shut-off timer and be of the type that shut off automatically if tipped over.

• Combustible materials, such as oil-soaked rags, waste, and shavings shall be kept in approved metal containers with metal lids. Containers should be emptied as soon as possible.

• Flammable liquids such as gasoline, benzene, naphtha, lacquer thinner, and other solvents of this class shall not be used for general cleaning purposes.

• In any building, except one provided for their storage, flammable liquids such as gasoline, benzene, naphtha, lacquer thinner, and other solvents of this class shall be limited to five gallons, in an approved properly labeled container.

• When pouring or pumping gasoline or other flammable liquids from one container to another, metallic contact shall be maintained between the pouring and receiving containers.

• Strict adherence shall be paid to the "No Smoking" and "Stop Your Motor" signs at fuel dispensing locations.

• Change oil-soaked or contaminated clothing. It may cause skin irritation and is a fire hazard. Do NOT place in a dryer!

• Smoking or open flame shall not be permitted in areas where dangerous gases might be present, for example, oil rooms, hydrogen areas, acetylene storage, or similar areas. Neither shall smoking be permitted in storerooms, battery rooms, flammable liquid storage and use locations, or in other areas where quantities of combustible materials are kept. Absence of "No Smoking" signs shall not excuse smoking in dangerous places.

• All containers shall be labeled as to their contents. The Material Safety Data Sheet for each hazard will be readily available.

• A fire escape plan shall be posted in each building. Personnel should be familiar with their plan. Employees assigned to field locations, vessels, rigs, barges, etc., shall review the station bill for information pertaining to muster locations and other emergency responsibilities.

6.0 FIRE SAFETY AND LIFE SAVING EQUIPMENT

Fugro shall provide adequate and appropriate fire, safety, and life-saving equipment. This equipment shall be properly located at all times and only used during emergencies or drills.
It shall only be used for the purpose for which it is intended. All employees shall be required to report any deficiencies in equipment immediately to their supervisor.

Fire, safety and lifesaving equipment shall not be removed from designated locations for any purpose other than its authorized use, maintenance, or testing. When fire extinguishers have been used they shall not be put back into service until they have been refilled.

**6.1 TYPES OF FIRE PROTECTION EQUIPMENT**

The basic types of fire protection equipment and systems used within Fugro to control or extinguish fires are:

- Portable fire extinguishers
- Sprinkler systems
- Chemical types extinguishing systems, including carbon dioxide, dry chemical and HFC-227ea systems

**6.2 INSPECTIONS AND MAINTENANCE**

All extinguishers shall be regularly inspected, refilled, weighed, etc., in accordance with the manufacturers' recommendations. The date of such inspections, refills, etc., shall be recorded on a tag permanently attached to the extinguishers.

As required by state fire marshal law, below are the frequencies that each type of fire protection equipment must be inspected by a licensed vendor.

- Fire Extinguishers - Annually
- Fire Alarm Panel - Annually
- Fire Sprinkler System - Quarterly
- Fire Suppression System - Bi-Annually

As required by federal law, OSHA 29 CFR 1910.157, fire extinguishers are to be visually inspected monthly. Documentation of the visual inspection shall be kept and available upon request.

**7.0 EMERGENCY DRILLS**

Office fire drills shall be held annually and shall be taken seriously by all concerned. For action plans to be effective all staff must be familiar with the safety and emergency procedures appropriate to their location. A log of all emergency drills shall be maintained.

**8.0 FIRE PREVENTION TRAINING**

Fugro shall provide basic training, upon initial assignment, in the use of fire fighting techniques and equipment to an appropriate number of office and field based personnel. Additional fire fighting training shall be provided annually thereafter.
Where Fugro has provided portable fire extinguishers for employees use in the workplace, Fugro will provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved in fighting fires that are in the incipient stage.

Employee's assigned fire fighting responsibilities shall be familiar with both the location and the operation of all fire protection equipment in the area of their work.

9.0 APPLICABLE REGULATIONS, CODES AND RECOMMENDED PRACTICES

Emergency Action Plan

Fugro Emergency Contact List

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ATTACHMENT D
RESULTS OF A DOWNHOLE VIDEO-LOG OF THE
McCROSKEY WS-12 WATER WELL
**Wellbore Video Report**

**Company:** Fugro, Consultants, Inc  
**Address:** 4820 McGrath Street, Suite 100  
**City:** Ventura  
**Requested By:** Timothy A. Nicley  
**Copy To:**  

**Operator:** L. Hock  
**Location:** AREA Lease off Long Canyon road  
**Operator:** McCrosky WS-12 Water Well  
**Survey Date:** Oct 2, 2012  
**Camera:** CCV Color Flip Camera - Short L.H.  

**Well Owner:** AREA  
**Designated Use:** General Inspection  
**Reason For Survey:** Top of Casing  
**Zero Datum:** Measured  
**Reason For Survey:** Very Heavy, Increasing W/Depth

**Casing Buildup:**

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<td>Static water level @ 248'</td>
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<tr>
<td>254'</td>
<td>No visibility @ 255'</td>
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<tr>
<td>278'</td>
<td>Sideview, no visible perforations</td>
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<tr>
<td>304'</td>
<td>Sideview, no visible perforations</td>
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<tr>
<td>350'</td>
<td>Visible vertical slots</td>
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<tr>
<td>460'</td>
<td>Probable gun perforation</td>
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<tr>
<td>491'</td>
<td>Fill, end of down run survey @ 492'</td>
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<tr>
<td>492'</td>
<td>Sidescan up</td>
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<tr>
<td>170'</td>
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**SELECTED WELLBORE SNAPSHOTS**

0' (See Other Side)  
247' (See Other Side)  
254'  
278'  
304' (See Other Side)  
350' (See Other Side)  
460' (See Other Side)  
491' (See Other Side)
ATTACHMENT E
VARIOUS PHOTOGRAPHS THAT DOCUMENT THE FIELD WORK
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

DATE/TIME:
10/1/2012 11:26:40 AM

DATE/TIME:
10/1/2012 11:28:53 AM

PLATE E-1
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

PLATE E-2
Sturgeon Services (for Aera Energy)
Project No. 04.62120024

SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

10/1/2012 3:57:10 PM

PLATE E-3
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

PLATE E-6
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

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10/3/2012 4:38:22 PM
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

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10/3/2012 4:40:46 PM
SITE PHOTOGRAPHS
McCroskey WS-12 Pumping Tests
East Cat Canyon, Sisquoc, California

10/4/2012 7:15:59 PM

10/4/2012 7:16:08 PM

PLATE E-20
ATTACHMENT F
REPORT OF FIELD OPERATIONS
**July 21, 2012**

**Vessel:**
- **Owner:** Sturgeon Services
- **Vessel Name:** Aer-Energy

**Location:**
- **Surface Water:** Eau Claire, Wisconsin
- **Weather:** Hot, clear

**Description:**

- **8:** Site orientation/safety meeting with T. Nuss and C. Pohle.
- **8:** Met at McCrorey WS-12 site. Filled 500 gallons of water for testing.
- **17:** Filled pump to the point of 1000 gpm for test.
- **17:** Noted pH: 7.5, EC: 1160 μS/cm.
- **17:** Started pulling pump on 1/4 in. PVC drop pipe (20 ft long).
- **17:** Pulled 461 ft of drop pipe (2476 ft total).
- **17:** Released 1.5 ft below ground. SCE: 292.38 μS/cm.
- **17:** All off site. To return to 10 am for video log. Water running into well.

**Notes:**
- **Observation Period:** Start: 7, Stop: 9
- **Mileage:** 0 miles

**Copy Sent to Client:** Y

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4820 McGrath Street, Suite 100 - Ventura, California 93003-7778 • 805/650-7000, Fax: 805/650-7010
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<tr>
<td>Location</td>
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</tr>
<tr>
<td>Weather</td>
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<tr>
<td>Observer</td>
<td>Timothy Nisely (Fugro)</td>
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<tr>
<td>Project</td>
<td>McCracken WS-12 Testing</td>
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**Description:**

- 9:30 am On site for video log. Program turnover. Setup sun shade.
- Only 200 gallons of water was introduced into well overnight. Deo on site.
- 10:15 Video log to be here at 10:45.
- SWL: 244 ft blue, Some pollution at 350 ft.
- Fill at 491 ft. : ~ 2100 at 01:11. No clear contamination. Heavily encrusted.
- No pump ~ 260 upard. Well is in poor condition.
- 12:30 Phone call of Eric Pulson & Dan Tomma, plan is to continue at plan.
- For step test. Pump to be installed today.
- Due to remain on site until 4pm. Fisher can to arrive in 7th morning.
- 12:45 Off site.

**Mileage:** ___________________ miles
Job No.: 04.62120024  Date: October 3, 2012
Location: East Cat Canyon, McCrory WS-12  Weather: Clear
Observer: Timothy Niall (Fugro)  Observation Period: Start:  Stop:

Description:
Pump installation underway by Fisher Pump crew, observed by Dean Leamini. Pump intake installed to 479 feet. Tube for transducer installed to 473 feet. Stakes were 1.251.41 feet below top of tube (3 feet above casing). Transducer (300 psi range) installed to 473 feet. Therefore: 226 ft  writer above transducer

147 pm Started transducer at 1 minute intervals.
155 pm Pump on to check rotation. See Pumping Test Field Data Form for details. Switched off.
201:30 pm Switched on. No discharge. Switched off.
207 pm Meter: 58, 007, 0844 ft³ Switched on for Step Test.
Pumped for 100 minutes at 42 gpm (initial high rate). 100 minutes at 75 gpm 100 minutes at 100 gpm 100 minutes at 125 gpm (until 8:37 pm)

Meter not accurate enough so flow rates calculated with bucket stopwatch. Flow divided to top of slope at several locations. Flow reached road, crossed to west side then down (North) along shoulder of Long Canyon Rd, continues crossing back to east side. No pooling evident.

Mileage: ________ miles

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<table>
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<th>Clock Time (Minutes)</th>
<th>Elapsed Time (Feet BTOC)</th>
<th>Water Level (Feet BTOC)</th>
<th>Drawdown (Feet)</th>
<th>Discharge (Gallons)</th>
<th>Discharge (gpm)</th>
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Approved by David Gardner, AC 71 Manager, Fugro West, Inc. 11/5/09
Note: If this is a printed copy, please check the online QMS to ensure that it is the latest version.
WR-F45 Pumping Test Field Data Form (Cont.)

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<th>Discharge (gpm)</th>
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<td>7:50</td>
<td>49.59</td>
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<td>Water slowly spilling on sides</td>
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<td>7:46:45</td>
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<td>7:50</td>
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<td>0.26</td>
<td>125 psi, Still rusty.</td>
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<td>0.28</td>
<td>125 psi, up</td>
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<td>~125</td>
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</table>

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Note: If this is a printed copy, please check the online QMS to ensure that it is the latest version.
Compiled equipment and lighting for constant rate test (lighting, generator...)

1100 am Started pumping of well for test at 125 gpm. See Pumping Test Data Form for details.

125 gpm rate study after initially higher rate.
After several hours, flow rate and pumping level study.
After 2 hours (1300) water became rusty in color, clearing for several hours thereafter.

Minor erosion on shoulder and road noted.
1900 Tank field by this well (10,000 gal) is 1/2 full: 4.5 ft from top of 9 ft high tank.

2300 Test study. To leave pump on all night. Collected water samples.
When leaving site, noticed small slump at top of road.

2330 Stopped water flow from pump. Test terminated. Data sufficient for analysis due to study Plan & Q. Mound cones in front of slump.
Called Don. Sent pictures of slump.

0000 (Midnight) Cleaned up dirt of shool w/Don (lights, traffic control)
No tire marks were present on this very recent slump. Photographed site.
Slump is small and superficial ≤ 2 ft deep.

0050 Don and I leave site. Road sufficiently delineated. To get and clean in 1 week next morning.
### WR-F45 Pumping Test Field Data Form (Cont.)

**Project Name:** Apex East Cut Canyon  
**Date:** 10/4/2012  
**Well No.:** McCrady WS-12  
**Project No.:** 04.G2120.024

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<td>22:00</td>
<td>660</td>
<td>75</td>
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<td>125</td>
<td>125</td>
<td>1213-Sm, 19.9, 2.45</td>
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<tr>
<td>23:00</td>
<td>720</td>
<td>Fill bucket</td>
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<td></td>
<td>125</td>
<td>1213-Sm, 19.9, 2.43</td>
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<td>23:16</td>
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<td>Small hillside, stop slide, slide filled, clogged</td>
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<td></td>
<td></td>
<td>Stop slide, clogged, stopped slide, slide filled</td>
</tr>
</tbody>
</table>

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Note: If this is a printed copy, please check the online QMS to ensure that it is the latest version.
Job No.: 04.62120024  Date: October 5, 2012
Client: Sturgeon Services - Aten Energy  Project: McCookley WS-12 Testing
Location: E. Cty Cyn. McCookley WS-12  Weather: Clear
Observer: Timothy Nilby (Fugro)  Observation Period: Start:  Stop:

Description:

730 Fisher Pump on site to remove test pump then re-install 15HP existing pump.

Removed test drum. Download all data. Complete recovery to 4.

Dismantled broken to clean up Long Cyn Rd.

1030 Clean up largely complete. Pump removal underway. Fisher plus to complete re-installation today, if not tomorrow.

Mileage: _______ miles

Copy Sent To Client: Y N  Continued On Next Page  Page  Of
ATTACHMENT G
VARIOUS GRAPHS OF THE AQUIFER TEST RESULTS
McCroskey WS-12 Step Test Hydrograph

- **Step 1**: Pumping rate: 42 gpm, Pumping water level: 280 feet, Specific Capacity: 1.25 gpm/ft
- **Step 2**: Pumping rate: 75 gpm, Pumping water level: 317 feet, Specific Capacity: 1.06 gpm/ft
- **Step 3**: Pumping rate: 100 gpm, Pumping water level: 356 feet, Specific Capacity: 0.91 gpm/ft
- **Step 4**: Pumping rate: 125 gpm, Pumping water level: 393 feet, Specific Capacity: 0.85 gpm/ft

Static water level: 246.3 feet

Time since step began, minutes
ATTACHMENT H
CONSTANT DISCHARGE TEST RESULTS
GENERAL MINERAL CONSTITUENTS ANALYSIS
Prepared for: Fugro West, Inc.
4820 McGrath St. Suite 100
Ventura, CA 93003
Attn: Tim Nicely

Report Date: October 15, 2012
Laboratory Number: 122977
Project Name: McCroskey WS-12
Project No: 04.62120024
Sampled by: Client

On October 5, 2012, Capco Analytical Services, Inc. (CAS), received one (1) sample to be analyzed. The sample was identified and assigned the laboratory ID number listed below:

<table>
<thead>
<tr>
<th>SAMPLE DESCRIPTION</th>
<th>CAS LAB NUMBER ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCROSKEY WS-12</td>
<td>122977-01</td>
</tr>
</tbody>
</table>

By my signature below, I certify that the results contained in this laboratory report comply with applicable standards for certification by the California Department of Public Health’s Environmental Laboratories Accreditation Program (ELAP), both technically and for completeness, and that, based on my inquiry of the person or persons directly responsible for performing the analyses, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Alin E. Repede, MS
Director - Analytical Operations

If you have any further questions or concerns, please contact me at your convenience. This report consists of 6 pages excluding the cover letter and the Chain of Custody.

This report shall not be reproduced except in full without the written approval of CAS. The test results reported represent only the item being tested and may not represent the entire material from which the sample was taken.
CERTIFICATE OF ANALYSIS

Client: Fugro Consultants
Sample ID: McCroskey WS-12
CAS LAB NO: 122977-01
Analyst: AN/ABE/GM/LL

GENERAL MINERAL SUMMARY

<table>
<thead>
<tr>
<th>COMPOUND</th>
<th>RESULT</th>
<th>UNITS</th>
<th>DF</th>
<th>PQL</th>
<th>METHOD</th>
<th>DATE ANALYZED</th>
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</thead>
<tbody>
<tr>
<td>Alkalinity (CaCO₃)</td>
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<td>mg/L</td>
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<td>2320 B</td>
<td>10/05/12</td>
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<tr>
<td>Bicarbonate (CaCO₃)</td>
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<td>10/05/12</td>
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T.D.S.: Total Dissolved Solids
mg/L: Milligrams/Liter(ppm)
QUALITY CONTROL SECTION
QUALITY CONTROL SECTION

Client: Fugro Consultants
Sample ID: Method Blank

CAS LAB NO: 122977-MB
Analyst: AN/ABE/GM/LL

GENERAL MINERAL SUMMARY

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<th>COMPOUND</th>
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<th>DF</th>
<th>PQL</th>
<th>METHOD</th>
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T.D.S.: Total Dissolved Solids
mg/L: Milligrams/Liter (ppm)
Quality Control Report

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<th>Sample Name</th>
<th>Qualifier</th>
<th>Sample Result</th>
<th>QC Result</th>
<th>Unit</th>
<th>Spike Level</th>
<th>%REC</th>
<th>Control Limits</th>
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<tr>
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<td>mg/L</td>
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<td>80-120</td>
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</table>

mg/L: Milligrams/Liter (ppm)
%REC: Percent Recovered
BQL: Below Practical Quantitation Limit
## Quality Control Report

**Client:** FUGRO  
**Sample ID:** McCroskey WS-12  
**CAS LAB NO.:** 122977-01  
**Sample Matrix:** WATER  
**Date Sampled:** 10/04/12  
**Date Received:** 10/05/12  
**Date Analyzed:** 10/05/12  
**Analyst:** GP

<table>
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<th>Sample Name</th>
<th>Qualifier</th>
<th>Sample Result</th>
<th>QC Result</th>
<th>Unit</th>
<th>Spike Level</th>
<th>%REC</th>
<th>Control Limits</th>
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<tr>
<td><strong>Chloride (by EPA 300)</strong></td>
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*mg/L: Milligrams/Liter (ppm)*  
*%REC: Percent Recovered*  
*BQL: Below Practical Quantitation Limit*
Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

[Signature]
Keith Chang, Ph.D. (QA/QC Supervisor)

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Capco Analytical certifies that the test results meet all requirements of ELAP unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Legend for Abbreviations:
PQL Practical Quantitation Limit
BQL Below Practical Quantitation Limit
ND NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
MDL Method Detection Limit
MRL Method Reporting Limit
MDA Minimum Detectable Activity
MCL Maximum Contamination Level