Lodi Gas Storage, L.L.C.
A BUCKEYE PARTNERS, L.P. COMPANY

January 11, 2013

Mr. Michael Robertson
Program Manager
California Public Utilities Commission
Consumer Protection & Safety Division
Safety & Reliability Branch
320 West 4th Street, Suite 500
Los Angeles, CA 90013

Certified Mail Receipt No. 70110110000215292093

RE: GO 112-E Gas Audit of Lodi Gas Storage

Dear Mr. Robertson:

Lodi Gas Storage, L.L.C. (LGS) submits this written response to the Consumer Protection and Safety Division (CPSD) of the California Public Utilities Commission. On behalf of the CPSD, Terence Eng and Fred Hanes conducted a General Order 112-E audit of LGS from August 20-24, 2012. The audit findings identified by CPSD were provided to LGS on December 13, 2012. This written response addresses the audit findings as noted by CPSD in the Summary of Inspection Findings.

This written response includes the attached documentation:

- Attachment #1 – LGS responses to CPSD Summary of Inspection Findings
- Attachment #2 – Letter from Farwest Corrosion Control Company
- Attachment #3 - LGS Safe Work Permit documenting Kirby Hills cathodic protection remedial action
- Attachment #4 – Cathodic Protection System Commissioning Report
- Attachment #5 – External Corrosion Control Monitoring Report dated June 25, 2012

If you have any questions, or require more information, please contact me at **gclark@lodistorage.com** or at (209) 368-9277 x21.

Sincerely,

Gregory N. Clark
Compliance Manager

1520 West Kettleman Lane • Suite A1 • Lodi, California 95242
209 368 9277 • 209 368 9276 (Fax) • www.lodistorage.com

Enclosures

cc: File #S3.03
T. Eng, F. Hanes, D. Lee, (via e-mail)
A. Anderson, E. Kuykendall, J. Lawhorn, R. Russell (via e-mail)

Attachment #1

Lodi Gas Storage, L.L.C.

A BUCKEYE PARTNERS, L.P. COMPANY

LGS Responses to CPSD Summary of Inspection Findings

SUMMARY OF INSPECTION FINDINGS

A. Audit Findings and Violations

Title 49 CFR, §192.465(d) states:

"Each operator shall take prompt remedial action to correct any deficiencies indicated by the monitoring."

CPSD reviewed Line Segment KC021KB, Compressor Station IJ, and found that the cathodic protection on the pipeline did not meet the -850 mV criteria as specified in Title CFR Part 192 Appendix D for two consecutive monitoring cycles. Lodi Gas Storage recorded annual pipe-to-soil readings of the segment on 5/27/10 (-664 mV) and 6/13/11 (-707 mV). No readings were noted between the two dates to demonstrate that the deficiency was remediated.

On May 19, 1989, the Federal Department of Transpiration (DOT) issued a letter that provided an interpretation of Title 49 CFR §192.465. In the letter the DOT stated that cathodic protection deficiencies are expected to be addressed and corrected by the next monitoring cycle under normal conditions.

Lodi Gas Storage was in violation of Title 49 CFR §192.465(d) for not taking prompt remedial action to correct deficiencies indicated by its monitoring.

LGS Response:

The low pipe-to-soil potentials (-664 mV and -707 mV) on line segment KC021KB were caused by two separate issues that were each remediated prior to the next monitoring cycle. Therefore, the low cathodic protection readings recorded in May 2010 and June 2011 do not constitute a violation of 49 CFR §192.465(d).

LGS contracted Farwest Corrosion Control Company to conduct external corrosion control monitoring per §192.465(a). A detailed description of the monitoring and remedial actions as they apply to line segment KC021KB has been provided for your reference by Farwest Corrosion Control Company (see Attachment #2).

The cause of low potential on May 27, 2010 was an omitted flange insulator kit on the 6" bypass line, and remedial action was completed on June 7, 2011. This remedial action, installation of a flange insulator kit, was documented by LGS on a safe work permit (see Attachment #3).

The cause of low potential on June 13, 2011 was an ineffective flange insulator kit on the 16" inlet to the compressor station, and remedial action was completed on September 22, 2011. This remedial action, installation of impressed current cathodic protection systems, was detailed in the system commissioning report (see Attachment #4).

In conclusion, the most recent external corrosion control monitoring for line segment KC021KB was conducted on June 25, 2012 and shows a pipe-to-soil potential of -1058 mV (see Attachment #5). This pipe-to-soil reading meets the -850 mV criteria as specified in Title CFR Part 192 Appendix D and corroborates that remedial actions have been completed.

B. Recommendations

Title 49 CFR, §192.243(a) states:

"Nondestructive testing of welds must be performed by any process, other than trepanning (emphasis added), that will clearly indicate defects that may affect the integrity of the weld."

Lodi Gas Storage's Procedure 15.02, p.2 states the line quoted above minus the underlined portion "other than trepanning". Although Lodi Gas Storage's procedure does not explicitly state that trepanning is allowed, the procedure also does not explicitly state that trepanning is forbidden. CPSD recommends Lodi Gas Storage explicitly include in its procedure that trepanning is not allowed during nondestructive testing of welds.

LGS Response:

The text "other than trepanning" has been added in LGS Operations and Maintenance Manual Procedure 15.02 per CPSD's recommendation.

Attachment #2

Letter from Farwest Corrosion Control Company

FARWEST CORROSION CONTROL COMPANY

Materials • Engineering • Installation
4114 Armour Ave., Bakersfield, CA 93308
Tel: 661-323-2077 • Fax: 661-323-2647
www.farwestcorrosion.com

Central California Regional Office
CLC #248232

January 10, 2013
Job Number JB3363

Lodi Gas Storage, LLC
1520 W Kettleman Lane, Suite A1
Lodi, California 95242

Attention: Mr. Greg Clark

Subject: **Response to CPUC Finding: 2010 and 2011 Annual Cathodic Protection Survey of Cathodic Protection Systems - Lodi Gas Storage Kirby Hills Facilities – Solano County, California**

BACKGROUND:

A recent audit of the Lodi Gas Storage Kirby Hills facilities by the California Public Utilities Commission revealed what appears to be a "finding" of deficient pipe-to-soil potentials at the same location on the 16-inch Transmission Pipeline for two consecutive years. However, an examination of the reports from the 2010 and 2011 Annual CP Surveys reveals that the inadequate potentials at this location are the results of two separate and distinct causes occurring at two separate and distinct times. The purpose of this report is to reiterate the documentation of the above occurrences.

CATHODIC PROTECTION CRITERIA:

All potential levels measured and recorded are referenced to the criteria for cathodic protection as established by the National Association of Corrosion Engineers standard SP0169-2007, Section 6, Subsection 6.2.2.1 paragraph 1.

A negative (cathodic) potential of at least 0.850 Volts (850 millivolts) with cathodic protection applied, as measured with respect to a saturated copper/copper sulfate (Cu_2SO_4) reference electrode contacting the electrolyte, is considered the criteria for cathodic protection of buried or submerged steel structures. Voltage drops other than those across the structure-to-electrolyte boundary must be considered for valid interpretation of this voltage measurement.

SURVEY RESULTS & CONCLUSIONS:

Although the survey data sheets may not clearly indicate that the problems with insulating flange kits in question are not the same, the text of the 2010 and 2011 reports clearly identifies the distinction. The following passage is quoted from the 2010 Annual CP Survey report (**bold underline** added for emphasis):

"16" TRANSMISSION PIPELINE:

- We began our 2010 survey at the PG&E connection on Birds Landing Road. Pipe-to-soil potentials were noted to decrease (become less negative) as we approached the LGS Kirby Hills Plant. When we arrived at the plant, we observed that **a flange insulator (IF kit) was found to have been inadvertently omitted from a six-inch bypass pipeline connection to the Transmission Line.** This situation is causing current intended to protect the pipeline to be consumed by Plant piping and its electrical grounding system. All other dielectric fittings tested were found to provide adequate isolation."

and quoted from the 2011 Annual CP Survey:

"16" TRANSMISSION PIPELINE:

- **Although the missing insulating flange kit (IF kit) on a six-inch bypass pipeline connection reported during the 2010 Annual Cathodic Protection Survey has been replaced, the 16-inch IF kit at the inlet to the Compressor Plant was found to be ineffective.** This situation is most likely caused by a buildup of electrically conductive debris from internal cleaning (pig) runs lodging in the gap between flanges. The conductivity of this debris allows current intended to protect the pipeline to be consumed by Plant piping and its electrical grounding system."

CONCLUSIONS AND RECOMMENDATIONS:

1. Although deficient pipe-to-soil potentials on the 16-inch Transmission Pipeline riser at the Kirby Hills Compressor Station were recorded during two consecutive annual surveys, an examination of the reports for those surveys reveals that the low readings were the result of two separate and distinct issues. The missing six-inch insulator was installed per Farwest recommendations to address the finding from the 2010 Annual Survey. This IF kit was functioning properly at the time of the 2011 survey. However, the 16-inch insulator had apparently failed in the time between the 2010 and 2011 surveys.
2. Impressed current CP systems were installed in 2011 to protect buried compressor plant piping. The shorted 16-inch insulator is no longer a detriment to the level of protection on the Transmission Pipeline as the magnesium anode cathodic protection on the 16-inch pipeline is in effect supplemented by the plant CP systems through any shorted insulators.
3. If ANY modifications or additions to piping are proposed, it is strongly recommended that a corrosion engineer review the modifications to insure that the effectiveness of the CP system will not be compromised.
4. The entire CP system should continue to be tested annually by a qualified cathodic protection technician or engineer.

We trust that the enclosed information is adequate for your needs. If you have any questions, or if we can assist you in any way, please do not hesitate to call.

Respectfully,
Farwest Corrosion Control Company

Bill Golden
NACE Corrosion Technologist #6143

Attachment #3

Permit No:

№ 2896

Work Authorization Permit

- [x] **Local Safe Work Procedure** (Complete General - Section Pages 1,2, & 6)
- [ ] **Hot Work/Hot Tapping** (Complete General & Hot Pages 1, 2, 3, & 6)
- [ ] **Excavation** (Complete General and Excavation – Pages 1, 2 & 6)
- [ ] **Permit Required Confined Space** (Complete General and Confined Space – Pages 1,2,4, 5 & 6)
- [ ] **Permit Required Confined Space Alternate Entry** (Complete General and Work – Confined Space - Pages 1, 2, 4, 5, & 6)
- [ ] **Confined Space** (Complete General and Confined Space – Pages 1, 2, 4, 5, & 6)
- [ ] **Lockout, Tagout** (Complete General and lockout, tagout – Pages 7 & 8)

JOB LOCATION ▶	KIRBY HILLS
JOB DESCRIPTION ▶	INSTALL INSULATORS

EMERGENCY NOTIFICATIONS				
☐ Emergency Notification Coordinator	Name: WILL	Type of Communication ☐ Phone ☒ Radio ☐ Other-▶		
☒ Control Room	Phone No. ~~(209) 368-9277 x16~~	707-371-1333		
SHERIFF Dispatch: ~~(209) 468-4421~~	FIRE Department: *Liberty* ~~(209) 339-1329~~ *Woodbridge (209) 634-7516*	HOSPITAL: ~~(209) 334-3411~~ 707-421-7040	AMBULANCES PHONE: ~~(209) 334-3311~~	RESCUE SERVICE *SJC-OES (209) 468-3969*

Discuss Emergency Contingency Plan (i.e. direction to location, escape routes, muster points, alarm/warning signals, etc.)

List details: (Attach supplemental if additional space required)

MUSTER @ FRONT GATE

MINIMUM REQUIREMENTS			
• Smoking in Designated Areas Only	• Hard Hats	• Safety Eyewear	• No Alcohol, Drugs or Firearms
• First Aid Equipment	• Safety Shoes (ANSI Safety Toed For P/L locations – Substantial, All Leather For Distribution Locations)		

REQUIRED SAFETY EQUIPMENT (List additional specific safety equipment in written safe work plan on page 2)

REQUIRED Y	REQUIRED N/A	COMPLETED Y		REQUIRED Y	REQUIRED N/A	COMPLETED Y	
☒	☐	☒	Fire Extinguishers	☒	☐	☒	Eye I Face Protection (e.g. goggles, faceshield)
☒	☐	☒	LEL, 02 Monitors	☒	☐	☒	Hearing Protection
☐	☒	☐	H2S Monitor	☒	☐	☒	Fire Retardant Clothing
☐	☒	☐	Respiratory Equipment	☐	☒	☐	Bonding Clamps I Ground Rod
☐	☒	☐	Lockout -Tagout Devices / Locks I Blinds	☐	☒	☐	Warning Signs I Barricade
☐	☒	☐	GFCI Protected Electrical Sources	☐	☐	☐	Other _____
☐	☒	☐	Fall Protection				

PRE-WORK CHECK LIST

REQUIRED Y	REQUIRED N/A	COMPLETED Y	
☐	☒	☐	Express Maintenance Work Order — W.O. Number:
☒	☐	☒	Verbally notified affected personnel. Date: 07 JUL 11
☒	☐	☒	Person notified? CONTROL
☐	☒	☐	Checked for hidden or buried pipelines or wire cables.
☐	☒	☐	Notified the LOCAL/STATE ONE -CALL SYSTEM? Confirmation number:
☐	☒	☐	All Hazardous Energy Sources Locked and Tagged Out. *(Complete Lockout/ Tagout section, Page 6)*
☒	☒	☐	Area secured with warning signs, flags, and barricades in place.
☒	☐	☒	Safety, fire and personal protective equipment available and functional.
☐	☒	☐	Bonding cables installed.
☐	☒	☐	Rectifiers turned off and critical bonds removed. List number and location in detailed work plan on page 2.
☒	☐	☒	Sources of ignition removed. (Cell Phones, Pagers, Cameras and other electronic equipment must be rated for use in accordance with the area classification)
☐	☒	☐	Identify potential Exposure Hazards (e.g. Asbestos, Lead, Benzene, Other) Explain:
☒	☐	☒	Verified that other work in the area will not affect conditions of the job.
☒	☐	☒	**PRE-JOB SAFETY ORIENTATION CONDUCTED & DOCUMENTED** (including Haz-Com & Emergency Procedures)
☒	☐	☒	MSDS available at site. 07 JUL 11
☒	☐	☒	**COPY OF PERMIT POSTED AT THE JOB SITE.**

WRITTEN SAFE WORK PLAN AND SPECIFIC JOB REQUIREMENTS COVERING TASKS AND POTENTIAL HAZARDS
Note: If attached safe work plan addresses this do not repeat.

Describe Job: (What tasks are to be performed?)

INSTALL INSULATORS

Describe Associated Hazards: (Identify the hazards associated with tasks listed above.)

Pressure release while taking out old INSULATORS.

Slip-trip-fall

Describe Precautions To Be Taken: (What precautions will be taken to address the hazards listed above?)

Use caution

PRE-JOB PERMIT ORIENTATION LOG (For additional names or names of persons assigned to job after initial orientation, attach additional page)

Signature	Date	Signature	Date	Signature	Date
	6/7/11				
	6/7/11				
	6/7/11				

INITIAL PERMIT AUTHORIZATION / RENEWAL / DURATION

Company Representative

Contractor Representative

Contractor Name

Number of Workers on Site Initial Day of Permit →

Start 7 JUN

Expires 7 JUN

Renewal of Permit

Day	1	2	3	4	5	6	7	8	9	10
Date										
Initials (Company Representative)										
Initials (Contract Representative)										
# Workers on site										

TRANSFER OF AUTHORIZATION ACROSS SHIFTS / ROTATIONAL PERSONNEL (Company Representative)

I have reviewed, agree with and accept the terms of the permit. And hereby accept responsibility for authorization.

Shift	Time	Date	Signature

TRANSFER OF AUTHORIZATION ACROSS SHIFTS / ROTATIONAL PERSONNEL (Contractor Representative)
(Requires Company Representative approval)

I have reviewed, agree with and accept the terms of the permit. And hereby accept responsibility for authorization.

Shift	Time	Date	Signature

JUN 07 2011

Permit No:

№ 2896

EXCAVATION REQUIREMENTS

- **Excavation properly shored, sloped or benched with safe means of egress (minimum of 25 feet).**
- **Workers maintain safe distance while equipment is in operation.**
- **Spoil pile must be a minimum of 2 feet from the edge of the excavation.**

REQUIRED Y	REQUIRED N/NA	COMPLETED Y	
☐	☐	☐	Underground Service Alert (USA) Notified. (800) 227-2600
☐	☐	☐	"Competent Person" on site while excavation is in progress. Name:
☐	☐	☐	Excavations 20 feet or deeper require the services of a Registered Professional Engineer.

SOIL TYPE:

☐ Stable Rock ☐ Type A ☐ Type B ☐ Type C

SOIL TYPES:

- Type A: Clay, Silty Clay, Sandy Clay and Sandy Clay Loam
- Type B: Silt, Silty loam, Sandy loam
- Type C: Gravel, Sand and Sandy Loam, submerged soil or soil from which water is freely seeping

LOCKOUT / TAGOUT

Equipment Locked/Tagged: (Valves, Pumps, Motors, etc.)

Method of Isolation:

☐ Lock & Tag ☐ Tag Only ☐ Blinds ☐ Double Block & Bleed ☐ Other

Energy Type Isolated:

☐ Electrical ☐ Steam ☐ Hydraulic ☐ Mechanical ☐ Pneumatic ☐ Other

Sequence of Lockout: 1) Prepare for shutdown, 2) Equipment shut down, 3) Identify all equipment isolation points, 4) Apply L/O-T/O device(s), 5) Release stored energy, 6) Verify equipment will not start, 7) Perform work, 8) Clear tools, inspect equipment, 9) Clear personnel from area, 10) remove lockout/tagout devices, 11) Restart equipment

JOB COMPLETION CHECKLIST

REQUIRED Yes	REQUIRED No/NA	COMPLETED Yes	
☐	☒	☐	Vented air/nitrogen from line?
☐	☒	☐	Pressure bled off?
☐	☒	☐	Have vent holes been repaired?
☐	☒	☐	Vapor plugs removed or displaced
☐	☒	☐	Have blinds/skillets been removed?
☐	☒	☐	Are all lockout/tagout devices removed from work area?
☒	☐	☒	Have all affected parties been notified that the job is complete?
☐	☒	☐	Have all rectifiers been turned back on and all bonds connected?
☒	☐	☒	Housekeeping?
☐	☒	☐	Is Management of Change required? (i.e. update valve charts, protective device drawings, local procedures, etc)
☒	☐	☒	Verify alarm systems are functioning properly (e.g. high sump alarms, high tank alarms, etc.).
☐	☒	☐	Verify Drain and Bleeder valves are in the closed positions.
☐	☒	☐	Refill lines/equipment with liquid.

DEBRIEFING: (Post job review / lessons learned)

One insulator replaced on the 16" line from Birds Landings

PERMIT CANCELLATION: (Not required if Permit is closed due to job completion)

☐ **Permit Cancelled** Signature: Date and Time:

Reason for Cancellation:

JOB COMPLETION

☒ **Job Completed** • **Permit Returned to Company Representative**

SIGNATURE (Company Representative): **Date:** 6/7/11

JUN 07 2011

Lodi Gas Storage, L.L.C.

A BUCKEYE PARTNERS, L.P. COMPANY

Date: 6/7/2011

Location: Kirby Hills compressor station 16" line and 6" bypass line.

Subject: In reference to safe work permit #2896

Work Performed: Replaced one shorted stud insulating sleeve on the 16" mainline to Birds Landing master meter. Re-tested stud with Fluke meter and there is no longer a short. Replaced 4 shorted stud insulating sleeve's on the 6" by-pass line and re-tested studs with meter and there is no longer any shorts.

Signed:

Attachment #4

Lodi Gas Storage, L.L.C.

A BUCKEYE PARTNERS, L.P. COMPANY

Cathodic Protection System Commissioning Report

FARWEST CORROSION CONTROL COMPANY

Materials • Engineering • Installation
4114 Armour Ave., Bakersfield, CA 93308
Tel: 661-323-2077 • Fax: 661-323-2647
www.farwestcorrosion.com

Central California Regional Office
CLC #248232

November 22, 2011
Job Number JH241

Buckeye Pipe Line Services
9999 Hamilton Blvd.
TEK #5
Breiningsville, PA 18031

Attention: Mr. Robert Gable

Subject: **Energize and Commission Cathodic Protection Systems at Lodi Gas Storage Kirby Hills Compressor Plant near Suisun City, California**

BACKGROUND:

Although the Lodi Gas Storage Kirby Hills Natural Gas Pipelines have been cathodically protected since shortly after construction, cathodic protection had not been installed to protect underground piping at the Kirby Hills Compressor Plant. Farwest Corrosion Control was contracted to perform current requirement testing and to design a CP system to protect soil side buried piping at the Kirby Hills Compressor Plant.

On January 18, 2011, Farwest Corrosion Control set up temporary CP systems utilizing a portable test rectifier connected to various temporary anode structures and conducted detailed surveys of pipe-to-soil potentials to evaluate the response of buried plant piping to CP current. Data from the potential surveys were extrapolated to calculate the CP current requirements and to determine suitable locations for groundbeds and rectifiers. The final CP design consisted of four semi-deep groundbeds of four anodes each, energized by rectifiers. To avoid the need for extensive dielectric isolation between piping and electrically grounded structures, the systems were designed to be of sufficient capacity to protect buried piping as well as structures connected to the Plant electrical grounding grid. With few exceptions the key structures are electrically common to the rest of the plant structures through common connections established primarily through the plant grounding system, as well as both below and above ground facilities, i.e., overhead pipe racks and skid mounted process equipment. As a result, in order to provide corrosion protection for the key underground pipelines, other underground structures will receive protective current as well. These structures include but are not limited to the following: bare copper grounding grid, electrical conduits and concrete rebar. It is estimated that the key structures represent less than 20% of the total underground structures. Farwest Corrosion Control Company was the successful bidder for the installation of the CP system components.

PROJECT SCOPE:

Install four (4) impressed current CP systems around the Lodi Gas Storage Kirby Hills Compressor Plant. Project tasks included but were not limited to the following:

- Install four (4) groundbeds with four high-silicon cast iron anodes each, backfilled with carbonaceous backfill (coke breeze)
- Install four CP rectifiers (furnished by Buckeye), anode junction boxes, cabling, etc.
- Energize and adjust rectifiers to appropriate levels in order to protect soil side buried piping
- Perform pipe-to-soil potential surveys to evaluate the operational status and make in-field adjustments if required

SYSTEM DESCRIPTION:

Four (4) separate cathodic protection rectifiers were installed throughout the plant dedicated to the underground structures. Each rectifier has a D.C. output capacity of 40 Amperes @ 40 Volts. In all cases the rectifier negative leads are connected to Plant piping and therefore to structures connected to the plant grounding system.

The original anode design called for four 59 foot deep groundbeds with four anodes each installed around the perimeter of the piping intended to be protected. However, hard sandstone was encountered at shallower depths at three of the anode locations. As a result, the groundbed designs were modified as follows:

1. North of Switchgear Building: No modifications. This groundbed was drilled to full depth (-59'; cement seal from -20' to surface) and four anodes were installed in a single borehole.
2. West of Compressor Building: Two anodes were installed in a single borehole (-30'; cement seal -10' to surface) and two additional boreholes were drilled, each with a single anode (-21'; cement -11' to surface) and (-19'; cement -10' to surface).
3. East of Compressor Building: The shallow depth of the sandstone formation at this location necessitated the drilling of four boreholes, each with a single anode (-15' with -9' seal, -18' with -9' seal, -19' with -9' seal, and -19' with -10' seal).
4. East of Gas Dehy Unit: The shallow depth of the sandstone formation at this location necessitated the drilling of four boreholes, each with a single anode (-19' with 10' seal, -19' with -10' seal, -18' with -9' seal, and -15' with 9' seal).

All anodes were successfully covered in coke breeze and sealed to surface with cement. All modifications to the original design depths as well as the less than 20-foot grout seals resulting from the decreased depths were inspected and approved by Solano County Inspectors.

METHODS AND PROCEDURES

Prior to energizing the rectifiers, "static" structure-to-soil potentials were measured and recorded throughout the plant on risers of the underground pipelines. Potentials were recorded again at these same locations after the four rectifiers had been adjusted to their anticipated total output current. These locations are noted on the data sheets.

Each rectifier / anode system was tested for the following:

- D.C. current and voltage output levels.
- Panel Meter accuracy
- Individual anode current output

All potentials were measured using a "MC Miller" portable copper/copper sulfate (Cu_2SO_4) reference electrode and a calibrated Fluke 87 digital multimeter. All rectifier and individual anode currents were calculated utilizing Ohm's Law by measuring the millivolt drop across the calibrated shunts installed in the rectifiers and anode junction boxes.

CATHODIC PROTECTION CRITERIA

All potential levels measured and recorded are referenced to the criteria for cathodic protection as established by the National Association of Corrosion Engineers standard SP0169-2007, Section 6, Subsection 6.2.2.1 paragraph 1.

A negative (cathodic) potential of at least 850 millivolts with cathodic protection applied, as measured with respect to a saturated copper/copper sulphate (Cu_2SO_4) reference electrode contacting the electrolyte, is considered the criteria for cathodic protection of buried or submerged steel structures. Voltage drops other than those across the structure-to-electrolyte boundary must be considered for valid interpretation of this voltage measurement.

SURVEY RESULTS:

RECTIFIERS AND ANODE BEDS

All rectifiers and anode beds were found to be fully operational and in good repair. Data pertinent to rectifier operation can be found on the attached Rectifier Data Sheets.

STRUCTURE TO SOIL POTENTIALS

Plant Structures – Static potentials recorded on the Plant structures were typical of those observed on unprotected steel in soil. Differentials observed between potentials measured in various areas of the Plant (and commonly interconnected via the electrical grounding system) are a probable explanation for the corrosion leaks discovered in 2010.

"ON" Potentials were recorded immediately following the energizing of the rectifiers and were observed to be increasing as polarization of the protected structures was taking place. Full polarization can be expected to take a minimum of several weeks in a facility of this size. Of the 194 potential measurements obtained on the plant underground structures, most were already in excess of the minimum –850 mV criteria for protection of buried or submerged steel and others were observed to be polarizing rapidly.

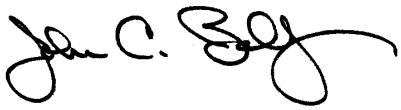
CONCLUSIONS:

The preliminary pipe-to-soil potential data indicate that the protected structures were either protected or in the process of polarizing to protected levels shortly after energizing the CP systems. During design testing, the estimated current required to protect the underground piping at the facility was 20 Amps. Immediately after startup on September 22, 2011, total system current was measured at 20.1 Amps. Once the structures are fully polarized, we anticipate that full protection can be achieved with this level of current. Rectifier and anode reserve capacity is sufficient for any foreseeable future adjustments.

We trust that the enclosed information is adequate for your needs. If you have any questions, or if we can assist you in any way, please do not hesitate to call.

Respectfully,

Farwest Corrosion Control Company



John C. Bollinger
P.E. #CR 937

Bill Golden
NACE Corrosion Technologist #6143

RECTIFIER DATA SHEET
Lodi Gas Storage Kirby Hills Compressor Plant
Suisun City, California

Rectifier #1

Date Energized: September 22, 2011	Recorded by: Bill Golden
Location of Unit:	North of Switchgear Bldg
Manufacturer:	J A Electronics
Model Number	CSA I S
Serial Number:	2110611
AC Rating:	120/240 Volts
DC Rating:	40 Volts, 40 Amperes
Shunt Rating:	50 A = 50 mV
Tap Settings:	Coarse: A of D Fine: 3 of 6
DC current output:	Ind.: 5.0 A Meas.: 5.0 A
DC voltage output	Ind.: 5.0 V Meas.: 4.96 V
Status:	OK

Anode Outputs (Amps):
1) 0.8
2) 0.8
3) 1.2
4) 2.8

Rectifier #2

Date Energized: September 22, 2011	Recorded by: Bill Golden
Location of Unit:	West of Compressor Bldg
Manufacturer:	J A Electronics
Model Number	CSA I S
Serial Number:	2110609
AC Rating:	120/240 Volts
DC Rating:	40 Volts, 40 Amperes
Shunt Rating:	50 A = 50 mV
Tap Settings:	Coarse: A of D Fine: 4 of 6
DC current output:	Ind.: 5.9 A Meas.: 5.9 A
DC voltage output	Ind.: 7.2 V Meas.: 7.19 V
Status:	OK

Anode Outputs (Amps):
1) 0.5
2) 0.5
3) 2.0
4) 2.8

RECTIFIER DATA SHEET
Lodi Gas Storage Kirby Hills Compressor Plant
Suisun City, California

Rectifier #3

Date Energized: September 22, 2011	Recorded by: Bill Golden
Location of Unit:	East of Compressor Bldg
Manufacturer:	J A Electronics
Model Number	CSA I S
Serial Number:	2110610
AC Rating:	120/240 Volts
DC Rating:	40 Volts, 40 Amperes
Shunt Rating:	50 A = 50 mV
Tap Settings:	Coarse: A of D Fine: 3 of 6
DC current output:	Ind.: 5.4 A Meas.: 5.4 A
DC voltage output	Ind.: 5.1 V Meas.: 5.13 V
Status:	OK

Anode Outputs (Amps):
1) 1.3
2) 1.3
3) 1.3
4) 1.6

Rectifier #4

Date Energized: September 22, 2011	Recorded by: Bill Golden
Location of Unit:	East of Dehy Unit
Manufacturer:	J A Electronics
Model Number	CSA I S
Serial Number:	2110612
AC Rating:	120/240 Volts
DC Rating:	40 Volts, 40 Amperes
Shunt Rating:	50 A = 50 mV
Tap Settings:	Coarse: A of D Fine: 3 of 6
DC current output:	Ind.: 4.8 A Meas.: 4.8 A
DC voltage output	Ind.: 5.3 V Meas.: 5.27 V
Status:	OK

Anode Outputs (Amps):
1) 0.6
2) 0.6
3) 2.1
4) 1.5

November 22, 2011
Job Number JH241

Lodi Gas Storage
Kirby Hills Compressor Plant
CP System Commissioning Data
Recorded: September 22, 2011

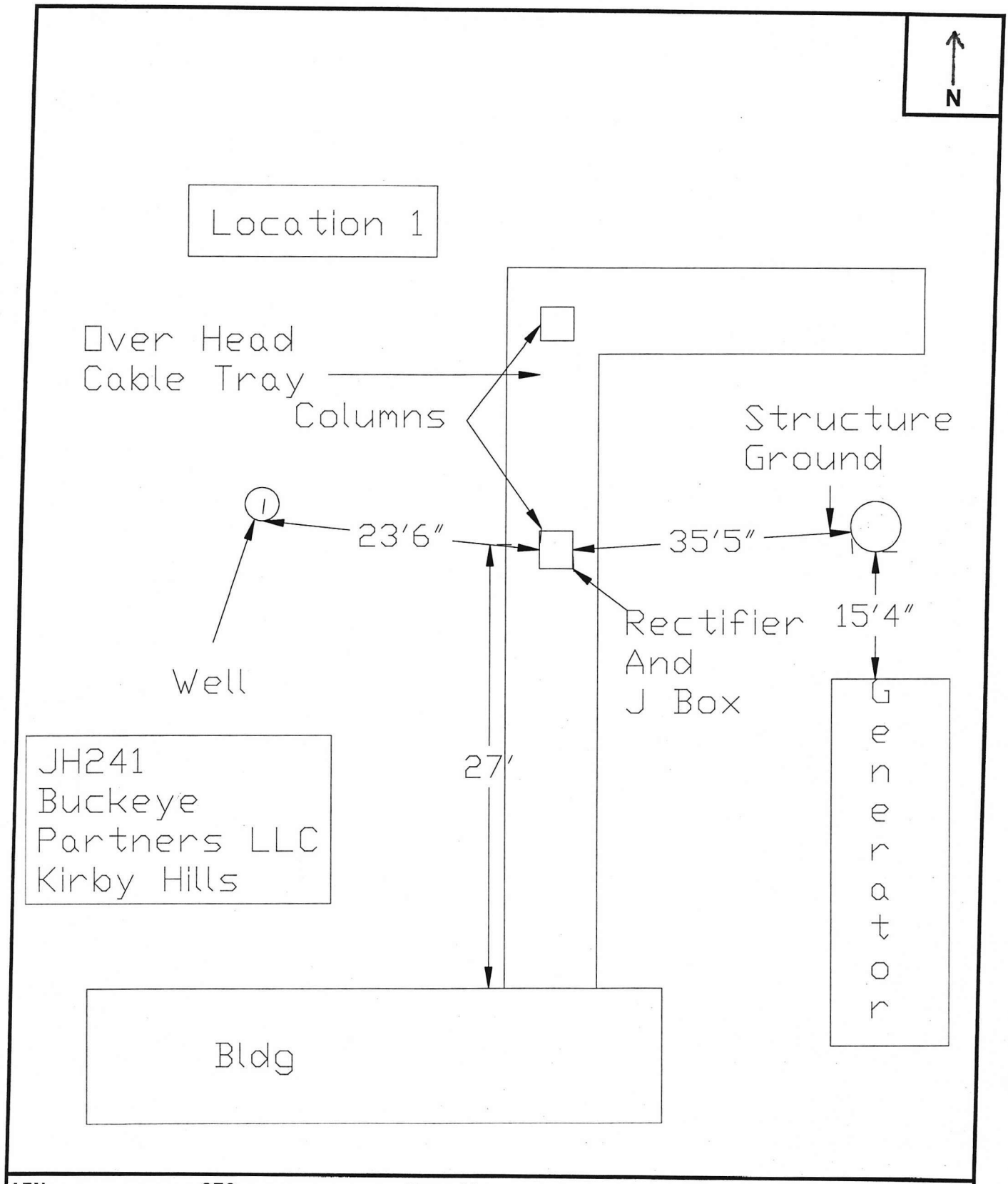
Loc. #	Structure	Static P/S (mV)	ON P/S (mV)	Comments
1	16" Pipeline	-576	-1072	
2	16" Pipeline - Plant side	-536	-1048	
3	2" S/O 16" Pig Launcher/Receiver	-557	-1036	
4	6" at BDV-9301	-347	-901	
5	6" Pipeline side BDV-9301	-608	-1009	
6	6" Plant at BDV-9201	-525	-1036	
7	6" Pipeline side BDV-9201	-1405	-1475	
8	12" Riser at XV-6102	-547	-1022	
9	12" Riser at XV-6103	-539	-854	
10	12" Riser at XV-6104	-538	-978	
11	12" Riser at XV-6105	-574	-955	
12	12" Riser (Blinded)	-544	-966	
13	12" Riser at ADV-6106	-430	-929	
14	12" Riser at loc. # 10, 11, & 13	-586	-987	
15	12" Riser SE of Filter/Separator	-531	-934	
16	12" Riser S of Filter/Separator	-504	-1012	Structure lead connection point
17	2" Riser N of Filter/Separator	-575	-998	
18	4" Riser at SDV-6350	-521	-1053	
19	1" Riser N of raised platform	-519	-988	
20	3" Riser "From PH11 Fuel Skid"	-513	-900	
21	2" Riser "PH1 Dehy"	-499	-900	
22	1" Instrument air	-523	-912	
23	2" at Red relief valve	-534	-928	
24	4" Riser w of #23	-530	-970	
25	2" Riser at SDV-5102	-509	-880	
26	2" Riser N of #25	-516	-801	
27	12" Riser NW of Large Tower	-520	-855	
28	12" Riser N of Tower Manifold	-547	-885	
29	12" NE of Tower	-511	-851	
30	8" Riser ENE of Tower	-509	-881	
31	2" E of Tower	-534	-913	
32	12" SE of W Compressor Bldg	-527	-939	
33	12" E of #32	-554	-960	
34	12" S of XV-5100	-517	-824	
35	1" Inst. Air to XV-5100	-526	-833	
36	12" N of XV-5100	-557	-840	
47	2" Riser of Filter/Separator	-493	-836	
48	1" Inst Air to Filter/Separator	-507	-830	
49	2" Riser N of Filter/Separator	-499	-830	
37	12" Blinded NE of #36	-518	-876	
38	12" Riser 10 ft. N of #37	-497	-837	
39	Valve Operator 6' W of #38	-497	-830	

40	12" Riser E of #37 & #38	-532	-899	
41	3" Riser at BDV-1400	-451	-737	
42	1' Inst. Air to BDV-1400	-509	-789	
43	8" Riser at XV-1500	-452	-757	
44	8" at XV-1200	-502	-832	
45	8" at XV-1000	-480	-812	
46	1" Inst. Air to XV-1000 & XV-1100	-505	-807	
50	4" Riser SW corner of skid	-496	-846	
51	1" Riser SW corner of skid	-488	-818	
52	3" Riser S of center skid	-415	-816	
53	3" Riser E of #52	-479	-818	
54	2" SE corner of skid	-503	-832	
55	Riser S of SDV-6362	-496	-836	
56	4" Riser N of Heater	-512	-831	
57	12" Riser S of XV-6250	-495	-822	
58	4" Riser N of skid	-494	-825	
59	3" Riser at BDV-2400	-493	-775	W of Compressor Bldg.
60	1" Inst. Air to BDV-2400	-491	-768	
61	1" Inst. Air to XV-2200	-495	-802	
62	8" Riser to XV-2200	-506	-826	
63	8" Riser to XV-2000	-489	-835	
64	1" Inst. Air to XV-2000	-402	-781	
65	1" Inst. Air to Crossover Valve	-491	-800	
66	2" Riser E of Big Separator	-475	-835	
67	2" Riser at BDV-6253	-495	-800	
68	12" Riser E of #67	-488	-814	
69	Valve Operator N of #68	-498	-790	
70	12" Riser N of #69	-497	-817	
71	2" Riser E of SDV-6252	-492	-843	
72	12" Riser at SDV-6252	-507	-859	
73	12" Elbow SW of ADV-3010	-512	-853	
74	12" Riser N of ADV-3010	-506	-870	
75	Valve Operator S of #73	-506	-876	
76	4" Riser NE corner of W Comp. Bldg	-410	-772	
77	3" Riser NE corner of W Comp. Bldg	-410	-760	
78	3" Riser NE corner of W Comp. Bldg	-411	-761	
79	3" Riser NE corner of W Comp. Bldg	-413	-766	
80	2" Riser NE corner of W Comp. Bldg	-417	-787	
81	3" Riser SE of Pump	-427	-791	
82	3" Riser N of Air Compressor	-507	-1163	
83	3" Riser S of Air Receiver	-452	-953	
84	3" riser N of Air Receiver	-422	-781	
85	1" Riser NE of #84	-425	-798	
86	2" Riser E of #84	-408	-760	

87	S 2" Riser E of #86	-434	-828	
88	N 2" Riser NE of #86	-428	-803	
89	2" Riser SE corner of Compressor Bldg	-446	-776	
90	3" Riser SE corner of Compressor Bldg	-445	-774	
91	10" Riser W of N cooling fans	-526	-1484	
92	8" Riser W of N cooling fans	525	-1507	Structure lead connection point
93	10" Riser SW corner of N Comp Bldg	-440	-984	
94	8" Riser W of ADV-4009	-426	-888	
95	10" Riser at SDV-4003	-469	-892	
96	8" Riser at ADV-4006	-450	-851	
97	6" Riser at ADV-4005	-463	-859	
98	8" Riser W of SDV-4001	-456	-839	
99	12" Riser at SDV-4001	-483	-852	
100	6" Riser, S center of N Comp. Bldg	-424	-688	
101	2" Riser, S center of N Comp. Bldg	-429	-673	
102	2" Riser, S center of N Comp. Bldg	-429	-672	
103	2" Riser, S center of N Comp. Bldg	-424	-677	
104	2" Riser, S center of N Comp. Bldg	-424	-677	
105	2" Riser, S center of N Comp. Bldg	-398	-669	
106	2" Riser, S center of N Comp. Bldg	-398	-669	
107	2" Riser, S center of N Comp. Bldg	-347	-664	
108	10" Riser at SDV-3001	-476	-783	
109	6" Riser E of SDV-3001	-474	-782	
110	6" Riser at BDV-3005	-474	-786	
111	6" Riser at ADV-3006	-480	-782	
112	12" Riser at SDV-3003	-491	-825	
113	1" Inst. Air W of Central Line	-504	-835	
114	2" Riser 6' N of #113	-503	-844	
115	6" Riser E of ADV-3009	-484	-783	
116	8" Riser E of ADV-3008	-502	-813	
117	3" Riser at Pump (SE corner of Bldg)	-511	-826	
118	6" Riser E side of N Cooling Fans	-532	-1713	Structure lead connection point
119	8" Riser E side of N Cooling Fans	-538	-1580	
120	North Tank	-566	-891	-896 inside containment
121	Second North Tank	-665	-841	
122	Glycol Tank ABJ-7500	-588	-805	Inside Containment: -659/-818
123	NOT USED			
124	Lube Oil ABJ-7700	-537	-771	Inside Containment: -255/-456
125	New Coolant ABJ-7600	-549	-816	Inside Containment: -381/-574
126	Used Coolant ABJ-7300	-545	-822	Inside Containment: -415/-670
127	New Lube Oil ABJ-7800	-546	-805	Inside Containment: -406/-681
128	(N) #1 Pump Suction	-541	-817	
129	#2 Pump Suction	-552	-821	
130	#3 Pump Suction	-533	-789	

131	#4 Pump Suction	-526	-790	
132	(N) #1 Pump Discharge (E)	-376	-571	
133	#1 Pump Discharge (W)	-464	-730	
134	#2 Pump Discharge (E)	-410	-632	
135	#2 Pump Discharge (W)	-471	-732	
136	#3 Pump Discharge (E)	-432	-670	
137	#3 Pump Discharge (W)	-478	-752	
138	(S) #4 Pump Discharge	-452	-700	
139	2" Riser NW of Scrubber (S of pumps)	-520	-854	
140	16" Riser W of #139	-517	-854	
141	1" Riser N end of Filter/Separator (S of #140)	-475	-762	
142	2" Riser N end of Filter/Separator (S of #140)	-474	-760	
143	2" Riser N end of Filter/Separator (S of #140)	-475	-760	
144	Inst. Tubing SE end of Filter/Separator	-513	-817	
145	N 2" Riser 3' E of #144	-519	-842	
146	S 2" Riser 6' N of #145	-504	-822	
147	12" Riser W of SDV-6156	-540	-827	
148	12" Riser at SDV-6156	-554	-564	
149	12" Riser at SDV-9603 (IF Kit)	-545	-867	
150	12" Riser W of BDV-9604	-598	-980	
151	6" Riser at BDV-9604	-597	-1001	
152	12" Riser to Field	-883	-854	
153	3" Riser N of SDV-5151	-513	-789	
154	16" Riser at SDV-5151	-496	-757	
155	2" Riser at SDV-5152	-506	-782	
156	2" Riser 6' S of #155	-540	-854	
157	16" Riser to E, S of Large Vessel	-531	-806	
158	16" Riser to W, S of Large Vessel	-496	-757	
159	2" Riser from W side of PECO Filter/Separator	-523	-828	
160	2" Riser SE corner of PECO Filter/Separator	-549	-849	
161	2" Riser NE of Dehy	-548	-883	
162	2" Riser NE of Dehy	-539	-880	
163	2" Riser W side of of Dehy	-544	-892	
164	2" Riser W side of of Dehy	-547	-887	
165	2" Riser W side of of Dehy	-536	-891	
166	16" Riser E of PECO Filter Separator	-535	-857	
167	W 2" Riser N of Boiler	587	-1028	
168	E 2" Riser N of Boiler	-593	-1036	
169	2" Riser N of Small Boiler	-589	-1026	
170	1" Riser N of Small Boiler	-590	-1026	
171	Out of service 1" N of Small Boiler	-594	-1065	
172	2" Riser to plastic line - E of Vent Stack	-562	-940	
173	2" Riser N of Small Dehy	-533	-899	
174	Valve Operator W of Vent Scrubber	-507	-893	

175	16" Riser S of PECO Filter/Separator	-554	-928	
176	12" Pig Launcher/Receiver W of Small Dehy (IF)	-571	-1009	
177	2" Riser from Pig Launcher/Receiver	-587	-1097	Structure lead connection point
178	12" Riser W of Pig Launcher/Receiver	-578	-1023	
179	12" Riser N of SDV-9200	-572	-1035	
180	12" Riser E of SDV-9200	-583	-1097	
181	12" Riser W of SDV-9200	583	-1464	
182	1" Inst. Air to SDV-9200	-610	-1087	
183	12" Riser at XV-5104	-564	-1046	
184	4" Riser at BDV-5105	-566	-1007	
185	12" Riser at XV-5106	-553	-1008	
186	4" Riser N of BDV-5107	-559	-997	
187	12" Jumper - Middle N	-479	-759	
188	12" Jumper - Middle S	-475	-780	
189	3" Riser N of XV-5106	-550	-931	
190	2" Riser W of Small Dehy	-548	-947	
191	2" Riser W of Small Dehy	-547	-947	
192	2" Riser W of Small Dehy	-556	-945	
193	1" Riser W of Small Dehy	-556	-947	
194	2" Riser W of Small Dehy	-556	-946	



APN:	SEC:	Township:	Range:

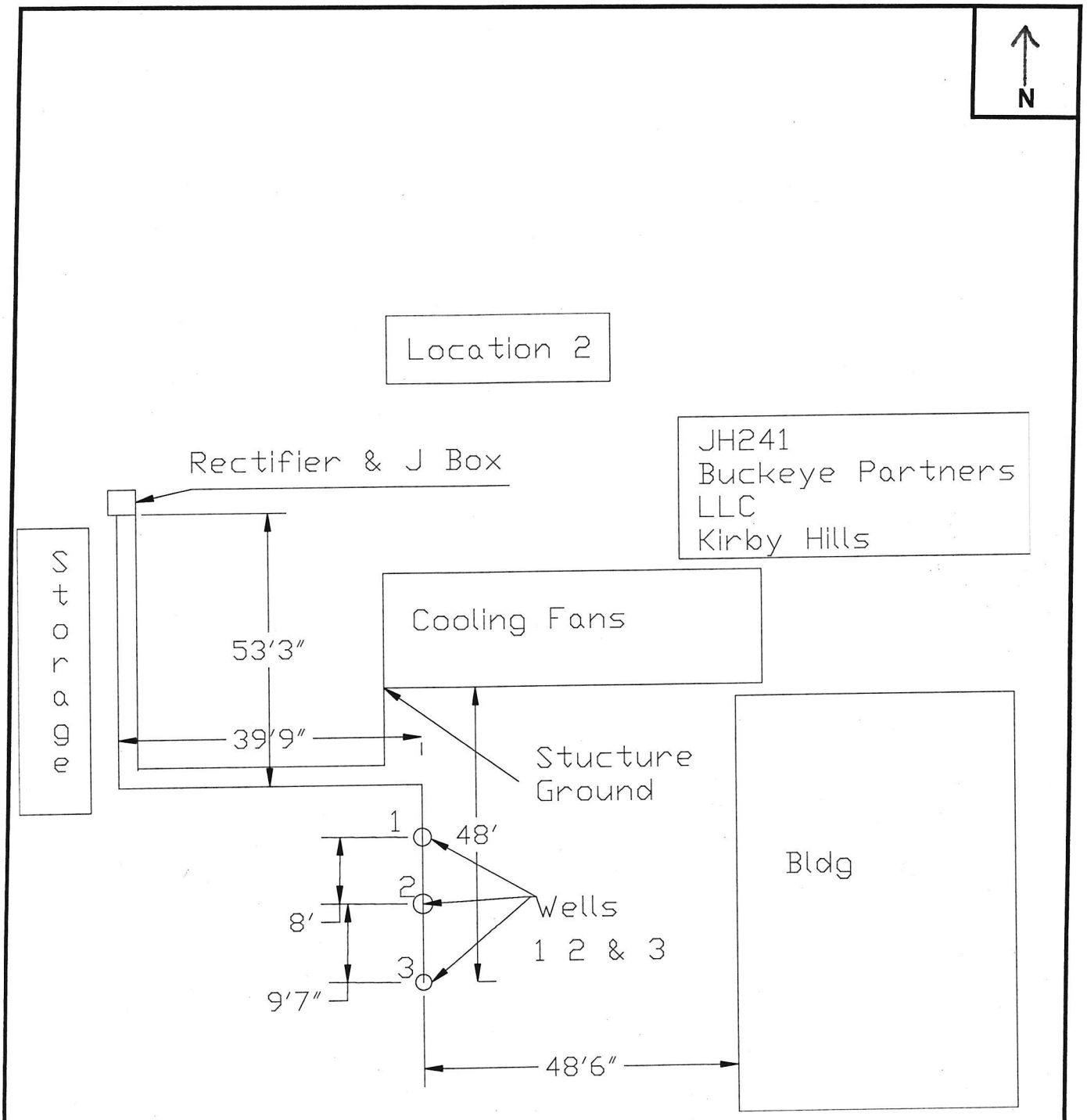
FARWEST CORROSION CONTROL COMPANY
4114 Armour Ave, Bakersfield, CA
Ph. (661) 323-2077 Fax (661) 323-2647

Customer: _____

Farwest Job #: _____ **Date:** _____

GPS Coordinates: _____ **West Latitude:** _____

North Longitude: _____



APN:	SEC:	Township:	Range:

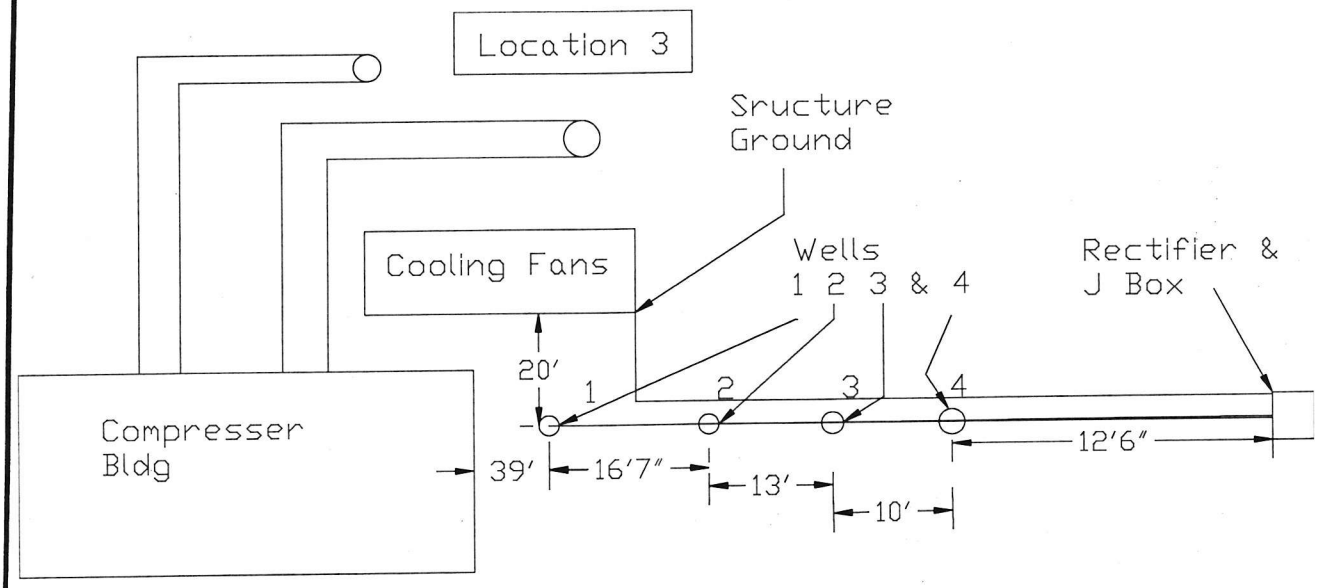
FARWEST CORROSION CONTROL COMPANY
4114 Armour Ave, Bakersfield, CA
Ph. (661) 323-2077 Fax (661) 323-2647

Customer: _____

Farwest Job #: _____ **Date:** _____

GPS Coordinates: _____ **West Latitude:** _____

North Longitude: _____



JH241
Buckeye Partners
LLC
Kirby Hills

APN:	SEC:	Township:	Range:

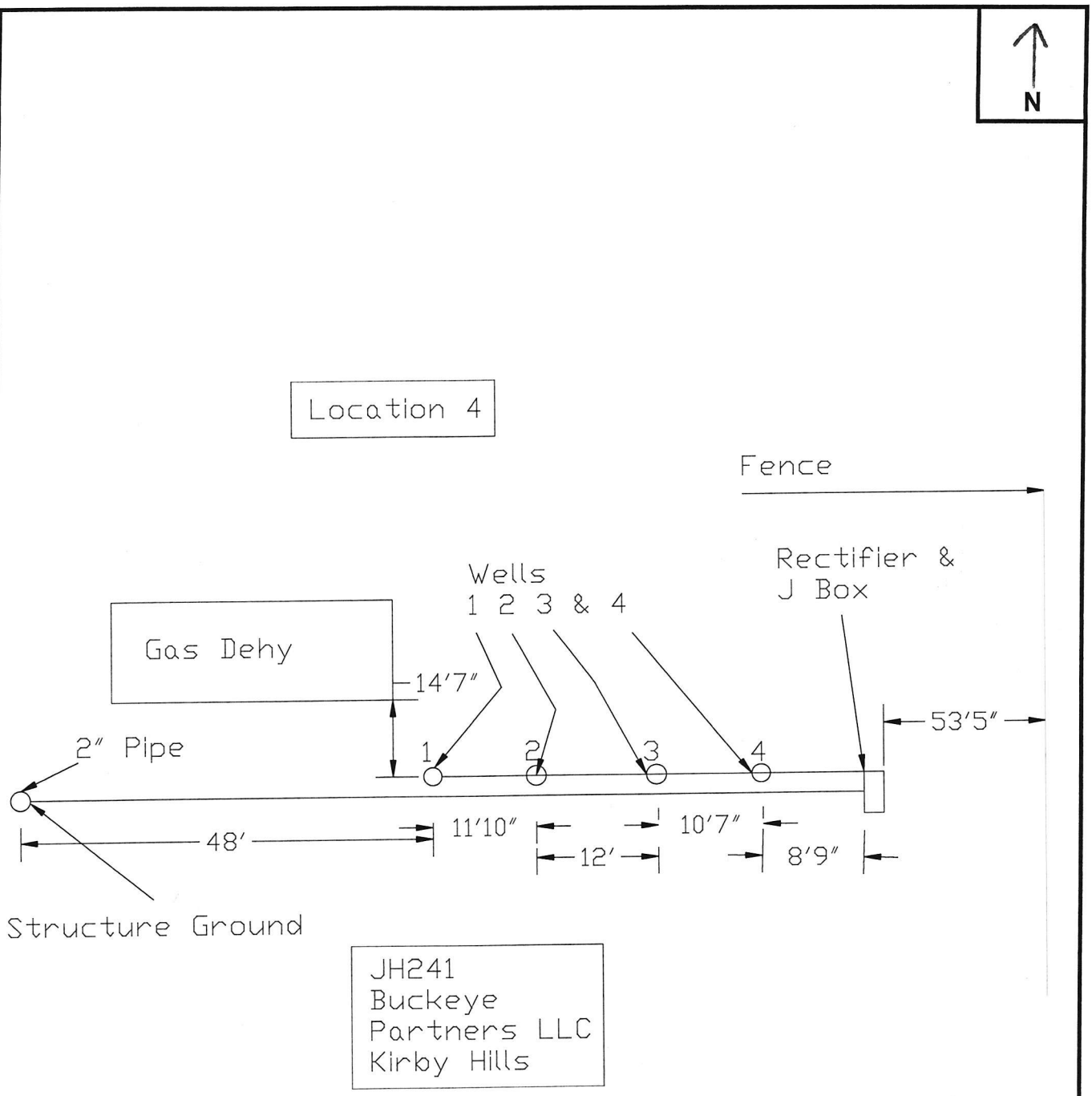
FARWEST CORROSION CONTROL COMPANY
4114 Armour Ave, Bakersfield, CA
Ph. (661) 323-2077 Fax (661) 323-2647

Customer: _____

Farwest Job #: _____ **Date:** _____

GPS Coordinates: _____ **West Latitude:** _____

North Longitude: _____



APN:	SEC:	Township:	Range:

FARWEST CORROSION CONTROL COMPANY
4114 Armour Ave, Bakersfield, CA
Ph. (661) 323-2077 Fax (661) 323-2647

Customer: _____

Farwest Job #: _____ **Date:** _____

GPS Coordinates: _____ **West Latitude:** _____

North Longitude: _____

Attachment #5

External Corrosion Control Monitoring Report dated June 25, 2012

BUCKEYE PARTNERS, L.P.

CP SURVEY REPORT

District: PACIFIC

Resp: 651 - LODI

Fac Type: MAINLINES

Line Segmt Code: KC021KB **Line Segmt Name:** KIRBY HILLS TO BIRDS LANDING 16"

Line Segmt Code and Pipe	Location Description	Location #	Inspection Date	Structure P/S	Structure IRF	Effective Static P/S	Casing P/S	Foreign P/S	Insulator P/S	Inspection Remarks
KC021KB	COMPRESSOR STATION IJ	0+00	6/25/2012	-1.058					-1.025	
			6/13/2011	-0.707					-0.646	
			5/27/2010	-0.664					-0.586	6" Bypass piping not insulated
			5/14/2009	-1.449					-0.449	
			5/9/2008	-1.495					-0.424	
KC021KB	ANODE TS	3+00	6/25/2012			-0.726				
			6/13/2011	-0.921		-0.726				Remote: Not Recorded
			5/27/2010	-0.950		-0.726				Mag output = 62 mA
			5/14/2009	-1.548		-0.726				
			5/9/2008	-1.578		-0.726				
KC021KB		25+35	6/25/2012	-1.130	-0.990	-0.718				
			6/13/2011	-0.774		-0.718				R/B: 3.5 mV; R/Y: 3.4 mV; R/W: 0.1 mV ?
			5/27/2010	-0.770		-0.718				
			5/14/2009	-1.498		-0.718				
			5/9/2008	-1.562		-0.718				
KC021KB	ANODE TS	53+41	6/25/2012	-1.181	-1.079	-0.752				
			6/13/2011	-0.895		-0.752				Remote P/S: -896
			5/27/2010	-0.878		-0.752				Mag output = 29 mA
			5/14/2009	-1.535		-0.752				
			5/9/2008	-1.583		-0.752				
KC021KB		103+41	6/25/2012	-1.198	-1.071	-0.733				
			6/13/2011	-0.865		-0.733				
			5/27/2010	-0.873		-0.733				
			5/14/2009	-1.529		-0.733				
			5/9/2008	-1.565		-0.733				
KC021KB		126+98	6/25/2012	-1.205	-1.180	-0.737				
			6/13/2011	-0.864		-0.737				R/B: 3.0 mV; R/Y: 0.1 mV; R/W: 2.9 mV ?
			5/27/2010	-0.893		-0.737				
			5/14/2009	-1.542		-0.737				
			5/9/2008	-1.577		-0.737				
KC021KB	ANODE TS	153+69	6/25/2012	-1.260	-1.140	-0.732				
			6/13/2011	-1.010		-0.732				Remote P/S: -975
			5/27/2010	-1.025		-0.732				Mag output = 16.5 mA
			5/14/2009	-1.547		-0.732				
			5/9/2008	-1.593		-0.732				
KC021KB		180+40	6/25/2012	-1.251	-1.165	-0.729				
			6/13/2011	-0.905		-0.729				

Line Segmt Code and Pipe	Location Description	Location #	Inspection Date	Structure P/S	Structure IRF	Effective Static P/S	Casing P/S	Foreign P/S	Insulator P/S	Inspection Remarks
			5/27/2010	-0.980		-0.729				
			5/14/2009	-1.521		-0.729				
			5/9/2008	-1.588		-0.729				
KC021KB	OLSEN RD - ANODE TS	207+26	6/25/2012	-1.255	-1.141	-0.727				
			6/13/2011	-0.960		-0.727				Remote P/S: -951 mV (Olsen Rd xing)
			5/27/2010	-0.999		-0.727				Mag output = 69 mA
			5/14/2009	-1.535		-0.727				
			5/9/2008	-1.576		-0.727				
KC021KB	AT FENCE CORNER	233+60	6/25/2012	-1.318	-1.226	-0.739				
			6/13/2011	-0.935		-0.739				At Fence Corner/Tee
			5/27/2010	-0.980		-0.739				
			5/14/2009	-1.519		-0.739				
			5/9/2008	-1.582		-0.739				
KC021KB	ANODE TS	259+77	6/25/2012			-0.732				COULD NOT LOCATE
			6/13/2011	-1.120		-0.732				Remote P/S: -1036 mV (Foreign xing)
			5/27/2010	-1.100		-0.732				Mag output = 25 mA
			5/14/2009	-1.545		-0.732				
			5/9/2008	-1.585		-0.732				
KC021KB		275+05	6/25/2012			-0.724				COULD NOT LOCATE
			6/13/2011	-0.965		-0.724				R/B: 0.5 mV; R/Y: 0.5 mV; R/W: 0.0 mV ?
			5/27/2010	-0.945		-0.724				
			5/14/2009	-1.530		-0.724				
			5/9/2008	-1.571		-0.724				
KC021KB	STORAGE METER STATION - ANODE TS	306+70	6/25/2012	-1.223	-1.110	-0.736				
			6/13/2011	-1.048		-0.736				Remote P/S: -1018 mV
			5/27/2010	-1.100		-0.736				Mag output = 25 mA
			5/14/2009	-1.528		-0.736				
			5/9/2008	-1.577		-0.736				
KC021KB	METER STATION IJ - BIRDS LANDING	308+20	6/25/2012	-1.276	-1.172				-1.276	
			6/13/2011	-1.045					-1.047	
			5/27/2010	-0.975					-1.635	
			5/14/2009	-1.530					-0.500	
			5/9/2008	-1.570					-0.573	