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Storage Tank Emission Management System Plan (STEM)

Piceance Assets

**Piceance Basin
Garfield County, CO
March 11, 2016 Rev#0**



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HRL COMPLIANCE SOLUTIONS, INC.
Environmental Consultants

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Introduction to the STEM Plan

Plan Introduction and Statement of Basis

Pursuant to Air Quality Control Commission (AQCC) Regulation Number 7 § XVII.C.2.b Ursa Operating Company (Ursa) has developed the following Storage Tank Emission Management System (STEM) Plan to identify, evaluate, and employ appropriate control technologies, monitoring practices, operational practices, and/or other strategies designed to meet the requirements set forth in AQCC Regulation No. 7 § XVII.C.2.a. This STEM Plan (the Plan) is structured such that information contained within the body of the Plan is intended to apply generally to all facilities covered by the Plan as listed in Appendix A. Information provided in the appendices to the Plan is intended to supply site-specific information for the facilities covered by the Plan.

About the Plan

The Plan is intended to be a living document. As new facilities are brought on line, operational practices change, or deficiencies within the Plan are discovered, the Plan will change to meet current needs. The Plan addresses the following operational, procedural, and administrative actions:

- Identification of personnel conducting facility inspections (Including training and certifications)
- Monitoring Strategies (Including frequency and methodology)
- Design analysis and operational practices employed to prevent venting of hydrocarbons
- Plan efficacy evaluation procedures
- Procedures for updating the Plan
- Certification by appropriate personnel

The above pieces of the STEM Plan are designed to provide a framework which can be built upon to ensure that all subject storage tanks are operated without venting hydrocarbon emissions to maintain compliance with Regulation No. 7 § XVII.C.2.a. It is also intended to ensure that all subject facilities are designed and operated in a manner consistent with good engineering and air pollution control practices.

The STEM Plan

Identification of Personnel

There are many different components of the STEM Plan and many individuals will assist in ensuring that the Plan is executed to the fullest extent. Personnel conducting inspections pursuant to the STEM Plan may include pumpers, third party contractors, truck drivers, internal inspectors, and others. Although the experience and expertise of these individuals will vary greatly, the following training and certifications will be required by ALL personnel who are expected to assist with the execution of the STEM Plan:

- Ursa’s safety training course
- Ursa’s expectations and procedures for conducting STEM inspections
- A current and valid certification to operate the equipment used (e.g. IR Camera Certified) for approved instrument monitoring method (AIMM) inspections

Individuals regularly conducting STEM inspections will complete the STEM Personnel Information Sheet included in Appendix C to document their training, certifications, and qualifications to conduct these inspections.

Completed STEM Personnel Information Sheets are included in Attachment 1 in the Completed Forms Section.

Monitoring Strategies

The facilities covered by the STEM Plan will require inspections of various types and varying frequencies. Ursa differentiates between general inspections and AIMM inspections. General inspections will be conducted monthly for all facilities with actual uncontrolled emissions less than fifty (50) tons per year and will coincide with the monthly audio, visual and olfactory (AVO) inspections required by AQCC Regulation No. 7 § XVII.C.1.d. AIMM inspections will replace the AVO aspect of general inspections during months when an AIMM inspection is conducted. General inspections will not be conducted for facilities with uncontrolled actual emissions greater than or equal to fifty (50) tons per year since monthly AIMM inspections will be conducted at these facilities as required by AQCC Regulation No. 7 § XVII.C.2.b.(ii). The information captured by each type of inspection (general and AIMM), is outlined below. An example of each inspection sheet is provided in Appendix C, and a list of facilities and the frequencies with which the different inspections are conducted at each facility are included in Appendix B. The table below outlines the criteria used to determine the frequency with which each facility is inspected:

Storage Tank Inspection Frequency		
Threshold: Storage Tank Uncontrolled Actual VOC Emissions (tpy)	Approved Instrument Monitoring Method (AIMM) Inspection Frequency	General Inspection Frequency
≥ 6 tpy and < 12 tpy	Annually	Monthly
≥ 12 tpy and < 50 tpy	Quarterly	Monthly
≥ 50 tpy	Monthly	---

Aspects of a General Inspection

A general inspection will include verifying that the following is true for each facility:

- All thief hatches are closed, latched, and properly seated
- The pressure relief valves (PRV) are not leaking and are operating correctly
- All open ended lines are sealed
- Emission control equipment is operating properly
 - E.g. visible pilot on flare, no visible emissions from flare, etc.
- There is no audible or visible emissions from equipment
- Any odors are associated with normal operation
 - E.g. actuating pneumatic device

Aspects of an AIMM Inspection

An AIMM inspection will include the following:

- A certified infrared thermographer will survey the facility with an infrared camera.
- Any leaks identified using the camera will be tagged for repair
- A first attempt to repair leaks identified will be made within 5 working days from the date of identification
- All records pertaining to leaks and their timely repair will be documented
- An AIMM inspection will also verify the information contained in a general inspection

Design Analysis and Operational Practices

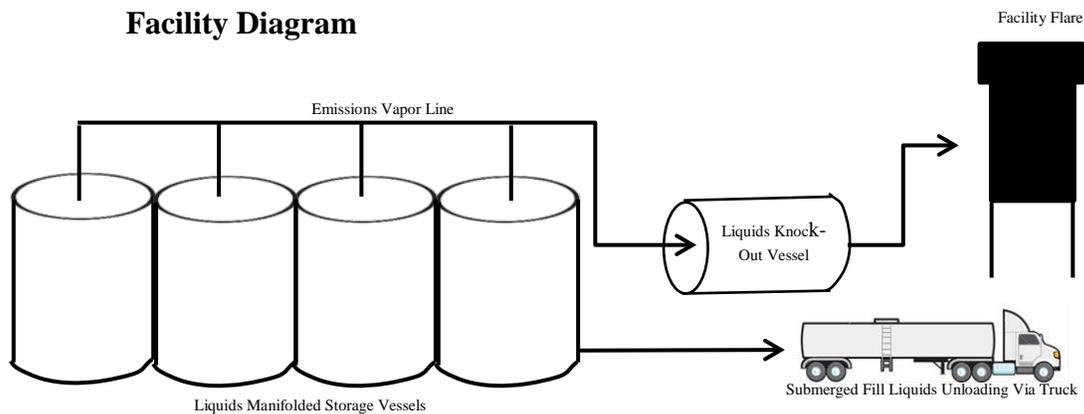
Facility Design

Each facility owned and operated by Ursa is carefully designed to ensure that the facility is engineered to meet all current and future needs. If a deficiency is discovered plans are immediately set in motion to modify the facility design to ensure that it is constructed to the highest engineering standards, and is safe, efficient, and environmentally sound.

In general, each facility is constructed such that following separation (either two (2) or three (3) phase) liquids are routed to the appropriate storage tanks. Each of the tanks are equipped with properly weighted and sealed thief hatches and PRVs to ensure that emissions are routed to the

vapor line and not vented to the atmosphere under normal operating conditions. The vapor line is connected to a liquids knock-out vessel to remove any residual liquids remaining in the vapor stream. Following the knock-out vessel, emissions are routed to an enclosed combustor designed to reduce VOC emissions by greater than 95%. (Depending on which specific combustor is installed the manufacturer guaranteed VOC control efficiency ranges from 95% to 99%.) Liquids are unloaded from the tanks as needed via tanker truck. All liquids unloading is conducted via submerged fill to minimize emissions associated with the unloading process.

Below is a typical facility design diagram, and while it may not represent any actual location the equipment and technologies deemed appropriate for each site have been applied to all of Ursa’s assets subject to this STEM Plan. The specific control technologies and equipment utilized at each individual facility are documented in Appendix B under the column heading “Control Technologies, Equipment, and Operational Practices”.



Operational Practices

Ursa’s facilities are checked frequently by Ursa’s personnel, pumpers, and third party contractors. Usually someone visits each site on a daily basis. Ursa has adopted the policy that environmental compliance is everyone’s responsibility. It is the expectation that all personnel who will be visiting Ursa’s sites, including employees and contractors, address observed compliance issues or bring them to a supervisor’s attention.

In addition to the general duty to be aware of compliance issues Ursa has implemented a brief facility check and overview process which personnel follow upon arriving at the facility. This facility check is similar to a general inspection however in most cases it is not documented. Aspects of this brief facility check may include but are not limited to: ensuring that the thief hatches are closed and sealed, PRVs are not leaking, any combustors are operating and have a visible pilot light, and that the facility is in good repair and not in need of any additional maintenance.

Ursa also implements the following operational practices to minimize emissions at all times:

STEM Plan – Piceance Assets

- Thief hatches are to remain closed and latched unless current operations require them to be open
 - E.g. gauging the tanks or down hole maintenance
- Combustors have a visible pilot light at all times
- Well maintenance and unloading is minimized, and an operator is present at any time when the thief hatch is open
 - Records of these events will be kept. An example of the Down Hole Maintenance & Liquids Unloading Event Log is included in Appendix C.
- Records of times when emissions were not routed to the control device are kept to ensure accurate emissions tracking and reporting

Recordkeeping

Records are properly kept and maintained in accordance with the requirements of the Regulations.

Plan Evaluation Procedures and Schedule

It is recognized and expected that this Plan will need to be revised over time. As the Plan is implemented in the field and the efficacy of the Plan is observed over time it will be necessary to update the Plan. Ursa has developed the following procedures and schedules for evaluating the STEM Plan:

Evaluation Procedures

- Review records kept pursuant to the Plan to identify any locations' recurrent problems (for all facilities collectively and individually).
 - If recurrent problems are discovered, either change current processes or implement new ones to prevent the recurrence from continuing.
 - If problems are a result of facility construction, begin the process for facility modification to rectify the problem.
- Review facilities currently covered under the Plan to ensure that they have all of the records and are receiving proper inspections in accordance with the Plan.
- Review and verify that facilities currently included in the Plan are required by Regulation No. 7 (e.g. emissions are still greater than 6 tpy).
- Review all facilities to ensure if facility emissions have increased above 6 tpy that the facility is added to the list in Attachment A.
- Evaluate each aspect of the Plan and verify that the practice is actually helping to minimize VOC emissions.

Evaluation Schedule

This Plan can be evaluated at any time as deemed necessary, however the following schedules will be followed at a minimum to ensure that all facilities owned and operated by Ursa are in compliance with the requirements of this Plan. If more frequent evaluations are deemed appropriate the schedule may be accelerated, but not delayed.

- Annually, the Plan will receive a full evaluation as outlined above in evaluation procedures
- Annually, facilities covered by the Plan will be reviewed to determine if actual uncontrolled emissions have dropped below 6 tpy and the facility is no longer required to follow the STEM Plan. Only those facilities which meet the following criteria will be removed from the STEM Plan:
 - Actual uncontrolled emissions have been below 5.5 tpy on a rolling 12 month basis for the previous 12 months
 - There are no immediate plans to drill new wells or refracture existing wells
- Monthly, the VOC emissions from each facility will be verified and facilities with increasing emissions above 6 tpy will be added to the list in Appendix A.
 - Newly added facilities will be added to the inspection schedule and will be in compliance within sixty (60) days of the discovery of the emissions increase in accordance with AQCC Regulation No. 7 § XVII.C.1.b.(i)(c).

Procedures for Updating the Plan

There are two different types of updates anticipated for the Plan. The first is a revision to the body of the Plan. The second is a revision which only affects the Appendices of the Plan.

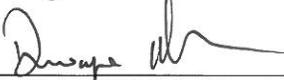
If the actual Plan is updated the Plan will receive a new revision number and revision date. The changes in the Plan will be conveyed to all affected field personnel and contractors.

If the revisions to the Plan only affect the Appendices a new revision number will not be given. Instead the changes will be documented in Appendix D. The information gathered will include the date of the changes, which Appendices were affected, who made the changes, and a brief description of the changes made. The changes in the Plan will be conveyed to all affected field personnel and contractors.

Plan Certification by a Responsible Official

Certification

Pursuant to Regulation No. 7 § XVII.C.2.b.(iv) I hereby certify that the STEM strategies utilized by this Plan are designed to minimize emissions from storage tanks and associated equipment at the facilities listed in Appendix A. These strategies are designed to limit emissions from all parts of the facility, especially from access points including but not limited to thief hatches, pressure relief devices, and open ended lines. Additionally, I certify that Ursa has implemented this Plan, including any inspections and protocols, and is diligently striving to reduce emissions from all storage tanks whether subject to this Plan or not.

	Dwayne Knudson	Senior Environmental Specialist
Certifying Official's Signature	Printed Name	Title

Appendices

Appendix A

List of Facilities Covered by the STEM Plan

AQCC Regulation No. 7 § XVII.C.1.b requires that tanks with uncontrolled actual VOC emissions greater than or equal to 6 tpy based upon a rolling 12 month total install air pollution control equipment. AQCC Regulation No. 7 § XVII.C.2.b requires that storage tanks subject to the control requirements of § XVII.C.1.b implement a STEM Plan. The following list of facilities have uncontrolled actual VOC emissions equal to or greater than 6 tpy on a rolling 12 month basis and are included in this STEM Plan.

Facility Name	AIRS ID	Facility Name	AIRS ID
Burkle A Pad	045-1798	Norcross A Pad	045-1788
Castle Springs Compressor Station	045-0910	North Bank B Pad	045-1797
Castle Springs E Pad	045-2224	O’Toole A Pad	045-1794
Castle Springs W Pad	045-2368	River Ranch A Pad	045-1433
Coloroso A Pad	045-1785	River Ranch B Pad	045-2357
Dever A Pad	045-1427	Robinson A Pad	045-1799
Dever C Pad	045-2050	Robinson C Pad	045-1801
Dixon A Pad	045-2351	Snyder A Pad	045-1437
Dixon B Pad	045-2226	Snyder C Pad	045-1800
Frei A Pad	045-2227	Speakman A Pad	045-2341
Gentry B Pad	045-1787	Valley Farms B Pad	045-2055
Gentry C Pad	045-1786	Valley Farms C Pad	045-1435
Gentry E Pad	045-1791	Valley Farms D Pad	045-1436
Gypsum Ranch A Pad	045-1428	Valley Farms E Pad	045-1796
Hangs A Pad	045-1429	Valley Farms F Pad	045-1795
Hangs B Pad	045-1430	Valley Farms I Pad	045-2058
Hunter Mesa Compressor Station	045-1647	Valley Farms J Pad	045-2376
Island Park B Pad	045-1431	Valley Farms L Pad	045-2392
Left Hand A Pad	045-2228	Watson Ranch Pad	045-1903
McLin B Pad	045-2355	Watson Ranch B Pad	045-2395
McLin C Pad	045-2356	Weinreis A Pad	045-1792
McPherson A Pad	045-1789	Yater Pad	045-2394
Monument Ridge Pad	045-2347		

**Note: The greatest potential for change within this Plan exists in which facilities are covered under the Plan. For this reason, changes in which facilities are covered under the Plan will not be given a Plan revision number; the changes will instead be documented in Appendix D. Only changes to the actual Plan will be given a new revision number.*

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The facilities listed above are included in the Plan based upon the VOC emissions from the rolling 12 month emission totals ending in December 2015.

Appendix B

Individual Facility STEM Plans

Inspection Frequencies:

The individual inspection schedules for each facility on the STEM Plan are outlined below

Facility Name	AIRS ID	Inspection Frequencies	
		General	AIMM
Burkle A Pad	045-1798	Monthly	Monthly
Castle Springs Compressor Station	045-0910	Monthly	Quarterly
Castle Springs E	045-2224	Biweekly	Quarterly
Castle Springs W Pad	045-2368	Monthly	Annually
Coloroso A	045-1785	Monthly	Annually
Dever A Pad	045-1427	Monthly	Quarterly
Dever C Pad	045-2050	Monthly	Quarterly
Dixon A Pad	045-2351	Monthly	Monthly
Dixon B Pad	045-2226	Monthly	Monthly
Frei A Pad	045-2227	Monthly	Monthly
Gentry B Pad	045-1787	Monthly	Monthly
Gentry C Pad	045-1786	Monthly	Annually
Gentry E Pad	045-1791	Monthly	Annually
Gypsum Ranch A Pad	045-1428	Monthly	Quarterly
Hangs A Pad	045-1429	Monthly	Annually
Hangs B Pad	045-1430	Monthly	Quarterly
Hunter Mesa Compressor Station	045-1647	Monthly	Quarterly
Island Park B Pad	045-1431	Monthly	Annually
Left Hand A Pad	045-2228	Monthly	Quarterly
McLin B Pad	045-2355	Monthly	Monthly
McLin C Pad	045-2356	Monthly	Monthly
McPherson A Pad	045-1789	Monthly	Monthly
Monument Ridge Pad	045-2347	Monthly	Quarterly
Norcross A Pad	045-1788	Monthly	Quarterly
North Bank B Pad	045-1797	Monthly	Annually
O'Toole A Pad	045-1794	Monthly	Quarterly
River Ranch A Pad	045-1433	Monthly	Quarterly
River Ranch B Pad	045-2357	Monthly	Annually
Robinson A Pad	045-1799	Monthly	Quarterly
Robinson C Pad	045-1801	Monthly	Monthly
Snyder A Pad	045-1437	Monthly	Quarterly
Snyder C Pad	045-1800	Monthly	Annually
Speakman A Pad	045-2341	Monthly	Quarterly
Valley Farms B Pad	045-2055	Monthly	Quarterly
Valley Farms C Pad	045-1435	Monthly	Quarterly
Valley Farms D Pad	045-1436	Monthly	Quarterly
Valley Farms E Pad	045-1796	Monthly	Quarterly

STEM Plan – Piceance Assets (Appendix B)

Facility Name	AIRS ID	Inspection Frequencies	
		General	AIMM
Valley Farms F Pad	045-1795	Monthly	Quarterly
Valley Farms I Pad	045-2058	Monthly	Monthly
Valley Farms J Pad	045-2376	Monthly	Monthly
Valley Farms L Pad	045-2392	Monthly	Monthly
Watson Ranch Pad	045-1903	Monthly	Annually
Watson Ranch B Pad	045-2395	Monthly	Quarterly
Weinreis A Pad	045-1792	Monthly	Annually
Yater Pad	045-2394	Monthly	Quarterly

Control Technologies, Equipment, and Operational Practices:

All of these sites are equipped with enclosed combustion devices to reduce VOC emissions.

Appendix C

Blank Forms

STEM Personnel Information Sheet

Personnel Information			
Name:			
Title:			
STEM Responsibilities:			
Trainings			
Training Name	Date of Training	Training Description	Expiration Date
Ursa Safety Training *		General safety requirements for all personnel working at Ursa facilities	
STEM Expectations*		Expectations and procedures for conducting STEM Inspections	
Certifications			
Certification Name	Date of Certification	Certification Description	Expiration Date

List all additional trainings and certifications in the spaces provided. Trainings marked with an asterisk (*) are required.

Facility General Inspection Report



STEM and AVO Compliance Inspection Form

Section 1.0 - Site Information

Facility Name			
Name of Inspector			Date of Inspection

Section 2.0 - Site Inspection

Section 2.1 - Air Inspection

Section 2.1.1 - Tank Battery Inspection Questions

Select Yes, No, NA

	Thief hatches closed and latched.
	No visible or audible emissions from thief hatch(es).
	No visible or audible emissions from PRV's.
	AIRS ID labeling present on all subject equipment.
	Thief hatch or PRVs properly seated

Select Yes, No, NA

Section 2.1.2 - Combustion Device Inspection Questions

	Combustion device present?
	Piping valves from the tanks to the Air Pollution Control Equipment (APCE) open?
	Sight glass present on combustion device?
	Pilot light on?
	Auto igniter present on the combustion device?
	Auto igniter operating properly?
	Signage present identifying which equipment is controlled by the combustion device?
	No visible emissions coming from the combustion device?

Select Yes, No, NA

Section 2.1.3 - Vapor Recovery Unit Inspection Questions

	vapor recovery unit present. (if No, skip all other questions in section 2.1.3)
	Unit operating properly?
	Tank vapors routed to the unit?

Select Yes, No, NA

Section 2.1.4 - Audio, Visual, Olfactory Inspection Questions - (AVO)

	No audible emissions coming from any piece of equipment, excepting those associated with normal operations.
	No visible emissions coming from any piece of equipment, excepting those associated with normal operations.
	No odors coming from any piece of equipment, excepting those associated with normal operations.

Section 2.1.5 - Preventative Maintenance Comments

Facility AIMM Inspection Report



AIMM Inspection Form

Section 1.0 – Site Information

Facility Name:		Facility AIRS ID:	
Name of Inspector:		Date of Inspection:	

Section 2.0 – Site Inspections

Section 2.1 – AIMM Inspection

Section 2.2.1 – General AIMM Inspection Information

Inspection Designation:	Initial Inspection	Periodic Inspection	
Inspection Method Used:		If Other Please Describe:	

Section 2.2.3 – Summary of Leaking Components

Table 3: Summary of Leaking Components	
Component Type	Number of Leaks
Valves:	
Connectors:	
Flanges:	
Pump Seals:	
Pressure Relief Devices:	
Other Components:	
TOTAL	

Section 2.2.4 – Corrective Actions

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	Are there any new corrective actions (leaks) associated with this inspection?

Section 2.2.5 – Additional Comments

Prepared By: THE UNIVERSITY OF SOUTHERN CALIFORNIA
PROFESSIONAL ENGINEERING

Down Hole Maintenance & Liquids Unloading Event Log

Site and Pumper Information	
Date:	
Pumper's Name:	
Facility Name:	
Facility AIRS ID:	
Well Maintained:	
API Number:	
Well Depth (feet):	
BMP's Used:	
Unloading Event	
Reason for Maintenance:	
First Attempt Made (Describe Actions):	
Was 1 st Attempt Successful?	Yes No (Circle One)
Second Attempt (Describe Actions):	
Was 2 nd Attempt Successful?	Yes No (Circle One)
Venting Information	
Was the well vented to atmosphere?	Yes No (Circle One)
Was venting limited to the max extent?	Yes No (Circle One)
Valve Size (inches):	
Casing Internal Diameter (inches):	
Average Flow-line Rate of Gas (scf/hr):	
Venting Start Time:	
Shut-in or Surface Pressure (psi):	
Estimated Emissions:	(Include Units)
Venting End Time:	

Appendix D

Non STEM Plan Revisions

The table below outlines any modifications to this Plan which affected ONLY the Appendices to the STEM Plan. These modifications did not receive a new Revision number, but are instead captured below.

Non STEM Plan Revision History			
Date of the Modification	Appendix Modified	Person Making Modifications	Description of the Modifications
5/1/2014	N/A	Kenny Seaver	Initial version of the STEM Plan and associated Appendices.
9/1/2014	A and B	Kenny Seaver	Added Island Park B Pad to Appendices A and B and updated the frequencies of AIMM inspections for facilities already in Appendix B
2/26/2016	A and B	Charlee Boger	Added Castle Springs E, Coloroso A, Valley Farms J, Valley Farms L, Watson Ranch B, and Yater to Appendices A and B. Updated frequencies of AIMM inspections for facilities already in Appendix B.

Attachment 1

Completed Forms

STEM Personnel Information Sheet

Personnel Information			
Name:		Reed Wold	
Title:		Air Compliance Technician	
STEM Responsibilities:		AVO and AIMM Inspection	
Trainings			
Training Name	Date of Training	Training Description	Expiration Date
Ursa Safety Training *	3/2014	General safety requirements for all personnel working at Ursa facilities	N/A
Certifications			
Certification Name	Date of Certification	Certification Description	Expiration Date
Optical Gas Imaging	7/2015	Infrared Camera Thermographer Certification	7/2020

List all additional trainings and certifications in the spaces provided. Trainings marked with an asterisk (*) are required.