CENTER FOR SUSTAINABLE SHALE DEVELOPMENT, INC.

INITIAL CERTIFICATION AUDIT REPORT SUMMARY

Chevron - Appalachian Michigan Business Unit (AMBU)

September 18, 2014

Company	Chevron Appalachia (Chevron)				
Address	600 Clubhouse Dr., Moon Township, PA 15108				
AUDITING FIRM INFORMATION					
Lead Auditor	John Stangline			Abbreviation	JAS
Auditor(s)	Dane Kennedy Gregg Hamilton Ben Harmon			Abbreviation	DK GH BH
Water Performance Standards Audited:	Standard 1- 8.3	Start Date of Audit	6/2/2014	End Date of Audit	6/10/2014
Air Performance Standards Audited:	Standard 9 - 15.4	Start Date of Audit	6/2/2014	End Date of Audit	6/10/2014
Field/Office Auditor Days	24	Offsite Auditor Days	14	Total Auditor Days	38
Scope of Certification:	These standards apply to unconventional exploration, development, and gathering activities including site construction, drilling, hydraulic fracturing and production in the Appalachian Basin. These regional standards consider geology, topography, population density, infrastructure, surface water, ground water and other issues of particular concern in the Appalachian Basin. Accordingly, until such time as the scope of these standards may be amended, these standards and the CSSD evaluation and certification process will be limited to Operators' unconventional activities in the Appalachian Basin.				

SUMMARY

Chevron's Appalachian Michigan Business Unit (AMBU) applied for certification to the Center for Sustainable Shale Development's (CSSD) Performance Standards on April 1, 2014. Pursuant to certification requirements and on behalf of the CSSD, Bureau Veritas Certification (BVC) conducted an audit of Chevron's AMBU operations within the Appalachian Basin. BVC's audit team was comprised of four auditors that met CSSD's auditor requirements including having the requisite oil & gas industry, environmental (air and water) and Appalachian Basin expertise. The audit was conducted for conformance to the CSSD Performance Standards (version 1: September 27, 2013) and in accordance with the requirements of the CSSD Verification Protocol (version 1.0: August 27, 2013) and Guidance for Auditors (August 19, 2013).

A scoping meeting was held on April 15, 2014 and May 20—21, 2014 to review the geographical and operational scope of Chevron's activities in the Appalachian Basin and to determine the appropriate set of certification audit sites. The desktop portion (document review) of this audit was performed by the audit team at 600 Clubhouse Dr. in Moon

Township, PA on June 2 and 3, 2014. The field verification portion of the audit was performed over the period of June 2, 2014 to June 9, 2014 at 22 locations in Pennsylvania (Greene, Washington, Fayette, and Westmoreland), Ohio (Harrison) and West Virginia (Marshall) with each site being visited by at least two BVC auditors.

The verification process included audit observations, interviews with responsible management, planning and operating individuals, documentation review and site visits. Where necessary and appropriate, the auditors requested explanations of operating procedures and reviewed working documents to demonstrate the level of conformance to the standards. Over the course of the audit, the auditors reviewed approximately 250 records and documents and interviewed 17 employees (5 office based, 12 field personnel) to determine conformance with the performance standards.

Table 1, titled "CSSD Certification – Chevron AMBU Audit Summary Scorecard" summarizes BVC's audit findings with respect to each performance standard. Table 2, titled "CSSD Certification – Field Verification Visits Chevron AMBU" outlines the Chevron AMBU locations and associated operations visited for observation and verification of conformance to the CSSD Performance Standards. The sites selected include a cross section of Chevron's AMBU operations and geographic locations throughout the Appalachian Basin that were active during the audit "operational window" as required by CSSD's Verification Protocol. The standards listed for each site are a sample of the areas of observation and verification addressed by the audit team.

Table 1: CSSD Certification – Chevron AMBU Audit Summary Scorecard

WATER	WATER PERFORMANCE STANDARDS	Finding (C,N,NA)*
1.0	**Std 1: No wastewater discharge**	
1.0	Maintain zero discharge of wastewater (including drilling, flowback and produced waters) to Waters of the Commonwealth of PA and other states.	C
2.0	**Std 2: Recycle water**	
2.1	Maintain a plan to recycle flowback and produced water, for usage in drilling or fracturing a well, to the maximum extent possible.	C
2.2	Recycle a minimum of 90% of the flowback and produced water, by volume, from wells in all core operating areas in which an Operator is a net water user.	C
3.0	**Std 3: Closed loop drilling / pits**	
3.1	Any new pits designed shall be double-lined and equipped with leak detection.	NA[1]
3.2	Contain drilling fluid, when using oil-containing drilling fluids to drill a well, in a closed loop system at the well pad (e.g. no ground pits).	C
3.3	Contain all drilling fluid and flowback water in a closed loop system at the well pad, eliminating the use of pits for all wells.	C
4.0	**Std 4: Centralized wastewater impoundments**	
4.1	Ensure that free hydrocarbons are removed from the water prior to storage; new impoundments must be double-lined with an impermeable material, equipped with leak detection; and take measures to reasonably prevent hazards to wildlife.	NA[2]
5.0	**Std 5: Geologic risk assessment**	
5.1	Establish an Area of Review, prior to drilling a well, which encompasses both the vertical and horizontal legs of the planned well; conduct a comprehensive characterization of subsurface geology , including a risk analysis; and conduct a thorough investigation of any active or abandoned wellbores within such area of review or other geologic vulnerabilities (e.g., faults) that penetrate the confining layer and adequately address identified risks.	C
6.0	**Std 6: Groundwater monitoring**	
6.1	Develop and implement a plan for monitoring existing water sources and demonstrate that water quality and chemistry measured during a pre-drilling assessment are not impacted by operations.	C
6.2	Conduct periodic monitoring for at least one year following completion of the well and monitoring must be extended if results indicate potentially adverse impacts on water quality or chemistry by operations.	C
6.3	Develop and implement an investigative and corrective action plan if monitoring establishes a possible link between an Operator's activities and of contamination of a water source	C

[1] Chevron's current standardized well pad design does not include onsite pits in the Appalachia Basin.
[2] Chevron does not own or operate centralized wastewater impoundments in the Appalachia Basin.

6.4	Conduct additional monitoring in the event a well is re-stimulated.	NA[3]
7.0	**Std 7: Well integrity; fluid design & disclosure**	
7.1	Design and install casing and cement to completely isolate the well and all drilling and produced fluids from surface waters and aquifers and prevent vertical movement of fluids in the annulus.	C
7.2	Do not use diesel fuel in the hydraulic fracturing fluids.	C
7.3	Publically disclose the chemical constituents intentionally used in well stimulation fluids.	C
7.5a	Work toward use of more environmentally neutral additives for hydraulic fracturing fluid.	C
7.5b	Perform mechanical integrity tests when refracturing an existing well.	NA[4]
8.0	**Std 8: Spill containment & emergency response**	
8.1	Design each well pad to minimize the risk that drilling related fluids and wastes come in contact with surface waters and fresh groundwater.	C
8.2	Develop and implement an emergency response plan and ensure local responders have appropriate training and equipment to respond to an emergency at the well.	C
8.3	In the event of spill or release, beyond the well pad, immediately provide notification to the local governing body and any affected landowner.	C
AIR	**AIR PERFORMANCE STANDARDS**	
9.0	**Std 9: gas to pipeline/ limited flaring**	
9.1	Direct all pipeline-quality gas during well completion of development wells, and re-completion or workover of any well into a pipeline for sales.	C
9.2	Any gas not captured and put in the sales pipeline may not be vented and must be flared (in accordance with Standard No. 10).	C
9.3	Acceptable reasons for sending gas to a flare and not directing gas into the sales line include: (a) Low content of flammable gas and (b) for safety reasons.	C
9.4	Circumstances unacceptable for sending gas to flare, instead of directing it into a sales line, are: (a) lack of a pipeline connection except for wells that are designated as either exploratory or extension wells; (b) inadequate water disposal capacity; and (c) undersized flow back equipment, lack of flow back equipment or lack of equipment operating personnel.	C
9.5	Document any upset or unexpected condition that leads to flaring of gas and maintain records of description of the condition, the location, date, and quantity of gas flared.	C
9.6	Exploratory well verification	C
10.0	**Std 10: Flare operation, if permitted**	
10.1a	Use raised/elevated flares or an engineered combustion device with a reliable continuous ignition source, which have at least a 98% destruction efficiency of methane. Pit flaring is not permitted.	C

[3] Chevron has not re-stimulated a well in the Appalachia Basin.
[4] Chevron has not refractured a well in the Appalachia Basin.

10.1b	Flaring may not be used for more than 14-days on any development well and no more than 30-days on any exploratory or extension wells. If flaring continues beyond 30-days for an exploratory or extension well, document the extent of additional flaring and reasons requiring flaring beyond the 30-days.	C
10.1c	Flares shall be designed for and operated with no visible emissions, except for periods not to exceed a total of five minutes during any two consecutive hours.	C
11.0	**Std 11: Engine emissions - rig; frac pumps**	
11.1a-e	Dedicated horizontal drill rig (non-road) diesel - average emissions must be equivalent to Tier 2 non-road diesel engine standards or better. All horizontal drill rig diesel non-road equipment must use Ultra-Low Sulfur Diesel fuel (15 ppm of sulfur) at all times.	C
11.2a-b	Dedicated frac pump diesel engines - average emissions must be equivalent to Tier 2 non-road diesel engine standards or better. All frac pump diesel engines must use Ultra-Low Sulfur Diesel fuel (15 ppm of sulfur) at all times.	C
12.0	**Std 12: Engine emissions - compressors**	
12.1	Existing compressor engines greater than 100 horsepower may not emit more than 1.5 grams of NOx per horsepower-hour.	C
12.2	Any new, purchased, replacement, reconstructed, or relocated lean-burn engines greater than 100 horsepower may not emit more than 0.5 g/hp-hr for NOx; 2.0 g/hp-hr for CO; 0.7 g/hp-hr for VOCs.	NA[5]
12.3	Any new, purchased, replacement, reconstructed, or relocated rich-burn engines greater than 100 horsepower may not emit more than 0.3 g/hp-hr for NOx; 2.0 g/hp-hr for CO; 0.7 g/hp-hr for VOCs.	NA[6]
13.0	**Std 13: Tank VOC emissions**	
13.0	All individual storage vessels at the well pad with VOC emissions equal to or greater than 6 tpy must install controls to achieve at least a 95% reduction in VOC emissions.	C
14.0	**Std 14: Fugitive emissions - controllers, seals, inspection**	
14.1	Change rod packing at all reciprocating compressors (both existing and new), including those at the wellhead, either every 26,000 hours of operation or after 36 months.	C
14.2	All pneumatic controllers must be low – bleed, with a natural gas bleed rate limit of 6.0 scfh or less or zero bleed when electricity (3-phase electrical power) is on-site.	C
14.3	Replace worn out wet seals on existing centrifugal compressors with dry seals.	NA[7]
14.4	Implement a directed inspection and maintenance program (DIM) for equipment leaks from all existing and new valves, pump seals, flanges, compressor seals, pressure relief valves, open-ended lines, tanks and other process and operation components that result in fugitive emissions. Monitor weekly (OVA) and annually (FLIR). Once significant leaks are detected, they are required to be repaired in a timely manner.	C

[5] Chevron has not purchased or replaced any existing lean-burn engines in the Appalachia Basin.
[6] Chevron does not own or operate rich-burn engines.
[7] Chevron does not own or operate any centrifugal compressors with wet seals in the Appalachian Basin.

14.5	Eliminate VOC emissions associated with the prevention of well-bore freeze-up.	C
14.6	Pressurize compressors when they are off-line for operational reasons to reduce blowdown emissions.	C
15.0	**Std 15: Engine emissions - water fleet, other**	
15.1	80% of all trucks used to transport fresh water or well flowback water must meet U.S. EPA's Final Emission Standards for 2007 and Later Model Year Highway Heavy-Duty Vehicles and Engines for particulate matter (PM) emissions.	C
15.2	By September 24, 2015, 95% all trucks used to transport fresh water or well flowback water must meet U.S. EPA's Final Emission Standards for 2007 and Later Model Year Highway Heavy-Duty Vehicles and Engines for particulate matter emissions.	NA[8]
15.3	All on-road vehicles and equipment must limit unnecessary idling to 5 minutes, or abide by applicable local or state laws if they are more stringent.	C
15.4	All on-road and non-road vehicles and equipment must use Ultra-Low Sulfur Diesel fuel (15 ppm of sulfur) at all times.	C

*C = Conformance with the standard
NC = Non-conformance with the standard
NA = Not applicable

[8] Initial certification audit preceded the effective date of the standard.

Table 2: CSSD Certification - Field Verification Visits Chevron AMBU

Site Name	Assessors	Date	General Location	Operation / Activity	Key CSSD Performance Standards Assessed
Sargent A	BH, JS	June 4, 2014	SW Pennsylvania	Drill Rig - (Patterson 334) 9 wells - 7 drilled; 1 in progress	*1 - Zero discharge, 3 – Pits/Impoundments, 8 –ERP and Containment, 11 – Engines, 15 - Truck idling*
Buday A				Production - 2 wells - drill, fracture, TIL 2011	*1 - Zero discharge, 8 – ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Wicks				Compressor Station - 5 compressors, 2 dehydration units	*1 - Zero discharge, 8 – ERP, 12 - Engine Emissions, 14 – Rod Packing, Controllers, Blowdown for Operations*
Grooms A				Production - 8 wells - drill, frac 2012, TIL 2013	*1 - Zero discharge, 8 – ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Miller A	GH, DK			Fracture - 7 wells - drilled 2013, fracture in progress	*1 - Zero discharge, 3- Pits/Impoundments, 7 - Frac Fluids, 8 – Containment and ERP, 11 – Engines, 15 - Truck idling*
Donley A				Post Drill - 2 wells - drilled March2014	*1 - Zero discharge, 3- Pits/Impoundments, 8 – Containment and ERP, 11 – Engines, 15 - Truck idling*
Burchianti B				Production - 5 wells - drill, fracture 2011, TIL 2012	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Hart A				Production - 3 wells - drill 2012, frac 2013, TIL 2014	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*

Site Name	Assessors	Date	General Location	Operation / Activity	Key CSSD Performance Standards Assessed
Snyder A	BH, JS	June 5, 2014	West Virginia	Production (Wet Gas) - 1 well - drill 2010, frac 2013, TIL 2013	*1 - Zero discharge, 8 – Containment and ERP, 13 – Tanks, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Siburt A				Production (Wet gas) - 1 well - drill 2010, fracture, TIL 2011	*1 - Zero discharge, 8 – Containment and ERP, 13 – Tanks, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Curry A				Production (Wet Gas) 1 well - drill , fracture, TIL 2010	*1 - Zero discharge, 8 – Containment and ERP, 13 – Tanks, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Caveny A				Production (Wet Gas) 1 well - drill , fracture, TIL 2010	*1 - Zero discharge, 8 – Containment and ERP, 13 – Tanks, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Gurki A	GH, DK		SW Pennsylvania	Production - 4 wells - drill, fracture, TIL 2013	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair), Blowdown*
Bassista / Dermotta A				Production - 2 wells - drill 2011, fracture, TIL 2012	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair), Blowdown*
Hepler A				Production - 3 wells - drill, fracture 2011, TIL 2011/12	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair), Blowdown*
Greenawalt_ A				Production - 3 wells - drill, frac 2011, TIL 2013	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair), Blowdown*
Skovran B				Production – 4 wells - drill 2011, fracture, TIL 2012	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*

Site Name	Assessors	Date	General Location	Operation / Activity	Key CSSD Performance Standards Assessed
Ritter A	GH, DK	*June 6, 2014*	SW Pennsylvania	Drilling rig (Patterson 339) 8 wells - 3 drilled Apr/May 2014, 1 in progress	*1 - Zero discharge, 3 – Pits/Impoundments, 8 – ERP and Containment, 11 – Engines, 15 - Truck idling*
Jackson Farms B				Production - 3 wells - drill, fracture 2012, TIL 2013	*1 - Zero discharge, 8 – Containment and ERP, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Knight A	BH, JS			Drill Rig (Nabors X8) - 7 wells - 4 drilled Apr-May 2014, 1 in progress	*1 - Zero discharge, 3 – Pits/Impoundments, 8 – ERP and Containment, 11 – Engines, 15 - Truck idling*
Kinsey A	DK, JS	*June 9, 2014*	Ohio	Production (wet gas) 2 wells - drill 2012/13, fracture, TIL 2013	*1 - Zero discharge, 8 – Containment and ERP, 13 – Tanks, 14 – Controllers, Chemical Injectors, LDAR (Leak Detection and Repair)*
Clark A				Post Drill - 2 wells - drilled Mar-Apr2014	*1 - Zero discharge, 3- Pits/Impoundments, 8 – Containment and ERP, 11 – Engines, 13 – Tanks, 15 - Truck idling*