



Preliminary Air Sampling and Analysis Plan

Version: 1.0 Effective Date: 6/09/14

Incident:	Ammonia Release
Location:	Richland, MS
Client:	KCS and MDEQ
Version History:	1.0

CTEH Project-Specific Action Levels

Plan/Assignment: **WORK AREAS**

Objective: Report air levels before they reach those requiring respiratory protection or other precautionary actions

Analyte	Plan	Action Level	Basis	Action to be Taken
Ammonia	Work Area	≤25 ppm	ACGIH®TLV for Ammonia – Reading sustained for 15 minutes	Report reading to Project Manager, evaluate work practices.
Ammonia	Work Area	≥25 ppm	ACGIH®TLV for Ammonia – Reading sustained for 15 minutes	Report reading to Project Manager, recommend APR donning, and evaluate work practices.
Ammonia	Work Area	35 ppm	ACGIH®STEL for Ammonia – Reading sustained for 5 minutes	Report reading to Project Manager, recommend APR donning, and evaluate work practices.
CO ₂	Work Area	≤5,000 ppm	ACGIH®TLV for CO ₂ – Reading sustained for 15 minutes	Report reading to Project Manager, evaluate work practices.
CO ₂	Work Area	5,000 – 30,000 ppm	ACGIH®STEL for CO ₂ – Reading sustained for 5 minutes	Report reading to Project Manager, egress and evaluate work practices.

Plan/Assignment: **Work Area: Facility**

Objective: Report air levels before they reach those requiring respiratory protection or other precautionary actions

Analyte	Plan	Action Level	Basis	Action to be Taken
Ammonia	Work Area	≤25 ppm	ACGIH®TLV for Ammonia – Reading sustained for 15 minutes	Report reading to Project Manager, evaluate work practices.
Ammonia	Work Area	≥25 ppm	ACGIH®TLV for Ammonia – Reading sustained for 15 minutes	Report reading to Project Manager, recommend APR donning, and evaluate work practices.
Ammonia	Work Area	35 ppm	ACGIH®STEL for Ammonia – Reading sustained for 5 minutes	Report reading to Project Manager, recommend APR donning, evaluate work practices.
Ammonia	Work Area	300 ppm	At IDLH for Ammonia – Reading sustained for 15 minutes	Upgrade respiratory protection to supplied air.
CO ₂	Work Area	5,000 ppm	ACGIH®STEL for CO ₂ – Reading sustained for 5 minutes	Report reading to Project Manager, evaluate work practices.
CO ₂	Work Area	5,000 – 30,000 ppm	ACGIH®STEL for CO ₂ – Reading sustained for 5 minutes	Report reading to Project Manager, evaluate work practices.
CO ₂	Work Area	40,000 ppm	IDLH for CO ₂ – Reading sustained for 5 minutes	Upgrade respiratory protection to supplied air.

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Plan/Assignment: **COMMUNITY Areas**

Objective: Report levels in the community

Analyte	Plan	Action Level	Basis	Action to be Taken
Ammonia	Comm.	Odor	Nuisance odor – sustained for 15 minutes	Report reading to Site Management, evaluate work practices.

Plan: **All – FLAMMABILITY**

Objective: Report areas where flammability is most likely

Analyte	Instrument Reading	Corrected Value	Correction Factor	Basis	Action to be Taken
LEL	2 %	1.6 %	0.8 for ammonia LEL*	10% of the LEL	Egress and Notify Site Management
VOCs	1650	16000	9.7 For ammonia PID	1% LEL as VOC	Egress and Notify Site Management

Methods

Real-Time Methods

Chemical	Instrument	Detection Limit*	Tube#/Lamp	Notes	Correction Factor
Ammonia	MultiRAE	0.1 ppm	PID 10.6 eV lamp	Measuring range: 0 – 2,650 ppm	9.7
	AreaRAE	0.1 ppm	PID 10.6 eV lamp	Measuring range: 0 – 2,650 ppm	9.7
	Colorimetric	0.2 ppm	Gastec tube #3L	Range: 1 to 30 Volume: 100 ml	1
CO ₂	MultiRAE Pro	100 ppm	NDIR Sensor	Range: 0 – 5,000 ppm	1
	Colorimetric	20 ppm	Gastec tube #2LC	Measuring range: 100 – 2000 ppm	1
	Colorimetric	30 ppm	Gastec tube #2LL	Measuring range: 300 – 5000 ppm	1

*For electronic instruments the detection limit and range is listed as the resolution adjusted by the correction factor.

Analytical Methods

Analyte	Media/Can	Method	Detection Limit	Target compounds
Ammonia	SKC 226-29	Mod. OSHA ID-188	20 µg	Ammonia
Ammonia	Radiello RAD168	WET-SOP-18	5.0 µg	Ammonia
Ammonia	Assay N584	Mod. OSHA ID-188	5.0 µg	Ammonia

General Information on Procedures (Assessment Techniques) Used

Procedure	Description
Guardian Network	A Guardian network may be established with AreaRAEs equipped with electrochemical sensors will be positioned at established locations around the work zone. The AreaRAEs will be telemetering instantaneous data at 15-second intervals to a computer console. MultiRAE Pros may also be used in the network. The data will be visible in real-time at the computer console and will be monitored 24 hours per day by CTEH personnel.
Hand-held Survey	CTEH staff members may utilize handheld instruments (e.g. MultiRAE Plus; ppbRAE, Gastec colorimetric detector tubes, etc.) to measure airborne chemical concentrations. CTEH will use these hand-held instruments primarily to measure the breathing zone. Additionally, measurements can be made at grade level, as well as in elevated workspaces, as indicated by chemical properties or site conditions. CTEH may also use these techniques to verify detections observed by the AreaRAE network.
Fixed Real-Time Monitoring locations	Multiple community locations may be identified and monitored at the same location approximately once per hour using hand-held instruments. This allows use statistical analysis more effectively than with a random approach.
Analytical sampling	Analytical sampling may be used to validate the fixed station and hand-held data monitoring data, or to provide data beyond the scope of the real-time instruments. Analytical samples may be collected as whole air samples in evacuated canisters or on specific collection media, and sent to an off-site laboratory for further chemical analysis.

Sampling Areas

Sampling Area	Description
Work Areas	
Refrigeration Facility Perimeter	The general area around the incident location where workers are actively or sporadically participating in remediation activities or normal work duties.
Facility	The spill area where all major spill cleanup operations will be performed. Generally requiring a level of personal protection above that required in the general work area.
Community Areas	The general area around the incident location where individuals not participating in remediation activities could potentially be exposed to the spilled chemicals.
Residential	The residential area northeast of the refrigeration facility.
Rail Yard	The KCS Rail Yard and Intermodal Yard northeast of the refrigeration facility.
Industrial/ Commercial	The industrial/commercial area surrounding the refrigeration facility.



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Quality Assurance/Quality Control Procedures

Method	Procedure
Real-time	<ul style="list-style-type: none">• Real time instruments may be calibrated in excess of the manufacturer's recommendations.<ul style="list-style-type: none">○ At a minimum whenever indicated by site conditions or instrument readings.• Co-located sampling for analytical analysis may be conducted, if necessary, to assess accuracy and precision in the field.• Lot numbers and expiration dates may be recorded with use of Gastec colorimetric tubes.
Analytical	<ul style="list-style-type: none">• Chain of custody documents may be completed for each sample.• Level IV data validation may be performed on the first sample group analyzed.• Level II data validation may be performed on 20% of all samples.• Level IV data validation may be performed on 10% of all samples.
Other	



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Change from version 1.0 to 1.1

- *In the section titled:*

	Name/Position	Signature	Date Signed
Prepared By:			
Reviewed By:			
Approved By:			