



# AMMONIA TRAINING PROJECT

**Kenai, AK**  
**May 13-15, 2010**

**FINAL REPORT**  
July 2010

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## **Section I: Introduction, Purpose and Scope of the Project**

### **A. Background**

Recent hazards analyses conducted for the Alaska Department of Environmental Conservation (ADEC) have clearly identified communities at risk from extremely hazardous substances (EHS) such as ammonia. Ammonia is a commonly targeted EHS for hazardous material (HazMat) release prevention and response planning, primarily because of its prevalence in Alaskan communities at seafood processing facilities.

Recent Level A/B HazMat response capability assessments have also indicated that most Alaskan communities do not possess an offensive HazMat response capability. This continuing project is intended to provide at-risk communities, such as those in the Kenai Peninsula Borough, with the training and knowledge they need to prevent and respond defensively to an EHS release.

The ADEC sponsored the initial pilot project (March 1999) at Petersburg, which included ammonia/chlorine training, non-regulatory technical assistance visits to EHS facilities, and a tabletop exercise. A follow-on project was sponsored in Kodiak, Alaska in November 1999, and included ammonia training, non-regulatory technical assistance visits, Incident Command System (ICS) training, a tabletop exercise, and a functional exercise (including the actual deployment of the Anchorage and Fairbanks Level A HazMat Teams). Other projects were held in Unalaska (April 2000), Bristol Bay (May 2001), Valdez (2004), Ketchikan (2007), and Juneau (2009) and featured ammonia and chlorine training, non-regulatory technical assistance visits, ICS training, and either tabletop or functional exercises.

The Kenai Ammonia Training Project is a cooperative effort involving ADEC and the Kenai Peninsula Borough (KPB). Aware Consulting (Rick Warren) was contracted by ADEC and provided academic and practical training, along with a seafood processing facility walk-thru and tabletop exercise to focus on proper emergency response procedures to anhydrous ammonia releases.

### **B. Purpose of Project**

**The overall purpose of this project is to:**

- Improve the HazMat response capability within the Kenai Peninsula Borough through increased awareness of the hazards posed by anhydrous ammonia. Provide classroom training on the hazards, handling, management and response to ammonia releases.
- Update current information on existing EHS hazards in the communities.

- Conduct a walk-thru tour and tabletop exercise aimed at improving the local HazMat response capability by jointly exercising the local emergency response teams in response to a simulated ammonia release at the Pacific Star seafood processing facility in Kenai.

## **Executive Summary**

The Alaska Department of Environmental Conservation (ADEC) Prevention and Emergency Response Program sponsored the "Preparedness, Safe Handling, and Emergency Response to Anhydrous Ammonia" training course in Kenai on May 13-15, 2010. The event was hosted by the Kenai Peninsula Borough and featured classroom instruction at the Kenai Merit Inn, a live ammonia release demonstration at the Kenai Airport north sector, a walk-thru tour and tabletop exercise involving response to a simulated ammonia release, and a positive air ventilation demonstration at the Pacific Star seafood processing facility.

A total of 48 personnel attended the training event including ADEC spill responders, KPB Central Emergency Services, Kenai Fire Department, Seward Fire Department, Nikiski Fire Department, KPB Community Emergency Response Team, Seward Fisheries, Icicle Seafoods, Trident Seafoods, Inlet Fish Processing, Pacific Star Seafoods, Alaska National Guard 103<sup>rd</sup> Civil Support Team, and the US Army 95<sup>th</sup> Chemical Company. For a complete list of attendees, see Appendix A.

The training was very well received as reflected in the course evaluation summary (see Appendix B). The final report was prepared and distributed by ADEC staff, in coordination with the Kenai Peninsula Borough and Aware Consulting.

The event was held at the Kenai Merit Inn and began with classroom and academic instruction on May 13. Academic instruction continued on May 14 and included a live ammonia release demonstration at the Kenai Airport. The third day of the training (May 15) featured a walk-thru tour of a typical seafood processing facility with emphasis on the ammonia refrigeration equipment, an "on location – walk through" ammonia release scenario exercise, and a positive air ventilation demonstration all at the Pacific Star seafood's.

A detailed outline of the entire training course and demonstration/exercise schedule is provided at Appendix C of this report.

## Section II: Ammonia Training Course

The “Preparedness, Safe Handling, and Emergency Response to Ammonia” course was held at the Kenai Merit Inn on May 13-15, 2010.

A detailed outline of the course agenda is included at Appendix C.

The first day of the course was a full day of classroom instruction with topics including properties and characteristics of ammonia, uses, hazards, health effects, personal protective equipment, risk assessment, and monitoring equipment. During the second day of the course, a live ammonia release demonstration was staged at the Kenai Airport. The 103<sup>rd</sup> Civil Support Team suited out in Level A personal protective equipment and controlled the release of ammonia. Other Hazmat team members also monitored the air around the release site to determine concentration levels, and backup was provided by the Kenai Fire Department. Team members and equipment were also decontaminated prior to exiting the area.

Participants were also asked what would be desirable in terms of future training topics. Refer to Appendix B: Question #4 on page 24.



Classroom instruction at the Kenai Merit Inn



Air monitoring equipment demonstrations.



Live ammonia release demonstration.



Live ammonia release demonstration.



Air monitoring of live release.



Vapor to liquid.

Air Decon



### **Section III: Tabletop Exercise Summary and Lessons Learned**

The walk-thru tour and tabletop exercise was held on May 15, 2010, at the Pacific Star seafood processing facility in Kenai. Staff from the facility assisted with the walk-thru tour by pointing out and explaining various components of the ammonia refrigeration system. Rick Warren served as the primary controller for the ammonia release scenario “walkthrough” exercise. The facility was used as the setting for a simulated ammonia release. Rick Warren lead the group through the response sequence including first-on-scene procedures, staging, site assessment, hazard/risk assessment, site safety plan, operational zones, response strategies/tactics, plan and complete isolation, and decontamination. A positive air ventilation demonstration was also provided in one of the facility’s ammonia compressor rooms using a smoke generator to simulate an ammonia release.

#### **The objectives for the tabletop exercise were to:**

- Identify the facility and local emergency capability for:
  - Alert and alarm systems to notify facility employees, local facilities and residents and emergency responders.
  - Account for facility and local personnel to identify if rescue is required.
  - Notify facility, municipal, and outside resources as needed to support incident resource needs.
- Initially identify chemical release source and evaluate the potential severity of the incident (plume plots using CAMEO ALOHA).
- Incident/site safety issues:
  - Complete hazard/risk assessment initially and throughout the incident to ensure safe operations.
  - Complete a site safety plan, which includes operational zones, based on air monitoring results.
  - Use available resource materials to determine PPE requirements, zones, and response strategies/tactics.
- Use the Incident Command System (ICS) to plan strategies, employ tactics, and control the incident.
  - Identify and use needed human and equipment resources as dictated by the incident.
  - Document actions completed to access/isolate/secure the release.
- Complete a Debrief of this response after termination. Formally document lessons learned from this exercise.

**Basic Scenario:**

Date: May 15, 2010  
Time: 0900  
Weather: Sunny  
Wind: 5 -8 mph SW  
Temperature: 48 F

**General Timeline of Events:**

9:00am - Liquid ammonia release.  
9:15am - Evacuation/all accounted for.  
9:18am - KFD briefed by Pacific Star refrigeration staff and management of ammonia release conditions.  
9:20am - KFD protect downwind population and community notification.  
9:30am - throughout – Emergency Response Plan to isolate the area and allow leakdown until able to safely approach for isolation.



Walk-thru tour of ammonia system at Pacific Star seafood's



Positive air ventilation demonstration.



“Walkthrough” exercise at facility.

**Lessons Learned:** A Kenai Peninsula Borough (KPB) HazMat Response Team is needed.

Consistent planning and coordination between fish processing facilities and other HazMat facilities and local Fire Departments within each jurisdiction of the KPB will improve knowledge and response capability.

**Things That Went Well:** Pacific Star (PS) is knowledgeable of the hazards they have onsite.

PS has well maintained ammonia refrigeration equipment.

**Areas of Response Needing Improvement:** Both business and the community is at risk without HazMat Response capability if volatile chemicals like ammonia are released.

**Recommendations for Improvement:** Each FD jurisdiction should begin coordinating to form a KPB wide response capability.



## **APPENDIX A: Participant List**

The following is an alphabetical listing of the participants for this training event.

A total of 48 personnel attended the training event including staff from ADEC, KPB Central Emergency Services, Kenai Fire Department, Seward Fire Department, Nikiski Fire Department, KPB Community Emergency Response Team, Seward Fisheries, Icicle Seafoods, Trident Seafoods, Inlet Fish Processing, Pacific Star Seafoods, Alaska National Guard 103<sup>rd</sup> Civil Support Team, and the US Army 95<sup>th</sup> Chemical Company.



Class Photo

Participant List – Kenai Peninsula Borough Ammonia Training (May 13-15, 2010)					
	Name	Organization/Mailing Address	Phone	Email	
1	Jack Anderson	Central Emergency Services 231 S. Binkley St., Soldotna, AK 99669	262-4792	<a href="mailto:janderson@borough.kenai.ak.us">janderson@borough.kenai.ak.us</a>	
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8	Karen Corrigan	Seward Fire Department P.O. Box 167 Seward, Alaska 99664	224-3445	<a href="mailto:sewardfd@cityofseward.net">sewardfd@cityofseward.net</a>	
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15	John Harris	Kenai Fire Department	283-7666	<a href="mailto:Jharris1@ci.kenai.ak.us">Jharris1@ci.kenai.ak.us</a>	
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17	Allen Hulse	103rd Civil Support Team	575-9158	<a href="mailto:Allen.hulse@us.army.mil">Allen.hulse@us.army.mil</a>	
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33	Paul Oliver	103rd Civil Support Team		
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35	Tony Prior	Kenai Fire Department		<a href="mailto:tprior@ci.kenai.ak.us">tprior@ci.kenai.ak.us</a>
36	Craig Ralston	Nikiski Fire Department	776-5695	<a href="mailto:cralston@borough.kenai.ak.us">cralston@borough.kenai.ak.us</a>
37	Chad Root	Seward Fisheries, PO Box 8 Seward, AK 99664	224-3381	
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39	Lindsey Sagami	KPB Community Emergency Response Team 46723 Pintail Ave., Kenai, AK 99611	283-8447	<a href="mailto:Itsweld2wood@yahoo.com">Itsweld2wood@yahoo.com</a>
40	Kerry Smith	Icicle Seafoods, Homer	235-8107	
41	Bill Snyder	Icicle Seafoods, Homer	235-8107	
42	Richard Stauss	Inlet Fish Processing	690-0654	
43	Jeff Sutphin	Chief Engineer, Seward Fisheries PO Box 8, Seward, AK 99664	224-3381	
44	Charles Sweeney	Trident Seafoods Corporation		<a href="mailto:csweeney@tridentseafoods.com">csweeney@tridentseafoods.com</a>
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<b>Instructors/Coordinators</b>				
1	<b>John Coston</b>	<b>Aware Consulting Group Kenai, AK 99611</b>	<b>776-3162</b>	<a href="mailto:jcoston@awareconsulting.net">jcoston@awareconsulting.net</a>
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## **APPENDIX B: Course Evaluation Summary**

The following is a summary of the comments received following the academic portion of this training project. All of the individual student critiques and comments are captured below and consequently, a number of comments are repeated.

### **Training Course Evaluation on Preparedness, Safe Handling and Emergency Response to Ammonia Kenai, Alaska**

**Instructor:** Rick Warren

**Dates Attended:** May 13-15, 2010

**Evaluation by:** Participants

A total of 48 students attended the class. The following summarizes the course evaluation of 44 students who took the time to submit a course critique.

#### **1. List the topics you felt were most valuable to you in this course.**

- Procedures for protecting people, environment, and property with accidental releases.
- The details of dry and wet responses.
- Basic ammonia chemistry – shipping and storage info.
- Great coverage of all related information.
- Provided a good oversight on the overall handling of incidents, not just what happens at my level.
- Properties of ammonia under different conditions.
- Ammonia demonstration release, properties and characteristics of anhydrous ammonia, minor chemistry and physics lesson.
- Properties and handling requirements of NH<sub>3</sub>.
- Every bit of it. Cannot learn enough.
- Ammonia characteristics, first aid, PPE, hazards.
- Properties of ammonia, safety issues.
- Emergency tactics to use for fire personnel, characteristics and activity of ammonia if released.
- Health and effects, results of exposure. Types of gas – trace, dense, aerosol, pooled.
- Learning how ammonia reacts. I feel more comfortable if responding to a release now.
- I think the entire presentation was very valuable to me. I didn't know anything about ammonia before, and now have a better understanding of it.
- The entire course was a good refresher.
- All were great!

- I felt all of the instruction and material was valuable. We never get enough hands on training with instrumentation.
- Ammonia characteristics, background and hands on exercise. Excellent course, instructor's knowledge was very valuable.
- Wet vs dry mitigation approaches.
- Visual display of chemical properties of ammonia.
- Basics in ammonia as I've only been dealing with it for about 6 weeks. Pressures, temps, and stages of ammonia releases were valuable to learn.
- All topics were excellent.
- Physical, chemical properties of ammonia; local uses and scale of uses; exposure effects and guidelines; identification of response capabilities in AK.
- All of the topics were informative and were what I was looking to learn.
- NH<sub>3</sub>.
- Nitrogen trichloride.
- All of the information.
- The review and description of ammonia properties and characteristics in emergencies.
- NH<sub>3</sub> containment and physical liquid to cloud.
- Ammonia release travel.
- The whole course.
- Not much experience with NH<sub>3</sub>. Properties of NH<sub>3</sub> were very important.
- Saturation levels for ignition conditions.
- Have a plan and a 2<sup>nd</sup> (backup) plan so you don't go in blind.
- Identifying different types of vapor clouds (stages) and how to react accordingly.
- Health effects and results of exposure.
- The exercise with real releases. Monitoring equipment.
- All of it.
- The properties and characteristics of ammonia as well as the properties and how they react with other materials.
- Having a plan and assessing risks and hazards. I feel the most important thing to learn about was how to identify types of clouds to get an idea of how much quantity there is in PPM. Also controlling the gases with water and condensing it to liquid form ASAP to prevent any casualties from travelling NH<sub>3</sub>.
- Excellent refresher course for going over response guidelines.
- Health concerns, data points for ammonia, real world examples for how it moves and reacts.

**Least Valuable:**

- None
- Not just what happens at my level.
- Old footage of burning ammonia – no PPE, an unrealistic conditions – use modern footage/conditions – we're in 2010, not 1965.
- The heat in the room, they need to clean the restroom.
- Good information throughout the class.

- The food.
- Since I am at a beginner level, I feel that at this time it was all valuable.
- None
- A lot of PowerPoint, not that it's a bad thing, just hard to stay focused.
- Details on refrigeration system design.
- Can't think of any.
- None.
- Nothing.
- The sheer volume of raw technical information instead of practical response techniques/exercises.
- Medical.
- None
- Everything worked for me.
- I thought everything was valuable.
- How the refrigeration system works.
- Some of the videos.
- None.
- Just the learning about the ammonia in the ground that comes from animal waste.
- None.
- For fire service – how a compressor works.

**2. In which ways will this course help you to carry out your responsibilities on the job?**

- It will help decrease the chances of releases by utilizing proper preventative maintenance. Making sure vessels, valves, pressure switches are working and up to engineering standards.
- Knowledge and awareness of systems and capacities in our service area will be found out and pre plans will be updated.
- Identifying hazards for initial responses. Working more efficiently with first responders.
- Ability to operate more safely and increase in knowledge.
- Provide networking for better grasp on who to contact if an incident was to occur.
- Understand large releases and possible borough roles.
- The properties and characteristics portion of the class will help me the most....this information is more useful to me in my career, in regard to expected patterns and properties during real emergencies involving anhydrous ammonia.
- Understanding inherent danger/potential of ammonia better ability to assess/respond/mitigate.
- How to deal with NH<sub>3</sub> release.
- To better understand and to pass on to other personnel in the department.
- Now I have reasonable knowledge if I encounter ammonia.

- Awareness and understanding how to assist in preparation for EMT to inform them to the situation and variables.
- It will speed up overall response by knowing what to expect, local resources and reaffirmation of ammonia characteristics.
- How ammonia has effects and how to care or decon ammonia.
- Pre incident planning for Kenai Fire Department and the city.
- I feel I can identify a problem, or the potential, and feel more confident that as a CERT I can respond/react more competently to situations.
- It came at the right time of the year. It is a reminder to get out and do some pre-incident training.
- This course better prepared me to respond to ammonia and be better aware of its hazards. Very good course!
- It gave us a lot more confidence in our PPE and instrumentation.
- Gave me a better understanding on ammonia, how it reacts, exposure limits and signs/symptoms.
- Better familiarity with mitigation approaches.
- Increased awareness of ammonia services around town and knowledge in case of a live incident.
- Better understanding of what to look for as possible problems and how to respond to them.
- Much more familiar with hazards/response actions and protocols to maintain a safe response action.
- Awareness of response resources; awareness of properties for advising release reporters on initial response; awareness of response procedures.
- It will help me to be more informed to the hazards dealing with a NH<sub>3</sub> response.
- I better understand NH<sub>3</sub> reaction and response methods to a release.
- It gives me a better understanding of the properties and behaviors of ammonia.
- Knowing the safety precautions that must be known before an incident and during one.
- Understanding ammonia helps me better relate my job to everyday facility operations.
- How to approach an emergency.
- Travel – containment.
- Being more careful with ammonia equipment.
- Better oversight of fire stations and maintenance.
- More awareness of storage spots for petroleum products.
- Different way to find leak in the system.
- Knowing how to respond to a leak during and after the release (proper PPE, use water or not, flammable limit, etc.).
- I'll know how to identify anhydrous ammonia by the different types of formation and appearance.
- The class gave a better understanding on what a responders roll would be if responding to an actual release.
- How to react to ammonia spill/leak.

- It better helped me realize the amount of hazard the communities around have and how often it is used.
- Being more aware of the dangers and help me to understand to plan and assess risks and hazard before acting too soon. Helps us know how important it is to have working alarms and evacuation plans and to keep people aware of the R&H from the knowledge I have to offer.
- Primary responder for several fisheries in town.
- I understand more now how not to use water first and also the proper distances to stay in the clear.

**3. How do you feel the instructor's use of materials contributed to the course in the following areas? Please Comment!**

**The Presentations/Lectures**

- Thorough & good presentation.
- Knowledgeable and complete.
- Excellent.
- Clear – concise & understandable.
- Instructor was very knowledgeable on the subject.
- Great information, need to update videos, need to move laptop from in front of the screen – very distracting – more enthusiasm during presentation – it got so dry it was painful.
- Excellent. Good information throughout.
- Good info, good detail, plain.
- All good.
- Great, good presentation.
- Great job.
- Comprehensive.
- Very good. Good info for a wide range of attendees.
- Fair.
- Good.
- Very informative; well organized and “open” style; creating comfortable question atmosphere.
- Good.
- Great!
- Great reference to personal experiences. Rick is a very knowledgeable and informative speaker.
- Everything was pertinent.
- All were well presented – they could be shortened somewhat as we seemed to occasionally ramble.
- Great PowerPoint presentation and integration of visual aids and hands on materials. Pictures could have gone faster to keep audience interest.
- Lectures were informative and covered possible situations I feel I’ll possibly but hopefully not encounter.
- Very good; lots of practical experience and knowledge. Respected by

- commercial facility operators; highly recommended for future training.
- Great 1<sup>st</sup> hand knowledge & experience.
  - Great.
  - Okay, but lacked significant relevance to overall objective of course.
  - The presentations were laid out and followed very well coordinated with good breaks in between.
  - Excellent presentation and well prepared.
  - Good, but for review need to have different slides 1<sup>st</sup> to hit only key review points. 2<sup>nd</sup> flow of presentation would save time instead of hunting for the next slide from earlier list.
  - Good visuals.
  - Very good.
  - Very knowledgeable.
  - Good use of action videos and pictures showing stages of NH<sub>3</sub>.
  - It was a little slow but I think it should have been done like that because of the amount of people.
  - Good.
  - Good but a little drawn out.
  - Instructor was very knowledgeable in the subject.
  - Good.
  - Well presented.
  - I liked the lectures – interesting. Great instruction and constant teaching through different subjects about safety, hazards, response and more.
  - Excellent.
  - Had good real world examples. Excellent level of ammonia could answer 99% of questions.

### **The Demonstrations**

- Comprehensive & good learning aids.
- A good reminder of the attributes of the chemical.
- Short – would have liked to be a little closer.
- Practically applicable.
- Demonstrations were good. I think some went slightly to long though.
- Alright, need more space so everyone can see.
- Informative and practical.
- Good verification of lecture material & videos.
- All good.
- Well explained and presented.
- Great job.
- Informative.
- More of them to break up lectures in a warm lecture area.
- Great.
- Excellent.
- Clear; performed safely and helped confirm lectures with a visual is very good.

- Good.
- Awesome!
- Good mix of lecture to demo. Demonstrations were very useful to validate the lectures.
- Outstanding.
- Live demo was extremely useful.
- Plenty of discussion opportunities and time to share real world experiences.
- Outside demonstration was interesting to see actual ammonia release. Inside demos were hard to see.
- Very good, again demonstration showed lots of practical experience demonstrations all went well in reinforcing.
- Very good – practical.
- Very good.
- Great! Showed real actions of  $\text{NH}_3$  when released.
- Great.
- Always a positive portion to see what is discussed during the course there is no replacement.
- Great combination of visual presentation the helped explain  $\text{NH}_3$ .
- Good. Would be more interesting to have discharges flowing against and cross wind situations instead of just down wind discharges.
- Good to see how it.
- Very good.
- Most excellent.
- Live demo worked well with swirling winds.
- Was good in exercise on how to do it right.
- Good.
- Good but short people should be placed in front because they can't see everything when tall people are in front.
- Gave a better picture about what we had talked about.
- Good.
- Good.
- Live release was cool, the air decon was useful to the responders to protect others they go around. I'm more interested to learn about controlling releases live.
- Excellent.
- Excellent. Would have liked to see comparison with wet ground to see how much further it would travel.

### **The Presentation Materials and Visual Aids**

- Comprehensive & good learning aids.
- Good quality.
- Excellent.
- Of great use.
- This helped with understanding of lecture material.

- Need to update videos – 1965 doesn't have much to do with today's technology.
- Excellent.
- Basic, but clear.
- All good.
- Very good.
- Very good.
- Adequate materials – could go deeper into refrigeration components and potential for problems.
- Good.
- Great.
- Good.
- Good, clear PowerPoint well organized and flowed.
- Good.
- Great.
- Were appropriate and useful.
- Lots of PowerPoint.
- The materials matched to presentations helped reinforce the material.
- Awesome!
- These were very informative.
- Very good, very useful.
- Videos helpful.
- Great.
- Decent.
- The handbook is very good. Having most of the material already in it with filling in info.
- Great.
- Good to have early testing and present discharges to show urban/rural effects but more on how response could have made these better to contain.
- Good to use monitors.
- Very complete.
- Most were very good. Some not readable – too dark.
- Good – good with explanations on how they worked.
- Couldn't see it all that well to many people I think it should have been done in sections.
- Excellent.
- They were good.
- Good presentation.
- Good.
- Very well.
- The devices & materials used are very useful and can save your life, helps to identify core area by rating ppm.
- Excellent.
- Videos and slides were very useful and informative.

## **The Handout Material**

- I would prefer to have the handout to have the information & then a test on info at end instead of filling in the blanks as you go.
- Well put together.
- Well organized.
- Good.
- Alright.
- Excellent.
- Good, room for notes.
- All good.
- Good.
- Great job.
- Adequate.
- Good workbook to review.
- Good.
- Good.
- Book was well laid out; liked not having to take notes; allowed more opportunity to “listen”; liked workbook style.
- Your use of the follow along notes is a great idea. It keeps people engaged in what can at times be dry information.
- Very good!
- Really like the fill in the blank student guide, easy to follow and to the point.
- Very well organized – went right with the slides.
- Handouts were clear & concise without little “fluff”.
- Great format. Usually classes use handout format which decreases interest in the class since you have a copy of every slide. The fill in the blank method worked great for this class.
- Worked good with the visual aid.
- Very good; easy to follow and instructor addressed all issues.
- Workbook format good for keeping trainees alert & engaged = writing helps memory.
- Good – informative.
- Needs improvement to more accurately follow the visual presentation.
- As the course went on it’s a lot of information to go through.
- Great.
- OK.
- Very good.
- Excellent.
- Good info – websites.
- Made it easy to understand.
- Good.
- Good studying material.
- Was very helpful.

- Good.
- Great.
- The instruments are good & I'd like to have one at my plant. They are useful for fast leak detection. Writing out what we learned was a good idea too.
- Excellent.
- Held key points, little note taking needed. I liked the fill in study guide method & will steal that idea! Would have been nice to get DVD with videos.

### **The Ammonia Functional Exercise**

- Good to see the aerosol & dense cloud differences from releasing liquid & vapor & re-condensing vapor to liquid with tarp.
- Great learning tool.
- Haven't done yet but should be good.
- Interesting, need better descriptions of what is taking place – was good watching team in action.
- All good.
- Great.
- Good training.
- Good affirmation of classroom lectures.
- Interesting.
- That's tomorrow.
- This was excellent; I like visual learning and seeing the ammonia & environment interaction. Helped me understand and also being the responders system was really informative.
- The last day exercise seems more applicable.
- Great!
- Wonderful, was nice to see how the real stuff behaves and not just a stimulant.
- Interesting to see the ammonia in person.
- Very informative but a bit chilly.
- Very good, went as planned.
- Not completed yet.
- Great & was nice to see it live.
- Excellent.
- Perfect.
- Yet to do.
- Good to see for real.
- Very illustrative.
- Did not attend.
- Went well with weather condition & site set-up – embankment.
- I thought it was knowledgeable because I work with it all the time.
- I liked it, it was good hands on.
- Good.
- Eye opening.
- I expected more release but I saw how to put the suits on and remove. I also

- paid attention to the radio instructions and communication.
- Invaluable – excellent!
- Not done yet.

**The Facility Visits:**

- Remains to be seen.
- Haven't done yet but should be good.
- N/A.
- All good.
- Hope it's good, we'll see on Saturday.
- Very good.
- Not sure yet! Evaluation before visit?
- Good.
- Tomorrow.
- N/A.
- Haven't been yet.
- N/A.
- OK.
- Not completed yet.
- Haven't done yet but looking forward to them.
- Fair.
- N/A.
- ? Yet to do.
- Not yet!
- Good.
- None.
- I feel comfortable about the visits. I'm sure they are very attentive and thorough about inspections.
- Very impressive.
- Not done yet.

**4. What topics would you like training on in a future or follow-up session?**

- .More technical ammonia refrigeration equipment to make operation safer.
- More on storage & transport.
- Chlorine.
- Other chemicals/mixes of chemicals.
- Any.
- More functional exercises.
- Annual release exercise.
- Safety in the facilities as it relates to codes & standards.
- I would like to view more situational videos.
- LPG, chlorine.
- Any other hazards that the State of Alaska has in abundance.
- Anhydrous chlorine & LPG.

- $\text{Cl}_2$  and any other stuff you teach.
- Chlorine, methane, compressed gasses.
- Walk through specific response scenarios.
- $\text{Cl}_2$ .
- Less raw data & more practical response including hands-on & technique training.
- Perhaps inside  $\text{NH}_3$  containment techniques.
- More practical scenarios.
- PPE.
- More info on mixture of various chemicals found on sites.
- More in the safety about getting everyone out to safety.
- Facility conditions i.e. what to look for, poor conditions, good conditions.
- Chlorine.
- Chlorine.
- Becoming full-time responder.
- Like to see tech level training.
- A demo or live exercise for setting up decon distances. Will that be tomorrow?  
Not really clarified in class.

**5. Check boxes below for ratings that best describe this training course under each heading.**

	<b>Training Materials</b>	<b>Training Facility</b>	<b>Demonstrations</b>	<b>Practicality</b>	<b>Instructor</b>	<b>Exercise</b>	<b>Overall</b>
4 = Excellent	26	17	27	29	31	22	26
3 = Good	16	18	16	14	11	14	14
2 = Fair	2	7	1	1	2		
1 = Poor							
Not rated		2				8	2
Overall Average	3.5	3.2	3.6	3.6	3.6	3.6	3.6
Overall Rating	Good+	Good	Good+	Good+	Good+	Good+	Good+

**More comments here if you have them please:**

- Thanks.
- Seems there is a bit of redundancy on some points, yet review, review = retention!
- Wake up people that are napping more often.
- This has been one of the best classes I have attended, if not the best!
- Excellent job, Thanks.
- Better introduction to the group, I may have missed it though.
- Thanks for a well instructed class.

## **APPENDIX C: Training Course Agenda**

**Preparedness Training for  
Kenai Peninsula Borough  
Fire Service Agencies  
Fish Processors  
Local, Federal and State Agencies**

**On  
Safe Handling and Emergency Response to Anhydrous Ammonia  
At  
Kenai Merit Inn  
May 13-15, 2010**

**Presented by  
Kenai Peninsula Borough  
and  
Alaska Department of Environmental Conservation**

### **Overview of Scheduled Events**

#### **May 13, 2010**

Session one – Good Morning and Welcome - Ammonia Class Room Training and Demonstrations

#### **8:00 AM**

Getting to know each other

ADEC representatives – Background of the Ammonia and Chlorine Safety Project

Fish processors – Who is Represented?

Cities represented (Kenai, Nikiski, Soldotna, Seward, Homer and Others)

Who is represented?

USCG – Who is represented?

Other federal and state agencies – Who is represented?

#### **8:25 AM**

What we will do in the next 3.0 days

Classroom Instruction and Exercises

Field Demonstrations

Training Exercise/Drill

What do you need/want from this training?

Rules to guide us and Orientation to Ammonia Training Student Workbook

#### **8:45 AM**

Begin Classroom Instruction on Ammonia

Exercise – See Anything Wrong Here?  
Objectives of Ammonia Training  
Exercise – Name the Elements, Compound and Chemical  
Uses of Ammonia – Past, Present, & Future  
Exercise – Team Competition  
Properties and Characteristics of Ammonia  
The Useable Stuff ~ Numbers to Remember  
How is Ammonia Made?  
The Recipe – Minor Chemistry and Physics Lesson  
Hazards of Ammonia  
How Do We Know Where It Is?

**9:55 AM - BREAK**

**10:10 AM**

Health Effects of Ammonia  
Can This Stuff Hurt Me? How?  
Health Effects... First Aid/Treatment  
Exercise – Start your Emergency Medical Plan  
Personal Protective Equipment (PPE)  
PPE for three different “Operations”  
What to use when

**11:10 AM Break**

**11:20 AM**

Emergency Response Hazard and Risk Assessment  
Always Consider Protecting These Three  
Hazards and the Risks Associated with Them  
Chemical - Physical  
Decision Making Process  
  
Make Good Emergency Response Decisions  
Exercise – Find the Hazards and Risks  
Demonstration – Bottle Exercise

**12:00 Noon**

**We Will Eat Here – Enjoy Your Lunch!**

**12:50 PM**

Key Characteristics of Ammonia  
Core Things to Remember  
Demonstration - Review Ammonia’s Properties and Characteristics  
Exercise – Measure Air Concentrations of Ammonia  
Use Your Air Monitoring Equipment

**2:00 PM Break**

**2:15 PM**

Introduction to “Reading Ammonia Releases” – Know what and why It Acts like It Does!  
Ammonia Release Formations  
Four Formations to Remember  
Ammonia will Burn – Video

**3:15 PM**

Evolution of an Ammonia Release  
How Does NH<sub>3</sub> Act when it is Released?  
Ammonia Release Studies  
Videos tell the Stories  
Phillips 66 Pooled Releases

**~ 4:30 PM End of the Day – Enjoy your Evening! See You Here Tomorrow at 8:00 AM**

**May 14, 2010**

Session two – Good Morning! - Ammonia Class Room Training and Demonstrations

**8:00 AM**

Discussion on Yesterday’s session  
What impressed you?  
What stuck in your memory about Anhydrous Ammonia?

**8:45 AM**

Set up for Ammonia Release Demonstration  
Coordinated with Municipal Agencies and ADEC

Location – Kenai Airport North Sector  
Bus Transportation for the Group

**9:00 AM - Let’s go to the Ammonia Live Release demonstration site**

**9:30 AM - Live Ammonia Release Demonstration**

Demonstrations to be conducted

1. Open Air Anhydrous Ammonia Releases
2. Anhydrous Ammonia Tarp and Cover Recondensation Demonstration
3. Open Air Forced Ventilation Demonstration

**~ 11:00 AM – Back in the Classroom**

Debrief the Ammonia Live Release Demonstration

**11:20 AM**

In Depth Study of “Reading Ammonia Releases”

Continue Ammonia Release Studies  
Risk Assessment of Each Formation  
Review Ammonia Release Formations by Video  
You Identify What is Happening  
Videos Clips From Some or All:  
Lawrence Livermore  
Mapco Pipeline Release  
Desert Tortoise

**12:00 Noon**

**We Will Eat Here – Enjoy Your Lunch!**

**1:45 PM**

Ammonia Spill/Release Actions  
What-Works-Best-When  
“Recondensation of Ammonia Vapor Phase” Explained  
Where did the Cloud go?

**2:30 PM Break**

**2:45 PM**

Actual Incident Findings  
Lessons Learned

**3:30 PM**

Positive Pressure Ventilation  
Demonstration - PPV

Air Decontamination and Outside Forced Ventilation  
Fixed Facility Ventilation  
Environmental Impact  
Remember Ammonia is everywhere!

**~ 5:00 PM- END OF DAY – Enjoy your evening**

**\*For People not Attending the Functional Exercise –  
Will You Please Evaluate This Course Now?**

**5:15 PM Optional Review**

Review of Course  
Question and Answer Session on Ammonia  
Core Response Strategies and Tactics – Essentials for Ammonia

**6:00 PM- End of Day Two – Enjoy Your Evening!**

**May 15, 2010** – FX Orientation at 8:00 AM Here at the Merit Inn Training Room  
Conduct FX Commencing at approximately 9:00 AM

**May 15, 2010**

**8:00 AM Functional Exercise Prep Session 3 – Good Morning!**

Conduct FX Commencing at approximately 9:00 AM  
Location of the exercise will be announced during the FX Orientation

**8:00 – 8:45 Orientation to the Functional Exercise Conduct**

Location is Merit Inn Training Room  
Discuss Objectives and Ground Rules

Depart to Functional Exercise Commencement Locations

**Functional Exercise**

**9:00 AM – 12:00 PM**

**~ 9:00 AM – Commence Functional Exercise**

**~ 12:00 Noon – Termination of FX**

Decon – Demob - Restore ER Equipment to Ready Condition

**~ 1:30 PM - Debrief and Evaluation**

Location is Merit Inn Training Room

**~ 3:00 PM**

Complete Debriefing of Functional Exercise

Will You Please **Evaluate** the Functional Exercise?

**~ 4:30 PM End of Our Time Together – Hope to See You in the Future**