

Environmental and Public Protection Cabinet
 Department for environmental Protection
 Division of Waste Management
Site Inspection Report

Permit ID: KY8-213-820-105			Regional Office: Frankfort
Site Name: Blue Grass Army Depot			Program: Hazardous Waste
Site Address: 431 Battlefield Memorial Highway			
City: Richmond	State: Kentucky	Zip: 40475	County: Madison
Site Contact: Todd Williams	Title: Environmental Coordinator	Phone #: 859-779-6280	
Inspection Type: Investigation	Purpose: Complaint Investigation	TEMPO AI #: 2805	
Inspection Date: 9/1/06 and Subsequent Inspections	Time: Start 0800 a.m. End 1700 p.m.		
Latitude: 84° 15' 09"	Longitude: 37° 40' 59"		
Coordinate Collection Method: GPS +/-90 Meters			
Type of site: Military Installation-DOD Facility			

I. Investigation Results

Findings/Violations/Recommendations:

The Kentucky Department for Environmental Protection-Division of Waste Management (KDEP-DWM) received multiple complaints regarding monitoring deficiencies, operating procedures, systematic operational failures and miscellaneous problems in the abilities of instruments and personnel to perform the sensitive task of monitoring the chemical weapons stockpile housed at the Blue Grass Army Depot (BGAD) and more specifically, the Blue Grass Chemical Activity (BGCA). The complainants wished to remain anonymous. KDEP-DWM has investigated all claims made as a part of these complaints over the duration of the past several months, with findings related to issues that are civil in nature, and pertain to the Resource Conservation and

Recovery Act (RCRA), the Kentucky Revised Statutes (KRS), Kentucky Administrative Regulations (KAR) and the non-chemical and chemical storage permits issued to both the owners and operators of these permits, both BGAD and BGCA. It should be noted that several issues raised by these complaints are considered of a potentially criminal nature and have been forwarded to the Environmental and Public Protection Cabinet's (EPPC) Office of the Inspector General (OIG) and the Federal Environmental Protection Agency's Criminal Investigation Division (EPA-CID).

It should be noted that the status of each allegation is based on information collected on the date of the site visit or by information supplied by BGAD/BGCA. Conclusions and findings are based on the information made available to KDEP-DWM at the time of the request for the information in question. Prior configurations or system operations were unable to be verified. The specific complaint will be listed as well as the response action and/or status. Overall compliance status will also be determined as well as any remedial actions, including a date for the facility to return to compliance.

1. **Allegation:** There is no ventilation in the Toxic Chemical Laboratory (TCL), and the current laboratory is located in a garage:

Findings: The TCL is located inside of a metal building within the Chemical Limited Area (CLA) and is operated by BGCA personnel. Security guards routinely monitor this area, ensuring its security. The building that houses the laboratory also houses a maintenance bay/equipment storage area, as well as a locker room for employees, including a break room and showers. Exterior laboratory ventilation filtration units are located outside to the rear of the TCL. Ventilation hoods were listed in the BGCA

Chemical Hygiene Plan, and were found to be present and operational during the site investigation. Alarms and functional flow meters were found to also be operational during the site visit. Excessive turbulence was noted during the operation of the hood, but not to the point of causing the hood to be considered inadequate to perform its necessary function. If anything, the turbulence was overly excessive, and would pull more of a vacuum on the hood, which is preferable to the system not pulling enough air. BGCA should make necessary adjustments to the system to ensure excessive turbulence is within the ranges stated in the CHP. The CHP also states that the lab hoods require a signed, certification sticker on the hoods once they are certified by the BGAD Industrial Hygiene Office, and were not present during the site visit. This issue has been corrected and certification provided for the time period in question. During this site visit (November 2006), the laboratory ventilation system was present, and included black, ventilation hoods over each Gas Chromatography/Mass Spectrometer (GC/MS), and these hoods were connected to a series of exhaust ducts and vents that flowed outside to the carbon adsorption filter banks. The pressure gauges were operational and demonstrated that a vacuum was present on the ventilation system when being operated. Filter disposal records were reviewed and demonstrated that the spent carbon filters are disposed of properly within the necessary time frames once they are determined to be a waste material. Based on the information provided and the results of the investigation, KDEP considers this allegation to have no merit. KDEP does recommend better management of certification documentation and adherence to internal plan guidelines.

2. **Allegation:** BGCA is misleading in their use of chemical agent standards.

Findings: Agent calibration/challenge standards are from the Chemical Materials Agency (CMA), not Chemical Agent Standards Analytical Reference Material (CASARM's). BGCA does use live, dilute chemical agent standards for instrument calibrations/challenges, not simulants as was communicated to KDEP-DWM.

3. **Allegation:** Occasionally, 20-30 injections are performed at a time for some challenges/calibrations.

Findings: Noted. If the instruments do not vent the undestroyed agent component to outside of the work area, this could be a problem for employee exposure. KDEP-DWM has found that at the time of evaluation, all instruments in the lab and Real Time Analytical Platform (RTAP's) are ventilated in accordance with BGCA guidance documents.

4. **Allegation:** Several months is too long to go between calibrations.

Findings: KDEP-DWM concurs, based on manufacturers' recommendations. However, based on the information provided, there is no evidence that this has occurred.

5. **Allegation:** The agent gate was directed to be changed (around April 2006) when an operator from a sister base was in the igloo, so that a detection by the monitoring instrumentation would not occur.

Findings: Based on the documentation provided, KDEP-DWM is unable to substantiate this claim. There is the potential for criminal activity in this matter, and this issue has been forwarded to the EPPC-OIG and EPA-CID.

6. **Allegation:** Titrations used for water analyses are not being performed correctly.

Findings: Titration is a method used to determine the amount of chlorine in water. It is not used to evaluate the water for the presence/absence of chemical agents. Chloroform Extraction is the method used to perform both quantitative and qualitative analyses of chemical agents in water, down to the Army Soldier Drinking Water Standard of 20ppb for GB and VX, and 200ppb for H. As of the date of publication of this report, BGCA does not have the capability to perform this method or analyze samples to this level of quantification, and all water analyses that are required to be performed are performed by the Anniston Army Depot in Anniston, AL.

- 7. Allegation:** While unplugging rockets in calendar year 2000, something came out of the rockets. This material was stabilizer, agent and propellant. Chemical agent monitoring alarms went off, and people working in the igloo were told there were no harmful levels of agent in the igloo. After BGAD/BGCA performed acetyl cholinesterase level analyses for the individuals involved, they were told there were no abnormal readings. It was later revealed that these individuals' levels were inhibited, which is proof that they were exposed during this time period. The "cover-up" is alleged to be based on BGAD performing blood analysis on the wrong portion of blood, which would not show up on the test (serum vs. red blood cell analysis). The fact that BGAD knowingly performed the incorrect analysis and reported the results to the affected individuals is the basis of the cover-up, and 2 of the personnel involved in the cover-up have been promoted further up in the Chemical Materials Agency (CMA) organizational structure.

Findings: KDEP reviewed the employee exposure log, monitoring results and some of the operational parameters from the entire CY2000. The complainant stated this

incident occurred sometime around September 2000. The monitoring review from this month showed that on September 19, 2000 the igloo was monitored for a 15-minute time period, from 1530 until 1545, and during this time, 3 cycles were ran for analyzing GB at the igloo in question. There was no initial challenge performed to determine if the instrument was operating correctly. Also, after the sampling period was over, the post-analytical challenge failed, and was re-challenged and then passed. BGAD and BGCA stated that the failure occurred because an incorrect standard, the HPD agent standard was used, and not the correct standard, which should have been the MINICAM standard.

It should also be noted that there was an international treaty inspection taking place during this time, and an international crew was present inside of the igloo. The Site Specific Monitoring Plan (SSMP) states that monitoring must be performed during the entire duration of entry into a chemical weapon storage igloo. The employee exposure log indicated that the crew was inside the igloo for a minimum of 16 minutes and a maximum of 30 minutes, and is exhibited by the presence of 2 letters by each name (based on the level of dress), and is indicative of 15 minutes or less per entry. Based on this information, the air monitoring in this igloo was not satisfactory with the requirements listed in the SSMP, including -pre and -post monitoring challenges, and air monitoring was not performed for the entire duration of the igloo entry. There is no indication of a release of agent from this entry or time period, but the documentation does indicate that monitoring was not being performed correctly.

Additionally, during review of CY2000 monitoring documentation, the Personnel Monitoring Record/Employee Exposure Log showed that the crew entered the igloo in question on November 14, 2000 and as evidenced by the number of letters present by the entrants' name, the crew was in the igloo for a minimum of 46 minutes and a maximum of 60 minutes. When this document was compared to the results from the air monitoring, the air monitoring was performed on the previous day, November 13, 2000 and for a duration of 5 minutes, from 1141 until 1146. It appears that the crew entry was not accompanied by igloo air monitoring from the MINICAMS. The Monitor Log Sheet was reviewed by the Lab Supervisor and dated on November 13, 2000, and the performance was charted by the current QA/QC Specialist on an undetermined date, and the operator was listed as proficient. The operator and individual charting the performance was noted to be the same individual performing the analysis.

It should also be noted that during the review of the entire CY2000 documentation, there were multiple weeks in September and November where the BGCA Class 1 Monitor Log Sheets from the BGCA Quality Control Plan used for recording monitoring results did not contain signatures, certifying that they have been reviewed and approved by BGCA laboratory management and Quality Assurance/Quality Control (QA/QC) personnel. Signature inconsistencies were also noted during this review. Specific allegations and findings based on the alleged cover-up, potentially corrupt promotions, HIPPA protected employee medical records, and signature inconsistencies have been forwarded to the EPPC-OIG and EPA-CID.

Upon historical review of release reporting to the EPPC-Environmental Response Emergency Spill Reporting system, no reports of this nature were made by BGAD/BGCA in CY2000. A release report was filed with the Cabinet in CY1996, which indicated that ~6 ounces of GB agent was released when the rockets were being monitored. The report showed that the employee was decontaminated, and the release was reported as required at the time. No violations were discovered by the Cabinet during the event in 1996.

In reference to observations noted during the review of CY2000 monitoring logs, related to the improper monitoring during work operations, BGAD is found to be in violation of 401 KAR 34:030, Section 2, Design and Operation of a Facility, by failing to operate a facility in a manner which minimizes the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. However, the violations discovered were based on events that occurred in CY 2000, and although the 5 year statute of limitations has expired on these violations, and further enforcement action cannot be pursued by the Division, corrective action recommendations are listed in the comments section below including remedial measures.

8. **Allegation:** TCL Supervisor has no degree in a science field.

Findings: The individual in question has had numerous training courses from the instrument manufacturer in reference to some of the instruments currently in use.

Periodic refresher courses and on-going operator proficiency has also been a component of applicable site-specific training. The Supervisory Chemist position is listed in the BGCA Training Plan, BGCA-R-350-7, with requirements for training listed within. The individual currently holding this position has met the requirements listed in the training plan and all permit related training requirements. The education credentials are not required to be kept by any permit condition or listed in the BGCA training plan as required documentation. It should be noted that although this individual has completed the listed training requirements, KDEP-DWM has found that the implementation of the BGCA training plan is inconsistent, and that although the training requirements are being met, decisions are being made subjectively in regards to the employee certification process, and does not ensure protection of human health and the environment from releases of chemical warfare agents. Please see allegation #28 for additional information. This allegation as stated is unable to be verified.

9. **Allegation:** Eight or nine people were in the igloo during the alleged spraying munition event that occurred in CY 2000, and the individual who was allegedly grossly contaminated with nerve agent GB is now dead, and another currently has cancer.

Findings: When questioned about the previously mentioned incident (spraying munition), BGCA stated that an event similar to this did occur, but no personnel were exposed; only that one of the munitions were over-pressurized, and when opened, it released a cloud of vapors. BGCA was unsure of what year this incident occurred, and could not produce any documentation related to this event. A review of release reports submitted to the Cabinet revealed that the event in question likely happened in June

1996. BGCA also stated that one of the persons in the igloo at the time of this incident is now dead and did in fact die of cancer, but attributed this to the individuals smoking of 5 packs of cigarettes per day. KDEP-DWM has referred this issue to EPPC-OIG and EPA-CID.

10. **Allegation:** An employee involved in this incident currently works at BGCA and had a significant drop in acetyl cholinesterase levels (60%-70%).

Findings: KDEP-DWM has not reviewed personal medical records due to HIPPA privacy laws and the sensitivity of the individuals' personal medical history. KDEP-DWM notes that a drop in acetyl cholinesterase levels is indicative of an exposure to an individual, but cannot directly correlate this information to a release to the environment, as other engineering controls could have been in place at the time to prevent a release to the environment.

11. **Allegation:** The Chemical Agent Related Hazardous Waste Storage Igloo (Igloo LO) had agent contaminated waste being stored in drums, that was allegedly vaporizing into the ambient air inside of the igloo. The air inside of the igloo was monitored and found to have levels of agent present. Another employee was directed to move these drums of waste without proper monitoring or personal protection. When this employee made complaints to management, he/she was transferred to an area not involving the handling of chemical munitions or related hazardous waste.

Findings: KDEP-DWM requested that BGCA provide air monitoring documentation related to this igloo during the time period in question. BGCA responded that no air

monitoring is ever performed in this igloo, so there is no documentation to provide. Based on this statement, there is no documentation to review to verify or refute this allegation. BGCA did provide the weekly inspection forms and igloo checklists as requested by KDEP-DWM. Upon review of these forms from 12/04 until 3/05, which is the timeframe that the complainant identified as the period of concern, KDEP found that BGCA was filling out the weekly inspection forms and checklists, but often did not sign the weekly inspection checklist form. KDEP-DWM communicated to BGAD/BGCA that the inspection forms must be signed to validate the weekly inspection requirement under the Resource Conservation and Recovery Act (RCRA). The drums in question contained decontamination solution resulting from the One-Ton Container agent transfer operation that occurred in 12/04. These drums were found to be present in the source igloo (igloo CD) during an inspection in 4/07 and were classified as 1X waste, which means that agent is present in this material at some level above the Short Term Exposure Limit (STEL). KDEP-DWM did find that drums were moved out of this igloo between 1/20/05 and 1/28/05, and the signature of the person performing the weekly inspection was the individual identified in the allegation as the person who made the complaint to BGCA management about concerns over handling material that was potentially positive for nerve agent GB. The review of documentation during this period showed that this individual often performed the weekly inspections up until 1/20/05, and did not perform any additional inspections after this date up until the end of the period that was under review (3/31/2005). This would be consistent with the portion of the allegation that stated this individual was transferred for making complaints about safety/environmental health. The

documentation does not prove that this event occurred, but lends credence that it could have happened as the complainant stated. KDEP could not determine that a violation occurred; based on the information submitted, however this issue has been referred to EPPC-OIG and EPA-CID because of the potential for criminal activity.

12. **Allegation:** The Commanding Officer in charge at the time of the previously listed allegation (Hazardous Waste Storage Igloo) was made aware of this circumstance and did nothing to correct or act on these deficiencies.

Findings: It should be noted that KDEP-DWM found the previous Commanding Officer of the BGCA to be responsive to requests related to previously issued Notices of Violation, and other specific KDEP-DWM requests, specifically the drainage of the storage igloos and the grounds of the CLA. Re-palletization and re-warehousing activities were also begun under this CO. In regards to this allegation, based on the documents provided, KDEP-DWM has found no documentation that indicates a failure of the BGCA CO to respond to any environmental/human health issues that were raised.

13. **Allegation:** Igloo Q had repeated “hits” (detections on the monitoring instruments) for GB nerve agent periodically from February 2004 until April 2004, and these hits were not reported to KDEP-DWM.

Findings: KDEP-DWM requested documentation for the time period between January 2004 and June 2004 to ensure that the time period in question as well as time on either side of the alleged event(s) was evaluated. Based on the information that BGCA

submitted, the air monitoring results between this period were all non-detect. KDEP-DWM found that the igloo was monitored weekly as required and was entered on 1/22/04 for first entry monitoring, 1/29/04 for a storage monitoring inspection, 3/2/04 for an air flow evaluation, 4/19/04 for a storage monitoring inspection, 5/4/04 for an inventory, and 6/1/04 for an international treaty inspection. Based on the review of these entries, weekly air monitoring results, and the set-up calibrations and operational parameters, KDEP-DWM can find no evidence that the air monitoring instruments showed any type of confirmed detections for nerve agents, and there is no requirement to report unconfirmed “hits”. Based on the information submitted and reviewed, KDEP-DWM finds that this allegation has no merit.

14. **Allegation:** BGCA Supervisory Chemist is not a chemist by training or education.

Findings: Please refer to allegation #8 within this report. This allegation is unable to be verified, as proof is not required to be kept in accordance with statutes, regulations or permit conditions. Supervisory Chemist has met site specific training requirements listed within the BGCA Training Plan.

15. **Allegation:** Standard Operating Procedures (SOP’s) are missing several integral steps that are critical to the analysis of water collected from igloos.

Findings: BGCA applies Department of the Army (DOA) specific SOP’s that are used across the nation, stockpile wide at other Chemical Demilitarization and Chemical Munition Storage Sites, and tailors them to conditions specific to BGCA. KDEP-DWM contacted several other state regulators where chemical munitions are stored,

and found that they have taken no exception to the SOP's currently being used by their respective stockpile storage sites, and that no substantial deficiencies have been noted to this point. BGCA has stated on multiple occasions that some SOP's do get periodically updated when necessity dictates, but BGCA stated that several levels of management review these SOP's and tailor them to the operations occurring at BGCA. These SOP's are then made available for review and concurrence by the employees performing the actions listed within the SOP. The procedure listed regarding removal/testing of infiltrate water in the CLA igloos is addressed in the First Entry Monitoring SOP BT-0000-M-107, dated October 26, 1992, Revision No. 6, Change No. 5, dated June 20, 2006. Due to a further lack of specificity regarding the allegations concerning SOP's or specific steps that were missing, no further action can be taken.

16. **Allegation:** The complainant was asked to sign off on SOP's by BGCA management staff. Complainant refused to sign/approve the SOP's that were not correct. This decision by the complainant resulted in alleged "black-balling", which included a reduction of duties and access to materials necessary to perform one's job requirements. This occurrence was also allegedly an example of the politically charged work atmosphere.

Findings: Although this is a serious allegation, KDEP-DWM fails to see the RCRA implications relating to hazardous waste management, and has referred this issue to EPPC-OIG and EPA-CID.

17. **Allegation:** BGAD/BGCA has a “bad reputation” among the other chemical munition storage sites because of their actions and mismanagement.

Findings: After discussions with environmental regulators from other states regarding this allegation, KDEP-DWM has found no evidence that this situation exists, and the allegation does not point to any specific statutory, regulatory or permit violations.

18. **Allegation:** The mold identified on the pallets included three dominant types, including the “black mold”, that voraciously eats wood. This condition adversely affects the storage of chemical munitions at BGCA.

Findings: KDEP-DWM requested the report prepared by the University of Kentucky for BGCA to identify the mold types on the pallets holding the chemical munitions. BGCA submitted some samples to UK for identification and recommendations on remedial actions. After review of this report, KDEP-DWM contacted the author of the report prepared by UK. In summary, the findings of the report were consistent with the allegation, and KDEP had previously identified deteriorated pallets in chemical munition storage igloos, and issued a Notice of Violation to remedy the identified violations. BGCA has made steps to correct these deficiencies, including improved drainage within the CLA, increased visual inspections in problem igloos, installing tarps on some of the igloos with severe infiltration, an improved system for collecting the water that does enter the igloos, and the replacement of 211 pallets as of the date of this report. There continues to be infiltration problems in the chemical munition storage igloos, however, BGCA has made attempts to correct the source of these

problems, better manage the results of these problems and to replace pallets that have been identified as the most severely impacted.

19. **Allegation:** Periodic releases have been documented on-site at BGCA, but exposures related to these releases have not been recorded.

Findings: KDEP-DWM requested several documents, including igloo specific records, release reports, instrument calibrations, etc. KDEP-DWM has evaluated these documents, which total over 8,000 pages of documents, especially documentation that is required to be submitted to the Division as required by statutory and regulatory authority as well as permit required submittals. KDEP-DWM has identified multiple occasions where the submission of these documents/reports have been delinquent, but all relatively recent incidents requiring reporting have an associated after action report. BGCA maintains employee exposure records for employees that enter igloos, and based on the information submitted and reviewed, no violations were noted. Due to the lack of specificity of the allegation, no further action can be taken.

20. **Allegation:** Igloo ZA was the location of the Cracked Firing Tube incident in May 2006. There was material on the floor of the igloo, Supervisory Chemist refused to allow DAAMS tube samples to be collected.

Findings: BGCA submitted an after action report for this incident, and claimed the incident occurred in a different igloo, igloo Q. Pictures were collected by BGCA during the incident and were reviewed by KDEP-DWM, and pictures showed that some material was on the floor, but was cleaned-up and containerized. KDEP-DWM

inspector made a follow-up inspection visit on November 2, 2006 to verify the location of the incident. Based on the inspection follow-up, the location of the incident was confirmed to be in igloo Q, as evidence of the stain remained on the floor and was consistent with the pictures from the incident. The stain was found to be on the floor inside of the igloo, on the left side, 5th row of pallets back from the front of the igloo, between the 1st and 2nd stacks. A new “puddle” was also found during this inspection, in close proximity to the original stain. Air monitoring detected no traces of nerve agent, and a confirmation with M-8 paper found that the material was not nerve agent. The source of this material was found to be a leak from a crack in the roof of the igloo, over the pallet stack in question, and had dripped down to the floor and puddle. This material had evaporated within a few days, after it was first noticed.

Igloo ZA was also evaluated, and was found to be only 15-20% full, which made the evaluation of the floors fairly easy. No stains similar to the one in the picture of the incident were found in this igloo. Additionally, after KDEP-DWM reviewed the air monitoring data during the over packing/isolation of the cracked firing tube incident, no positive readings were found and according to BGCA SOP's, no confirmation is required to be performed if no initial detections are found. As an example of best management practices, KDEP-DWM feels it would have been prudent to collect air samples with a DAAMS tube, considering material did leak out of the rocket, but procedures in place during this incident did not require this level of action. The allegation regarding the Supervisory Chemist refusing to allow these DAAMS tube samples to be collected has been referred to EPPC-OIG and EPA-CID.

21. **Allegation:** The Chemical Operations Director refused to allow testing for propellant or explosives in Igloo ZA, during the cracked firing tube incident. The statement was made that the leaking munition would be “canned” and didn’t need testing.

Findings: In response, the BGCA Senior Quality Assurance Specialist for Ammunition Surveillance (QASAS) submitted a signed memorandum that based on his professional experience dealing with chemical weapons, the location of the crack in the shipping and firing tube was in the area of the chemical agent containing warhead, not in the rocket motor, which contains the propellant. Based on the assessment by QASAS, the material that leaked out would have contained chemical agent, and not propellant, as there is an indexing ring approximately midway inside of the shipping and firing tube. The QASAS also stated that since no agent readings were obtained during this event, then the material that leaked out during this incident was silicone exudate, which is a silicon based lubricant used when the chemical munition was originally placed inside of the shipping and firing tube during its original assembly. The material is termed “exudate” because it had “exuded”, or exited from the shipping and firing tube.

It should be noted that during the November 2, 2006 follow-up inspection, when asked if any tests could be performed to determine if explosive material was present, BGCA stated that Webster’s Reagent is sometimes used to detect explosives, such as TNT, RDX, HMX, etc. Since the material inside of the rockets is a solid propellant, this method would not have provided any further indication of the presence/absence of

explosives. BGCA also stated that analysis of the material could have been performed by Mass Spectroscopy, but there was no indication that the material was an explosive or propellant, and that the mass spectroscopy instruments on-site at BGCA are not currently set-up to analyze for this material. Supporting documentation showed that the leaking rocket was “canned”, or over-packed as stated by the chemical operations director, and placed into the appropriate leaker igloo, igloo GH.

NOV: KDEP-DWM finds that BGCA did not take the appropriate actions to properly characterize the waste material in question, as generator’s knowledge is an unacceptable method of waste characterization in this circumstance, due to the inability to positively identify the nature of this material without analytical testing, and the potential for cross contamination by other hazardous constituents during the 40+ year period that the weapons have been in storage. It should also be noted that the entire M55 Rocket is classified as a hazardous waste, including all portions of the chemical munition in question. BGAD is found to be in violation of 401 KAR 34:020, General Facility Standards, Section 4, General Waste Analysis, which references 40 CFR 264.13 (1) (a): “Before an owner or operator treats, stores, or disposes of any hazardous waste, or non-hazardous wastes if applicable under 40 CFR 264.113 (d), he must obtain a detailed chemical and physical analysis of a representative sample of the waste. At a minimum, this analysis must contain all the information which must be known to treat, store, or dispose of the waste in accordance with this part and part 268 of this chapter.”

NOV: An additional finding is related to the storage of these weapons which caused compression of the pallet stack and subsequent cracking of the rocket in question. Improper storage which resulted in the cracking of the shipping and firing tube was determined to be the cause of this leak, and BGAD is found to be in violation of the Hazardous Waste Storage Permit issued on October 30, 2005, part GST04, Permit Condition T-41, by storing the hazardous waste in a container in a manner which may rupture the container or cause it to leak.

22. **Allegation:** Regarding the cracked firing tube incident, no confirmation sampling was performed for the negative results.

Findings: Based on the BGCA SOP's provided to KDEP-DWM, which were in effect at the time of this incident, no confirmation is required when an initial analysis shows that chemical agent(s) were not detected.

23. **Allegation:** There is confusion as to where BGCA receives the standards which are used to calibrate and challenge chemical agent monitoring instruments, either from CMA or CASARMS.

Findings: BGCA receives live, dilute chemical agent standards from the Chemical Materials Agency Headquarters in Aberdeen, MD. BGCA formerly received these standards from CASARMS (Chemical Agent Standard Analytical Reference Material's). According to BGCA, these standards are not simulants of the respective agents, but live, dilute standards, which are further diluted to be used as calibration/challenge standards. KDEP-DWM feels this confusion has been clarified.

24. **Allegation:** The complainant claims that all agents stored at BGCA are carcinogenic (cancer-causing).

Findings: Based on the information reviewed, KDEP-DWM finds that Mustard (H) agent is listed by the International Agency for Research on Cancer (IARC) as a carcinogen. Both VX and GB agents are not listed by the IARC, American Conference of Governmental Industrial Hygienists (ACGIH), Occupational Safety & Health Administration (OSHA), or the National Toxicology Program (NTP) as a carcinogen. This reference can be found in the Blue Grass Chemical Agent Destruction Pilot Plant (BGCAPP) Research, Demonstration and Development (RD&D) Permit, Revision 3, Appendix D, p. 22, September 2006, Material Safety Data Sheets (MSDS). KDEP-DWM finds that the allegation is accurate for Mustard (H) agent, but not accurate for VX and GB nerve agents.

25. **Allegation:** A material of differing polarity must be used to perform confirmation analyses when agent(s) are detected. Allegation claims that this procedure is not being performed appropriately.

Findings: Based on the BGCA Site Specific Monitoring Plan (SSMP), the confirmation for agent detections is performed by using a different “method”. BGCA personnel stated that when an initial “hit” is found, a confirmation is always performed, and the difference in the “method” is based on the type of column used, which is differentiated based on polarity. Per BGCA, a DB-1 column is listed as non-polar, whereas a DB-210 and 1701 columns are listed as having medium polarity. Based on

the type of column used when the initial hit is discovered, a monitoring instrument that is fitted with a column of differing polarity will be used to perform the confirmation. This instrument must have gone through the certification process and must be operated by an operator who has successfully completed the operator proficiency program. Therefore, this allegation is refuted.

26. **Allegation:** When monitoring deficiencies were raised internally, representatives from the CMA headquarters came to BGCA to “clean-up” or “scrub” the documents before they were released to agencies that would perform future investigations.

Findings: KDEP-DWM takes this allegation very seriously, but is unable to verify this particular allegation. This issue has been referred to EPPC-OIG and EPA-CID. KDEP-DWM would like to note that the conclusions drawn during this investigation were made primarily on the documentation/information supplied to KDEP-DWM by BGAD/BGCA. If other investigations show that the documentation submitted to KDEP-DWM has been altered or falsified, then KDEP-DWM reserves the right to amend their conclusions/findings and any subsequent reports that are issued that pertain to these conclusions/findings.

27. **Allegation:** The complainant stated that there is no longer any “smoking gun” regarding these monitoring deficiencies due to the situation previously mentioned in #26, but the effect of this investigation into alleged monitoring deficiencies at BGAD/BGCA would encourage BGAD/BGCA to operate at a higher standard of proficiency.

Findings: Please see response for #26. KDEP-DWM has found that this investigation of alleged monitoring deficiencies has resulted in greater concern and diligence on the part of BGAD/BGCA regarding chemical monitoring operations within the CLA and in the overall chemical agent monitoring program.

28. **Allegation:** The complainant recommended reviewing training records and the instrument/operator certification process to determine if the personnel involved in the chemical agent monitoring program are capable of performing adequate monitoring for chemical agents.

Findings: KDEP-DWM performed a review of a representative sample of BGCA personnel training records and instrument/operator certifications. One finding of concern is in regards to the training that is performed for specific monitoring instruments and Real Time Analytical Platform's (RTAP's), which is a performance based training, and not hands-on refresher training for the instruments themselves. No written criteria was provided which would demonstrate which attributes to base performance levels on. The only related performance assessment tool is the computer program used by BGCA to track Operator/Instrument proficiency; Certify 4.0. This program tracks an operator's proficiency and determines if an operator's performance on the monitoring method/instrument they are performing is acceptable or not. These calibrations and certifications performed by the operators are tracked and evaluated based on the inputs that are received into the Certify 4.0 system. These inputs are based on the number of un-assignable calibrations/challenges, which would result in a failure for that operator on that specific method being tested. An operator must have, at

a minimum, 10 data points from which to draw the certification basis, and if greater than 30% of the calibrations/challenges were un-assignable, then the operator would be classified as unacceptable. Based on the review of the operator certification program and its results, no operators have failed to become certified.

The issue that is of concern with this program is that the certification is based on the failure rate, which is assigned by the laboratory supervisor and/or QA manager, and is a very subjective determination. An assignable failure is one that can be assigned to a problem other than the operator and can vary greatly, including problems with agent standards, injection methods, calibration standard(s) storage, and many other scenarios. The lab supervisor was asked to give an example of an assignable failure, and the example given was as follows: If a failure is recorded, then the lab supervisor/QA manager determines the cause of the failure, for instance if the calibration standards were not refrigerated or if air bubbles are injected into the instrument through a syringe during the calibration or challenge. While these issues may arise periodically, and are not attributed to a direct operator failure, they can indicate that the operator does not have the knowledge to keep the standards used for calibration refrigerated or to tap the syringe to make sure that all air bubbles are out of the syringe prior to injection into the instrument. If these or potentially other scenarios occurred, they could be attributed to the failure of something other than the operator, and would be subjective to the discretion of the lab supervisor or QA manager, and could cause a skewed result in the operator certification process.

NOV: There is no written plan or SOP that was provided to KDEP-DWM that provided guidance on what is or is not an assignable failure, which leaves the possibility of future incidents arising that could cause confusion or concerns that employees are not being treated appropriately and consistently during the operator certification process and as a result employees are not properly trained to prevent releases of chemical warfare agents to the environment. KDEP-DWM finds that BGAD is in violation of the employee training requirements in the Hazardous Waste Storage Permit issued on October 30, 2005, part GST04, permit condition T-17, by failing to ensure that employees are properly trained to prevent releases of chemical warfare agents to the environment.

NOV: It should be noted however that this type of certification should not take the place of hands-on training specific to the types of instruments being used at BGCA. KDEP-DWM has also been unable to find any plan or requirement that has been determined to be acceptable for basing refresher training strictly on a performance basis instead of hands-on type training. There is no evidence that the certifying officials have had any specific training other than on-the-job training to be able to assign failures as a part of this operator certification process. While OJT is highly regarded by the Division, in cases such as this where a certain level of technical competence is required, training by individuals or organizations intimately familiar with the monitoring instruments should be sought. Because there is no plan available and no specific training requirements for those members of management performing the certification of employees, KDEP-DWM finds that the refresher training program is inadequate to

ensure that employees are being trained in such a manner as to be able to protect human health and the environment from releases of chemical agents from the facility, and is in violation of the Hazardous Waste Storage Permit issued on October 30, 2005, part GST04, permit condition T-17.

29. **Allegation:** There is no SOP for testing for the presence of chemical agents in water.

Findings: KDEP-DWM agrees with the allegation that there is no specific SOP for testing for the presence of chemical agents in water, but has found that the First Entry Monitoring SOP, BT-0000-M-107, dated June 20, 2006, Operation number 5, discusses infiltrate water collection. This operation from the referenced SOP states that water will be determined suitable for collection upon successful, acceptable air monitoring analysis prior to first entry, air monitoring historical data and visual inspection of the chemical agent storage facility “igloo” where the water has entered, and air monitoring will be performed within the igloo for the duration of the operation. A separate complaint was received on May 22, 2007, which addressed improper shipping of water to Anniston, AL for analysis of nerve/blister agents. This report should be consulted for more information related to this allegation. It should be noted that the water collected as infiltrate from igloos does get containerized and was sampled for the presence of chemical agents in water. The sampling of this water is a permit-required action, and the shipment of samples is not regulated by RCRA.

30. **Allegation:** One cannot take a polar solvent and look for a polar agent. BGCA is performing this operation by using solvents of like polarity to look for agents.

Findings: BGCA has stated that their procedure for this type of operation is to use a column of different polarity to confirm agent hits. Based on the information provided, KDEP-DWM has been unable to find that BGCA has varied from their established procedure.

31. **Allegation:** Validation of data cannot be produced due to the compromised integrity of the documents.

Findings: KDEP-DWM has been using the instrument specific print-outs to assist in the validation of the BGCA Type I Monitor Log Sheets. Based on the information provided, no discrepancies have been found. The only information used to evaluate the validity of this allegation was the information provided to KDEP-DWM by BGCA. There have been instances where data provided has been questionable, and this information has been referred to EPPC-OIG and EPA-CID.

32. **Allegation:** BGCA personnel have injected water into a GC/MS, and should never be allowed to do so.

Findings: KDEP-DWM has found no documentation suggesting that water has been injected into a GC/MS instrument.

33. **Allegation:** The complainant recommended that the water testing data and the SOP's that govern the testing of infiltrate water be evaluated.

Findings: The only SOP regarding infiltrate water that was provided was the SOP for First Entry Monitoring, as referenced above. Operation 5 from this SOP deals

primarily with the collection procedures of infiltrate water, not the analytical testing of this water . In the chemical-related hazardous waste permit issued to BGAD/BGCA, the application section of the permit has a reference to the management of infiltrate water after it has been collected. The application states that collected infiltrate water can be discharged to the on-site waste water treatment plant after testing has been performed that demonstrates levels of agent are below 20 ppb for GB and VX and 200 ppb for H (these values are equivalent to the army soldier drinking water standard). At concentrations above this level, the water will be decontaminated and re-containerized and placed in the F-area hazardous waste storage igloo.

On April 19, 2007, water samples were collected by BGCA and sent to Anniston, AL depot to be tested for the presence of nerve/blister agents. The results of this analysis were determined to be non-detect, and the confirmation of these results were submitted to KDEP-DWM on May 31, 2007. KDEP-DWM then collected water samples to be analyzed for Volatile Organic Compounds, Semi-Volatile Organic Compounds and Metals, of which BGAD/BGCA collected split samples for their own analysis. These samples were submitted to the Division of Environmental Services for analysis. The results were provided to KDEP-DWM on June 19, 2007 and showed that no RCRA regulated constituents were found in the sample for Tank #1.

After additional review of the water testing protocol and the circumstances surrounding the storage and disposition of the collected infiltrate water, inconsistencies were found throughout this process. These findings were referred to EPPC-OIG and EPA-CID.

34. **Allegation:** BGAD/BGCA is not consistent with how other chemical weapons storage facilities in other states manage infiltrate water.

Findings: KDEP-DWM contacted several other state regulators in charge of compliance with other chemical weapons storage facilities, including Alabama, Colorado and Utah. Infiltrate water into the igloos in question has not been a historic problem at these sites, and they had no guidance or reference point to assist in making a determination in regards to this allegation. Again, there is no allegation of RCRA or permit violations.

35. **Allegation:** The educational background(s) and credentialing of personnel in the laboratory and others working in the CLA is not adequate for the jobs they are performing.

Findings: KDEP-DWM has the authority; based on applicable statutes/regulations, to request personnel training records related to the management of hazardous waste, and to ensure that the chemical agent monitoring requirement is being met by personnel who have been trained on instruments that are certified/calibrated for meeting this requirement. As referenced above in allegation #28, KDEP-DWM has found multiple inconsistencies and a failure by BGAD/BGCA to provide adequate training and a failure to ensure that releases of chemical agents to the environment are not occurring. KDEP-DWM does not feel that educational backgrounds are necessarily a sole indicator of an individuals' ability to perform their respective jobs. A combination of classroom instruction by knowledgeable personnel and on-the-job training should take

precedence in this matter, and KDEP-DWM has found that an abundance of training has taken place, but has not been necessarily effective in ensuring the protection of human health and the environment, and the management of this training program/certification process has not been proven effective to protect human health and the environment. The response to this allegation is that while problems have been identified in the training program at BGAD/BGCA, an individual's educational background should not be the sole indicator of proficiency in one's job performance.

36. **Allegation:** A complaint was lodged with the BGAD safety office in regards to the handling of helium tanks being transported into the CLA, and no adequate response was provided back to the complainant.

Findings: KDEP-DWM does not investigate personnel safety issues. This would be an issue better handled through additional internal channels or the appropriate regulatory agency, such as the Occupational Safety and Health Administration.

37. **Allegation:** The complainant recommended that the agent gates should be evaluated. Specifically, when the agent gate changes or drifts, the monitoring instrument should be re-evaluated to determine if the agent gate set when the instrument was calibrated is still effective.

Findings: Based on the information submitted and reviewed, and the MINICAMS Operators Workbook, the agent gate should be set to 6 seconds wide for H and 4 seconds wide for GB and VX. The retention time should be centered between this gate. For example, if a retention time for GB was 75 seconds, the agent gate should be set to

begin at 73 seconds and end at 77 seconds (two seconds on either side of the retention time peak value, e.g.). The review of this documentation showed that this is not the typical manner in which BGCA MINICAMS operators perform air monitoring analyses. Often, the agent gates are much closer to the retention time peak, and are not usually centered. In one instance, the agent gate began after the retention time peak was displayed. BGCA has explained that the results can be obtained from either peak height, or area under the peak. Further evaluation indicates that this statement is true, and BGCA has chosen to use peak height instead of area under the peak. Based on the documentation specific to the instruments used at BGAD/BGCA, monitoring performed using the method of calculating the area under the peak provides a result with more confidence, however the method employed by BGAD/BGCA is acceptable. Based on the information provided and explanations by operators and management staff, either this fact was not known or was not communicated to the individuals performing the permit required air monitoring. No violations of statutory or regulatory provisions were discovered in regards to this procedure; however, either the lack of knowledge or the failure to adhere to best management practices is of concern to KDEP-DWM.

In regards to the agent gates and calibrations/challenges, the review of submitted documentation shows that agent gates should remain the same for calibrations, challenges and monitoring for the same instrument on the same day. According to BGCA, different instruments can have different agent gates on different days, but the manner in which the instrument is either calibrated or challenged prior to daily

monitoring should remain consistent throughout the day that the instrument(s) are used. The review of submitted data showed that agent gates did shift frequently throughout the day; which is common and acceptable, but in many cases when the agent gate shifted outside of the acceptable parameters, it was not re-calibrated as is recommended by the instrument operator's workbook. Results were obtained by the instruments; however, KDEP-DWM is unable to determine if the results are in fact representative of the conditions inside of the igloo at the time the monitoring was performed. Due to the fact that the information provided in the instrument workbook are recommendations and not an established procedure, KDEP-DWM is unsure if the procedures performed by BGCA would result in erroneous data. KDEP-DWM does recommend for future monitoring that the instrument workbook be used as a guidance document for performing air monitoring analysis of chemical agent storage igloos, and that BGAD/BGCA incorporate these guidelines into their Site Specific Monitoring Plan and associated SOP's.

38. **Allegation:** The complainant alleges that SOP's #605 and 606 are written inadequately to be able to achieve the goals set forth in them.

Findings: SOP # BT-0000-W-605, Monitoring Various Items for Chemical Agents, with the most recent revision dated May 2004 and SOP # BT-0000-W-606, Sampling, Calibration and Analysis Procedures, were reviewed, but it should be noted that KDEP-DWM does not evaluate Department of the Army SOP's for accuracy.

39. **Allegation:** Three physical scientist technicians were identified by name, as being inadequate to perform their job functions, based on education and training credentials.

Findings: Other than the training requirements stated in RCRA regulations and the hazardous waste storage permit issued to BGAD on October 30, 2005, no additional information is required to be kept for these individuals. According to the operator's proficiency program these three technicians have been certified as acceptable. Concerns over the training program have already been addressed, but based on the program requirements, these operators have met the requirements to become certified to use the monitoring instruments at BGCA to meet the weekly air monitoring and inspection requirements.

40. **Allegation:** The V-to-G conversion pad placement has been incorrect and decisions are being made at BGCA's level for the placement of the pads.

Findings: KDEP-DWM has reviewed the data provided by BGAD/BGCA regarding the placement of these pads, and originally questioned the location and placement of these pads in correspondence dated June 27, 2005, and again in correspondence dated September 29, 2005, where the Division requested the results of BGAD/BGCA's internal study on the location, placement and change-out frequency; also known as a service life study, of the V-to-G conversion pads. The results of this study were not submitted to the Division until August 30, 2007, nearly two years later.

KDEP-DWM contacted the manufacturer of the instruments used to monitor chemical agents at BGAD/BGCA, and the instrument manufacturer stated that pads had to be on

the end of the distal end of the sampling line used for igloo testing. The manufacturer's response was based on the fact that a nucleophilic substitution occurs, where a fluorine molecule replaces the sulfur to carbon bond, thus creating a compound similar in structure to GB, except one chain is an oxydiethyl instead of an ethyl oxyethyl. This substitution is instigated by the pad, which is impregnated with silver fluoride, and is crucial to the conversion, transportation, and subsequent detection, by monitoring instruments. In the words of the manufacturer's representative, "if the pad is not at the distal end of the sampling line, then VX will never be detected". This statement was based on the scientific information that shows that a VX molecule is significantly larger and heavier than a GB molecule, and will not transport through the sampling line inside of an igloo because of its substantially larger structural composition.

BGCA acknowledged in their October 20, 2005 response that the pads were indeed placed at the distal end of the sampling line and at the end of the heated transfer line, attached to the RTAP. BGCA stated that this change occurred in the February-March 2005 timeframe. The placement of these pads was verified on September 28, 2005 by KDEP-DWM. However, BGCA has provided no documentation proving that the pads were in the correct placement inside of the igloo at the distal end of the sampling line prior to the February-March 2005 date. The Division would like to note that while monitoring appears to have been performed inadequately prior to February-March 2005, since the issue has been raised with BGAD/BGCA, they have responded by making the necessary changes to further be protective of human health and the environment. No mechanism exists to allow the Division to go back and determine if

the results of air monitoring for VX was protective, as all of the results were non-detect. Whether they were non-detect due to no leaking munitions or due to inadequate monitoring, is unable to be positively determined.

BGCA should continue to ensure that the pads are maintained on the distal end of the sampling lines within the VX igloos, and should ensure that the replacement schedule is followed, and replacement occurs for each of the pads in service on at least a 3-month interval as outlined in the V-to-G Conversion Pad Service Life Study submitted on August 30, 2007.

The investigation into these allegations by KDEP-DWM has taken place over the past several months, with a substantial time and resource commitment by the Division. These allegations are evaluated thoroughly with the information that has been provided by BGAD/BGCA to the Division, and the findings listed above are based solely on this information and the governing documents that were in place at the time the allegations were made, or when the events were alleged to have occurred. Should additional information be made available to the Division in the future that would affect the determinations of the findings listed above, this information will be reviewed and a revised compliance determination will be issued at this time.

Compliance Status – Out of Compliance – NOV Issued

II. Comments Including Remedial Measures and Expected Correction Dates

Comments:

Regarding the violations listed in allegation number 7, the recommended corrective actions are to develop additional training requirements to ensure that operators that perform air monitoring do so for the full extent that crew members are inside of the igloos performing operations. This requirement is crucial to the health and safety of the employees performing the operations as well as to prevent any unanticipated releases of chemical agents to the environment.

An additional corrective action recommendation for this allegation is to provide and document training that ensures that when RCRA required, weekly air monitoring is performed, that the individuals responsible for performing the monitoring; which meets the requirement for the required weekly inspection, signs the monitoring log, thus certifying that they were the individual responsible for performing the inspection. If additional BGCA personnel sign the logs in addition to the operator, this is acceptable, but the signature of the person performing the inspection/air monitoring must sign the inspection sheet or monitoring log form to meet the RCRA requirements.

In response to the NOV listed in allegation number 21, it appears that the waste characterization was based on generator's knowledge of the process. The statement by BGCA that the material that leaked out was not agent due to the negative air monitoring and M-8 paper results, and that it could not have been propellant due to the location of the leak is presumptuous. BGCA is assuming that the silicon exudate could not have been in contact with propellant due to the location of the leak, but appears to have failed to consider the additional location of the staining and drip marks on the other end of the rocket in question, based on the pictures that were provided to KDEP-DWM. This rocket has since been over-packed and placed in the appropriate leaker storage igloo, but as a remedial measure for this NOV, BGCA

shall develop an evaluation protocol for rockets or additional methods for characterizing waste materials that would address this issue in the future should it occur again.

As a remedial measure for the additional NOV listed in number 21, BGAD/BGCA shall operate and maintain the storage structures (igloos) and the pallets within them to ensure that deterioration does not cause additional rocket shipping and firing tubes to compress to the point of failure, causing them to rupture or leak.

As a remedial measure for the NOV listed in number 28, a written program of guidelines shall be developed and instituted that defines a classification of assignable or un-assignable failures, thus producing more confidence in the operator certification process. Training on these newly developed guidelines shall be provided and documented within 30 days of guideline development to allow for review by the Division.

As an additional remedial measure for the NOV listed in number 28, BGAD/BGCA shall also develop additional components of the personnel training program (Attachment H of the Hazardous Waste Storage Permit) to ensure that appropriate hands-on training and classroom instruction is provided to supplement the existing personnel training program. Documentation of these modifications should be submitted to the Division's Hazardous Waste Branch for approval and for incorporation into the Hazardous Waste Storage Permit when the next opportunity for modifications arises. Employee training shall be provided and documented to allow for review by the Division.