

Appendix K

**Tango (T) Range: Interim Pilot Program Report/ Lessons Learned
(May 12, 2008)**



DEPARTMENTS OF THE ARMY AND AIR FORCE
MASSACHUSETTS NATIONAL GUARD ENVIRONMENTAL AND READINESS CENTER
BUILDING 1204, WEST INNER ROAD
CAMP EDWARDS, MASSACHUSETTS 02542-5003

May 12, 2008

US Environmental Protection Agency, Region 1
1 Congress Street
Suite 1100
Boston, MA 02114-2023

Environmental Management Commission
Building 1204 West Inner Road
Camp Edwards, MA 02542

References:

In re Training Range and Impact Area, Massachusetts Military Reservation
EPA Docket No. SDWA I-97-1030
Limited Authorization for Lead Ammunition Training
Letter dated 23 July 2007

Certificate of the Secretary of Energy and Environmental Affairs (EOEEA) on the Notice of Project Change, dated August 10, 2007; Project name: Final Area-Wide Environmental Impact Report for Massachusetts National Guard Properties at the Massachusetts Military Reservation (MMR); EOEA number 5834

Subject: Massachusetts Army National Guard, Camp Edwards– Tango Range: Interim Pilot Program Report / Lessons Learned

Dear Ms Jennings and Mr Begley,

As was noted during the process the Massachusetts National Guard (MANG) conducted to request the approval of firing lead ammunition on Tango Range, for the National Guard to comply with new Department of Defense (DOD) and Department of the Army (DA) guidance to reduce deployment time for the soldier from about 18 months down to approximately 12 months, each State must maximize the allotted training time it has prior to unit deployment. To meet the guidance established by DOD and DA and, more importantly have trained and qualified personnel in small arms within established time frames, the operational small arms ranges at Camp Edwards are critical components. In order to increase and then sustain training, additional small arms ranges are required and the MANG will initiate a process similar to Tango Range to request additional small arms ranges for approval through the Tango Range trial period. Requested ranges may include additional 25 meter ranges like Tango Range and or pop-up target ranges.

The utilization of Tango Range over the past 10 months is a result of how the Army plans and commits its training resources. Typically, military units forecast ammunition and training facilities at least a year in advance based on the training venues that are available at the training site. When units were planning for the training years 2007 and 2008, Tango Range was not an approved range for lead ammunition usage. A military training year is October through September. Unit training and ammunition requests were essentially committed to other locations by the time Tango Range was approved in July 2007. Because resources were planned for other sites the number of soldiers through Tango Range is low; though, during the course of this training year / trial period the forecast for Tango Range will increase. What is important to note over the past ten months that military units have adjusted resources to train at Tango Range, the Army and Air Guard, the Army Reserve and the Coast Guard have successfully trained on the range. The majority of the ammunition fired on Tango has primarily been the 5.56mm bullets, but units have also trained with 7.62mm and 9mm bullets as well. The STAPP system has proven to be effective in containing the vast majority of the rounds, approximately 99%. Less than one percentage of the rounds were not contained due to ricochets, over shot, and a few rounds that hit the sand box traps along the target line.

The MANG continues to recognize that it has both legal and societal obligations to conduct the training activities in a manner that protects MMR resources and complies with applicable environmental requirements. In an effort for the MANG to move forward on two small arms ranges, Juliet and Kilo ranges and to get approval to fire lead ammunition on these ranges in the summer of 2008, the MANG is submitting the following Report. This Report is based on the above two references, EPA's Limited Authorization for Lead Ammunition Training dated 23 July 2007 and EOEEA's Certificate on the Notice of Project Change (EOEA #5834) dated 10 August 2007. In EPA's letter the MANG is required to complete a Pilot Program Report for the 17 month trial period, August 2007 through December 2008. As part of the process for Juliet and Kilo ranges, EPA directed an Interim Pilot Program Report be provided on the operations on Tango Range for the period of August 2007 to April 2008. The information in the Report will be in accordance with EPA's above referenced letter section IV, 3, 8. In EOEEA's certificate, the MANG was directed to provide a brief Summary Report of the Lessons Learned on the STAPP system at Tango Range, which also includes the same information that EPA has requested. Therefore, the two individually requested reports will be combined into one Report and will include the following: the number of rounds fired with an assessment of a percentage of rounds contained; monitoring activities to include the data collected; and, management and operational improvements made and incorporated into the revised Tango Range, Best Management Practices: Operational, Maintenance, and Monitoring Plan, (OMMP) dated 8 June 2007, revision 1, 14 December 2007. The Lessons Learned aspect of the Report will include issues and lessons learned from the construction, operation, and management of the STAPP system on Tango Range. This combined Report will be one of the documents that will be referenced / attached to the MANG's petition letter to EPA and the EMC for formal approval on the use of lead ammunition on Juliet and Kilo ranges. The formal approval petitions will address the requirements as outlined in EPA's Administrative Order and as outlined in the updated Environmental Performance Standards (11 July 2007) for the Environmental Management Commission.

Based on two years of observations and data collected from Tango Range, it was / is a positive decision by the MANG to move forward to install the STAPP bullet catcher system on Juliet and Kilo ranges. Based on these past two years, one year-plus without any firing and the past ten months with firing over 30,000 rounds of lead ammunition, the STAPP system is effective for the management of a 25-meter bermed range. For the MANG, the Tango Range OMMP with the STAPP bullet containment system has met the required performance criteria. The actual observation of training and the immediate inspection of the range to include the target line and the STAPP system support the conclusions that the vast majority of the rounds fired on the range are contained within the STAPP system. The monitoring techniques outlined in the OMMP that represent the scientific data collection, to include soil sampling and groundwater sampling are positive management tools to ensure the long-term safety of the Camp Edwards ecosystem to include the water supply resource and unit personnel conducting small arms training. Because Camp Edwards and its ecosystem are important, the tools selected for both immediate and long-term assessments for the management of small arms training on Tango Range will be continuously monitored and improved to ensure the sustainment of both.

The information and data associated with this report has been provided to the environmental agencies, the US EPA Region 1 (EPA), the Massachusetts Department of Environmental Protection (MassDEP), and the Environmental Management Commission (EMC) in other formats. Decisions based on the following information and data collected and then integrated into the revised Tango Range OMMP was also coordinated through the Small Arms Range Working Group (SARWG) that is comprised of members from EPA, MassDEP, the EMC, the MANG, and the Army Environmental Command's Impact Area Groundwater Study Program (IAGWSP).

Sincerely,



William F. FitzPatrick
COL FA
Deputy Director

Massachusetts Army National Guard
Camp Edwards – Tango Range:
Interim Pilot Program / Lesson Learned Report

1.0 BACKGROUND:

1.1 As noted in earlier documents, the STAPP system was scheduled to be shipped to Camp Edwards in the spring of 2006 to be part of the Department of the Army (DA) demonstration/validation testing program. The goal was to assess how effective the system could be in managing fired tungsten-nylon 5.56mm ammunition. When tungsten was discovered in one monitoring well on a small arms range (Bravo Range) in February 2006, the Commonwealth's leadership suspended the use of tungsten-nylon ammunition until more was understood about tungsten and its affect on the environment. After reviewing the environmental documents and consulting with the environmental agencies, Environmental Protection Agency (EPA), the Massachusetts Department of Environmental Protection (MassDEP) and the Environmental Management Commission (EMC), the Massachusetts National Guard (MANG) identified a process to return to the use of lead ammunition. The MANG was then able to petition DA to continue the demonstration/validation at Camp Edwards, but with lead ammunition. In the spring of 2006, the STAPP system was shipped to Camp Edwards and installed that summer.

1.2 It was noted in August and September 2006 there were some seam failures, which were repaired by October 2006. It was decided not to check for excess water in the system. In March 2007, 200 rounds of 5.56mm lead ammunition were fired into the STAPP system on Tango Range as a demonstration. Another demonstration was held in April 2007, when 1,500 rounds of 5.56mm lead ammunition were fired into STAPP. These were the first rounds fired into the system. In March 2007, after the demonstration was conducted on the left-most lane (lane number one), the top cover was peeled back and the STAPP system inspected. The rounds were contained within the first 3 inches of the rubber granular medium. The 1,500 rounds were fired across the entire 15 lanes in April 2007 with no noticeable problems. During both demonstrations there was no indication of any rounds ricocheting; the target frames and the sand boxes were inspected and there was no evidence of errant rounds.

1.3 In preparation for the request for approval to train with lead ammunition on Tango Range, the MANG checked the water collection system in STAPP after the March demonstration and removed 580 gallons of water from the system. This quantity of water exceeded the amount that the STAPP manufacturer had ever removed from its system in Sweden and in the system installed at Fort AP Hill, Virginia. The system is designed to shed water and not allow the penetration of precipitation through the rubber membranes. The excess water in the system was contributed to the seams that were not properly glued during installation. After the April demonstration, the system was rechecked and another 530 gallons were removed. Due to the amount of water that was removed from the system and because it was to be the major component for the management of Tango Range, it was decided that the system would be pulled apart to assess how the water was getting inside. The system was pulled apart in July 2007 (see paragraph 3.1.1). The bottom liner of the system was free of any bullet holes, and the 1700 rounds of 5.56mm

ammunition were contained within the rubber granular medium. Overall, the system was correctly installed.

2.0 Operational Results:

2.1 Since the approval by the EPA and the EMC for a 17 month trail period – August 2007 through December 2008 – during the past ten months, August 2007 to April 2008, 31,781 rounds of lead ammunition were fired on Tango Range into the STAPP system (see Table 2-1). The types of ammunition fired were 27,741 rounds of 5.56mm, 2,656 rounds of 7.62mm, and 1,384 rounds of 9mm. Part of the Tango Range Operations, Maintenance, and Monitoring Plan (OMMP) identifies that demonstrations with the Small Arms Range Working Group (SARWG) will be conducted prior to certain aspects of small arms training. The demonstrations are for the use of tracer rounds, comprising day and night demonstrations, and for the use of 7.62mm rounds. A daytime demonstration was conducted in November 2007 with the 7.62mm rounds to include tracer rounds: 60 rounds of 7.62mm tracer rounds were fired. As with the first demonstration of the 5.56mm rounds, the top membrane of the STAPP system was removed after firing for an inspection. The 7.62mm rounds were contained within the top three to four inches of the granular medium, and the tracer component of the round did not affect the containment aspect of the STAPP system.

Table 2-1, Total number of rounds fired on Tango Range, August 2007 thru April 2008				
Date	Unit	Rounds		
		5.56mm	7.62mm	9mm
Aug 2007	ARNG	3887		
Sep 2007	ARNG	3065		
Oct 2007	ANG / USAR	7900		
Nov 2007	USAR / CG / ANG	2800	2656*	
Jan 2008	CG			45
Apr 2008	USAR / ARNG / CG	10,089		1339
*~ quarter of the rounds fired were 7.62mm tracer rounds ARNG – Army National Guard ANG – Air National Guard USAR – US Army Reserves CG – Coast Guard				

2.2 Based on monitoring the training and the physical inspection of the STAPP system, it is estimated that roughly 63 (as of 19 April 2008) rounds were not contained in the system (approximately 0.20%). This results from rounds ricocheting off the target frames and from soldiers firing too high or too low. From those 63 rounds, a couple bullet holes have been found in the sand boxes at the target line, while the remaining rounds have gone over the top of the berm. As soldiers train and fire in a burst mode the rifle may “ride up” and the firer’s angle of fire changes and tends to be higher, especially if the firer is in an unsupported position. The whole point of small arms training is for the soldier to be familiar with how the weapon performs and then modify their handling of the weapon to ensure it does not “ride up” when using the weapon in the automatic mode. Ricocheting rounds, or those aimed too high, may hit near the upper plateau of the STAPP membrane. As a result, the rounds may slice through or skip out of the STAPP system (Figure 1). A plywood wall has been installed at the top of the berm as an additional measure to monitor these errant rounds. (Figure 2). The intent is not to capture

the ricochets or high rounds but to assess a possible percentage of rounds that may not be captured.

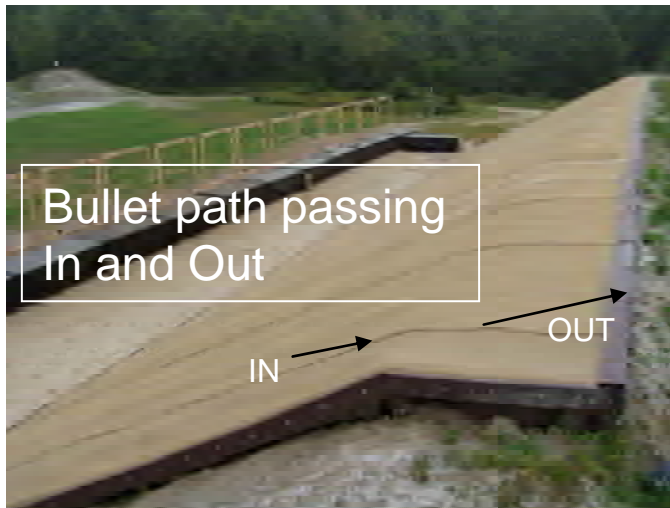


Figure 1. STAPP profile; black arrow indicates where the bullets can pass through the membrane – Tango Range



Figure 2. Plywood wall – Tango Range

3.0 Modifications:

3.1 The following section highlights the modifications to the OMMP. The modifications were initially discussed and approved at the SARWG meetings. Additionally, the MANG submitted a letter outlining those changes and modifications and requested concurrence from the environmental agencies for the modifications.

3.1.1 As noted in the Background section, a detailed inspection of the STAPP system was conducted in July 2007, prior to the start of training. At the beginning of the detailed inspection, an additional 300 gallons of water were removed. As part of the inspection, the system was taken apart and each aspect of construction was reviewed: the framework was intact, the bottom liner was not ripped or perforated, the depth of rubber granulars was correct, and the upper membrane was not torn. However, it was noted that there was

some silt inside the center section of the STAPP system. The moist silt indicated a potential mechanism or pathway for the excess water entering the STAPP system. The silt and water appeared to have entered the STAPP system between the system liner and the upper membrane where they are attached to the frame at the highest point of the system. To fix this condition, the berm apex and the erosion cover were removed to reduce the potential of runoff from precipitation infiltrating into the STAPP system. Figure 3 shows a modification to the system to reduce the infiltration potential: excess material from the bottom liner, which extends outside of the frame, has been wrapped around the upper membrane and bolted to the frame to prevent water infiltrating the system..



Figure 3. Liner and upper membrane attached to frame.

3.1.2 To date, water is still collecting inside the system. Based on the sections of the seams that have separated during the year, water from rain was able to get inside the system. However, the STAPP system continues to hold the collected water thus preventing a release into the environment. The volume of water removed from the system is discussed in section 4.1.

3.2 After the system was rebuilt, it was determined that the sand boxes should be placed behind the target row, instead of in front, to quickly and safely change the target screens from the target frames during training. It was also determined that two of the boxes should be used to block vehicle access from between the row of boxes and the STAPP system. As shown in Figure 4, this would reduce the possibility of mechanical damage to the STAPP frame and protect the lysimeters installed between STAPP and the toe berm boxes.



Figure 4. Sand boxes.

3.3 Due to comments on the draft June 2007 Tango Range OMMP from the SARWG and members of the EMC's Science Advisory Council, the interim action levels for metals and nitroglycerin associated with small arms firing were modified and additional levels were added for soil, soil pore-water, and groundwater. Initially, there were two levels for soil-pore water and groundwater and one level for soil. Now there are three interim levels for soil-pore water and groundwater and two interim levels for soil. The additional action levels were added as an early warning, an increased conservative approach, to assess the established monitoring techniques with respect to the training and protection of the groundwater.

3.4 Based on the results of background sampling from the lysimeters along the base of STAPP, three additional lysimeters were installed near the center lysimeter at the following depths – 3.5, 5, and 8 feet. Sampling results from the lysimeters are discussed in paragraph 4.2. The lysimeters currently installed are tension lysimeters, and the SARWG is reviewing whether pan lysimeters should be used instead of, or to compliment, the tension lysimeters. The lysimeter selection will also include research on the type of lysimeter and their physical make-up. This will help reduce the potential of introducing material that could cause false positives in the data collection and analysis of the water sample. A tension lysimeter samples soil-pore water through a six inch diameter or smaller cup, whereas a pan lysimeter can sample an area roughly two square feet. Both types are installed under the surface of the ground.

3.5 Due to comments by MassDEP and the EMC, the MANG proposed to knock down the elevated mounds at the old machine gun firing line. This soil would remain on site and be used to help raise the height approximately two feet of the 25-meter firing line. The mounds were knocked down to raise the height of the 25-meter firing line the week of 19 April 2008.

3.6 Based on a request by the Coast Guard to utilize the range as a transition range, the OMMP was reviewed to ensure it was protective during this type of use with respect to firing lines, firing lanes, weapons, and ammunition types. Below is a summary of the conclusions of this review:

3.6.1 The Coast Guard’s requested use of rifles and pistols and their associated ammunition is consistent with the OMMP. The Coast Guard also requested approval to train with shotguns at Tango Range. At this time, the MANG is not requesting approval for the use of shotguns or its associated ammunition. A demonstration would be requested and then evaluated by the SARWG to determine if Tango Range and the STAPP system would be an effective management method for shotguns.

3.6.2 The rifle and pistol ammunition requested is listed within the OMMP but it is not consistently listed throughout the plan. Table 4-3 of the Tango Range OMMP will be modified to reflect what is listed in sections 2.1.2 and 7.1.

3.6.3 With respect to the firing lines, the Coast Guard training requirement is to fire from several different distances from the target line, between 3 to 25 yards (also known as transition training). To accommodate this request, the MANG established a maximum and minimum firing distance from the target line along the range floor. The maximum firing distance is 25 meters, and the minimum firing distance is 3 yards (see the shaded zone on Figure 5). The maximum and minimum distances are within the range safety zones for the bermed range and do not compromise the capabilities of the STAPP system. The current design and construction of STAPP could support rounds fired directly on the upper membrane without compromising the integrity of the trap; however, weapons training will not include the point blank firing of the weapon at STAPP.

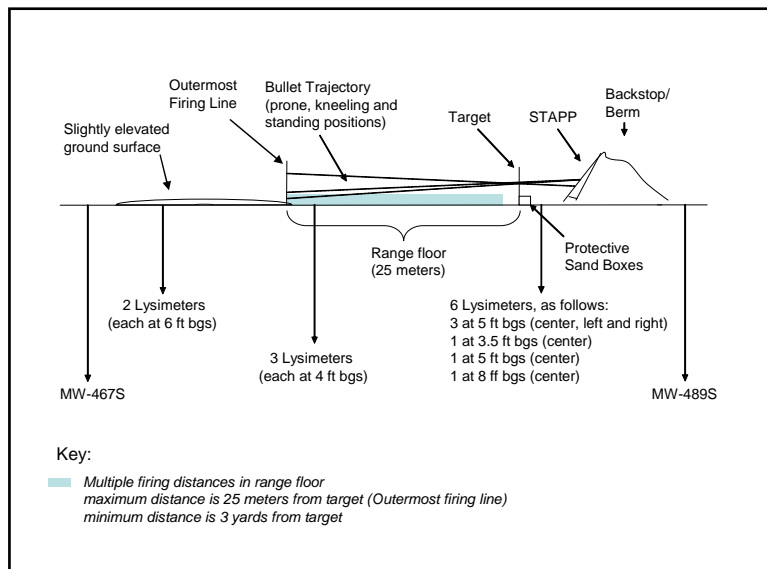


Figure 5. Cross section of range changes

3.6.4 Due to an increase in the area for the firing lines, the soil sampling plan was modified, see paragraph 4.4 for further information. The range floor sampling area will now include the north side of the 25-meter firing line to the STAPP system, to include six separate sampling units. Initially, soil sampling was identified for two areas: one along the 25-meter line and the other along the base of the STAPP system. Also, additional lysimeters maybe warranted within the range floor based on data from the existing lysimeters.

3.7 Based on the above changes, the plan has been modified with a new “as of date” – T Range Best Manage Practices: Operations, Maintenance, and Monitoring Plan, 8 June 2007, Revision 1 as of 14 December 2007.

4. Sampling Results:

4.1 Water inside the STAPP system:

The following two tables reflect the amount of water removed from the STAPP system and the dates the collected water was sampled with the associated analytical data. Table 4-1 is the amount of water removed from STAPP from the initial March 2007 removal to the recent removal in April 2008.

Table 4-1. Water removed from STAPP March 2007 thru April 2008			
Date	Gallons	Sampled	Remarks
Mar 2007	580	Yes	580 disposed at the CSA – Mar 2007
Apr 2007	530	Yes	840 gals disposed at the Otis Waste Water treatment plant – Nov 2007
July 2007	300	Yes; composite sample from 55-gallon drums of the 560 gallons	
Aug 2007	10		
Nov 2007	250		
Dec 2007	100	Yes	740 gallons in 55 gallon drums at the CSA. Will be disposed of thru SAFETY KLEEN – May 2008
Feb 2008	100	No	
Mar 2008	110	No	
Apr 2008	180	Yes	
CSA—Consolidated Storage Area managed by the New England Corps of Engineers			

4.1.1 Table 4-2 reflects the five sampling events. The November 2007 sampling event is a composite sample of the water, sitting in 55-gallon drums, that was removed from STAPP in July, August, and November 2007.

Analyte	Date Sampled 3/28/2007	Date Sampled 4/19/2007	Date Sampled 11/19/2007	Date Sampled 12/28/2007	Date Sampled 4/11/2008	Detection Limit	Reportable Limit	MassDEP Groundwater-1 Standard	EPA Maximum Contamination Level
Antimony	43.3	13.1	87.5	98.8	42.9	10.1	60.0	6.0	6.0
Arsenic	ND	ND	ND	ND	ND	3.5	10.0	10.0	100.0
Barium	29.6	35.7	46.8	50.3	34.7	6.2	200.0	2000.0	2000.0
Cadmium	ND	ND	ND	ND	ND	0.6	5.0	5.0	5.0
Chromium	ND	ND	0.49	2.1	0.44	1.8	10.0	100.0	100.0
Copper	ND	ND	4.2	5.3	2.9	4.1	25.0	10000.0	1300.0
Iron	78.1	21.0	4610	111	707	15.8	200.0	NA	NA
Lead	11.7	4.7	9.1	9.7	6.9	2.9	10.0	15.0	15.0
Mercury	ND	ND	ND	ND	ND	0.1	0.2	2.0	2.0
Selenium	ND	ND	ND	ND	ND	3.3	35.0	50.0	50.0
Silver	ND	ND	ND	ND	ND	3.6	10.0	100.0	NA
Zinc	19300.0	14500.0	21600.0	29100.0	22200.0	22.0	200.0	5000.0	NA
Tungsten	1.9	.042	2.0	2.1	1.6	0.2	2.0	NA	NA

Detection limit = laboratory minimum detection limit
Reportable limit = laboratory reportable limit; values reported between the detection limit and the reportable limit are estimated values

4.2 Lysimeter sampling:

4.2.1 Soil-pore water sampling will be conducted three times during the trial period and then annually in October/November. During the trial period, sampling is scheduled in April, August/September, and November/December; exactly when during these time frames will be based on rain frequency. If it has not rained, a meaningful sample cannot be collected. The collected sample is used to measure Lead, Copper, Antimony, and Nitroglycerine at depths of 3.5, 5 and 8 feet below the ground surface.

4.2.2 As previously mentioned in paragraph 3.4, in June 2007, the three lysimeters installed at the base of the STAPP system, between the target line and STAPP, were sampled and analyzed for Lead (Pb). The purpose of this sampling was to have a known background value prior to any firing of small arms on Tango Range. The data from the sampling (unfiltered sampling) became available on July 12, 2007. The results for the two outside lysimeters were non-detect for Lead (Pb), while the center lysimeter had a reading of 28.6 parts per billion (ppb). Because this value exceeded the 15.0 ppb Lead (Pb) Interim Action Level 2 established in Table 6-2 of the Tango Range OMMP, the center lysimeter was re-sampled on July 26. Also, future laboratory analysis reporting would include filtered and unfiltered data results. Soil samples were collected and field tested with an X-ray Fluorescent (XRF) metal detection device and a decision was made to install three additional lysimeters at depths of 3.5, 5 and 8 feet around the center lysimeter.

**Table 6-2. Interim Soil-Pore Water Action Levels
for the Initial Year of Fire Operations on T Range**

Analyte	Level 1 Sampling and Validation¹	Level 2 Focused Reassessment²	Level 3 Range Maintenance³
Lead	10 ug/L	15 ug/L	30 ug/L
Copper	867 ug/L	1,300 ug/L	2,600 ug/L
Antimony	4.0 ug/L	6.0 ug/L	12 ug/L
Nitroglycerine	3.2 ug/L	4.8 ug/L	9.6 ug/L

Notes:

1. Results exceeding Level 1 will be validated through resampling and analysis.
2. Focused Reassessment will include resampling and validation of results and an evaluation of the cause or need for action and review of the results with stakeholders. Possible modification of the Conceptual Site Model and follow on action could result. MANG will coordinate with the EMC, EPA, and MassDEP to identify appropriate maintenance actions (e.g., dust control, pH control, soil removal).
3. Range Maintenance may include soil removal, resampling, or temporary suspension of firing on the range. The range will be reconstructed once favorable results from the post excavation sampling are received. Soil removal may not be required if a removal action has already been conducted based on soil monitoring results.

4.2.3 Results from the re-sample were non-detect filtered and 19.4 ppb unfiltered, again for Lead (Pb) only. The XRF soil sample results were low, 16.0 parts per million or less, and do not seem to account for the reading of 28.6 ppb in the lysimeter. [The surface soil Interim Action Level 1 for Lead (Pb) is 4,535.0 parts per million.] On August 2, 2007, the original three lysimeters at the base of STAPP were re-sampled (the three new ones had not been installed yet). The sampling results on the two outer lysimeters were again non-detect for unfiltered as well as filtered; the center lysimeter was 8.8 ppb unfiltered and non-detect filtered.

4.2.4 The period of July through September 2007 was very dry and without any substantial precipitation, which made charging the lysimeters difficult. Lysimeters are “charged” by creating a water vacuum within the lysimeter to collect a meaningful sample. There was no measurable rainfall until early October, and even with this rain two of the lysimeters installed along the firing line did not function; a vacuum could not be made. These lysimeters will be worked on or possibly replaced in 2008.

4.2.5 In October, samples were collected and tested for the analytes as listed in the Tango Range OMMP. Lead (Pb) was non-detect both filtered and unfiltered; Copper (Cu) values were non-detect or below the Interim Action Level 1 except for the original center lysimeter that had the Lead (Pb) hit of 28.6 ppb. The unfiltered value for Copper (Cu) was 2,220 ppb and the filtered value for Copper (Cu) was 969 ppb. Antimony (Sb) was non-detect both filtered and unfiltered; and Nitroglycerin was non-detect.

4.2.6 After comparing lysimeter data from the center lysimeter at the STAPP system base with others along the base, there is some speculation that the center lysimeter may be defective or was damaged during installation. This lysimeter may be replaced at some point, or a different style of lysimeter may be considered. Both are installed in the ground at an agreed-to depth: on Tango Range it is plus or minus 5 feet.

4.3. Groundwater:

Based on the Tango Range OMMP, the first sampling events for soil and groundwater are not required until Fall 2008. The MANG/Impact Area Groundwater Study Program (IAGWSP) has sampled both during the past ten months. The groundwater monitoring wells (MW), MW-471 and MW-472 were sampled twice, in July and December 2007, and the analytes for groundwater sampling are Lead, Copper, Antimony, and Nitroglycerin. Sampling results were non-detect; these results are similar to the results the IAGWSP reports when sampling other monitoring wells installed on other small arms ranges. The MW sampling data since the wells were installed are shown in Table 4-3.

Table 4-3. Groundwater Monitoring Well sampling results					
		10/30/2006	3/29/2007	7/25/2007	1/4/2008
MW-471	Lead	ND	ND	ND	ND
	Copper	NA	ND	ND	ND
	Antimony	NA	ND	ND	ND
	Nitroglycerin	ND	ND	ND	ND
MW-472		110/31/2007	3/29/2007	7/25/2007	1/4/2008
	Lead	ND	ND	ND	ND
	Copper	NA	ND	ND	ND
	Antimony	NA	ND	ND	ND
	Nitroglycerin	ND	ND	ND	ND

4.4. Soil Sampling:

4.4.1 As was stated in the groundwater section, soil sampling between the STAPP system and the 25-meter firing line is not required until October 2008, but in February 2008 soil samples were collected from this area. The sampling methodology is the revised method: six sample areas versus two. The six sampling units will be analyzed both as a ground and un-grounded samples. Sample areas 1, 3, and 5 will have one 100-point Multi-Increment Sample (MIS) and two replicate samples. Sample areas 2, 4, and 6 will have one 100-point MIS sample without replicate samples. The analytes for soil sampling are Lead, Antimony, and Nitroglycerin; sample results for all units were less then the Level 1 Interim Soil Action Level listed in the Tango Range OMMP. Table 4-4 is the soil sampling results from the February 2008 sampling event.

Table 4-4. Soil Sample Results, February 2008

Analyte	Area 1			Area 2	Area 3			Area 4	Area 5			Area 6	Units	MDL	RL	T- OMMP Interim Action Level 1
	P	R1	R2		P	R1	R2		P	R1	R2					
Lead	710	646	765	608	327	339	347	269	190	161	263	5.8	mg/Kg	0.4138	4.9261	4,535.0 mg/Kg
Antimony	3.2	2.6	2.6	2.0	1.4	1.9	1.2	1.2	0.79	0.75	1.0	0.19	mg/Kg	0.054	2.9557	1,1750.0 mg/Kg
Nitroglycerin	ND	ND	ND	ND	ND	ND	ND	2.7	ND	ND	ND	NA	mg/Kg	14.0	120.0	5.0 mg/Kg

Areas 1-5 is on the range floor, Area 1 is the 25-meter firing line.
Area 6 is the target area, the area between the target frames and the STAPP system.
P – Primary sample; R1 – Replicate sample, R2 – Replicate Sample
MDL – Minimum Detection Limit
RL – Reporting Limit

4.4.2. In March 2008 the soil on Tango Range was sampled for pH as outlined in the Tango Range OMMP; the results were 7.1 along the firing line and 6.7 at the toe of berm between the target line and STAPP. The values are within the optimal range for soils at the Camp Edwards small arms ranges. This pH range is also optimal for the ecosystem at Camp Edwards and Cape Cod.

4.5 Visual Inspections:

The MANG has conducted periodic inspections of Tango Range as outlined in the OMMP. Inspections have been conducted before, during, and after a specific training event, and when training is not occurring. The items that have been inspected include the condition of the upper membrane, the glue sample alternatives, the seams of the membrane, the patching of the membrane, the condition of the toe berm boxes, and how the unit conducts small arms training. Personnel from Camp Edwards, the Environmental & Readiness Center (E&RC), and/or from MANG senior Headquarters have been on the range since training with lead ammunition resumed on 4 August 2007. The EMC's Environmental Officer has also been on range to observe all small arms training since 4 August, and has inspected the condition of the STAPP system as well. Personnel from EPA and MassDEP also conducted a periodic inspection of the range during small arms training. Summaries of the inspections and the inspection checklists reflect that operations on Tango Range have been in conformance with the OMMP. However, it has

been noted that the checklist and inspection procedures should be modified to increase the level of the training oversight. All three environmental agencies have reviewed the Camp Edwards Tango Range inspection checklist. On 30 November 2007, the Camp Edwards' Range Control personnel and members from the SARWG met to review the checklists and identify sections that should be improved to increase the level of protection and training.

5. Lessons Learned:

5.1 The Executive Office of Energy and Environmental Affairs (EOEEA) requires the MANG provide a summary of lessons learned on Tango Range based on its observations and use of the STAPP system as part of the approval process for Juliet and Kilo ranges. Many of the lessons have already been incorporated in the revised Tango Range OMMP to clarify training while improving the level of monitoring on the range. Also, based on the revised EPSs (11 July 2007), the EPSs require the MANG to develop plans that identify how a small arms range will be managed as well as re-built with a containment system to ensure protection of the environment. These plans must be briefed and approved through the EMC. This section will briefly discuss the berm construction and STAPP installation plans for Juliet and Kilo ranges. These plans reflect the observations noted during the building of the berm and STAPP on Tango Range, to include the glue and seam issues when the system was rebuilt in July 2007.

5.2 The continuous physical inspections of Tango Range before, during and after training, during the construction of the berm, and the installation of STAPP has influenced the management improvements to Tango Range. While the chemical sampling is important and provides the scientific evidence of the protection of the ecosystem, it is the direct observations and immediate modifications to management tools on Tango Range that have a real-time effect for soldier and environmental safety. The improvements that have been noted will be incorporated into the Juliet and Kilo Range OMMPs and will be used where appropriate on additional small arms ranges that are identified for training and integrated into their respective management plans.

5.3 It has been through the various demonstrations that the OMMP has been modified to clarify the training conditions to conduct small arms training on Tango Range while increasing the protection of the ecosystem. One improvement to the OMMP was the clarification of the minimum and maximum firing lines as noted in section 3.6 of this report. This change has also lead to an increase in the size of the soil sampling area and the number of samples collected, also previously noted in section 3.6.4.

5.3.1 By inspecting the target line and the STAPP system, we have been able to identify why there have been small tears in the STAPP cover membrane or have identified where rounds have actually passed through the cover/upper membrane. As stated in past public meetings and noted in coordination meetings, when rounds hit a solid object like the target frame, the rounds will tumble or ricochet. If the rounds are tumbling as they hit the STAPP system, they may create a small tear in the cover/upper membrane, which, depending on the size of the tear, may need to be patched. Rounds also can ricochet over the STAPP system.

5.3.2 Additionally, by observing range firing, it can be determined which type of ammunition or training will cause an increase in maintenance, specifically more patching of the upper membrane. The use of the 7.62mm rounds and/or firing the 5.56mm rounds of the M16 or M4 rifle in the burst mode can cause greater tearing in the upper membrane that would lead to more patching.

5.3.3 In observing the actual firing of weapons we have been able to determine to what height the 25-meter firing line should be raised. This will be accomplished by knocking down the mounds behind the 25-meter firing line, as noted in section 3.5. Raising of the 25-meter firing line will improve the angle of firing for training and reduce the potential for rounds to be fired too high and over the STAPP system. Since there is evidence on the STAPP system that indicate rounds have gone through the system near the plateau, (see Figure 7), a plywood wall has been built above the STAPP system (see Figure 2) at the top of the berm to assess the number of rounds that overshot the STAPP system and have not been contained. As noted earlier in section 2.2, as of 19 April 2008, it has been estimated that approximately 63 rounds out of 31,781 rounds fired were not contained within STAPP. Figure 7 depicts 7.62mm rounds that passed through the STAPP cover, upper membrane. The 7.62mm machine gun fires the 7.62mm bullets in a burst mode, several rounds in rapid succession; based on the number of slashes in the cover roughly 20 rounds passed in and out of the cover. There are also several other areas near the top of the STAPP system that show where 5.56mm rounds have also passed in and out of the cover, as shown in Figure 1. Also, as mentioned in section 2.2, several bullets are imbedded in the sand boxes as a result of aiming too low. Since the installment of the plywood wall in late March 2008, 33 bullet holes have been counted. Together these inspections account for approximately 63 rounds not contained in STAPP. Based on observation, inspections, and calculation of the number of rounds fired, the STAPP system contained approximately 99% of the rounds fired.



Figure 7. 7.62mm rounds pass in and out of the STAPP membrane

5.3.4 Because it is important to have a flat angle of fire, parallel to the range floor, the construction of Juliet and Kilo ranges will be different than Tango Range. On Tango Range the STAPP system was built on the established range floor, which influenced the target height. The targets needed to be raised so small arms fire will not affect the structural integrity of the STAPP system. As noted above, the firing line on Tango

Range was raised as well to minimize the change in the angle of fire. In order not to change the angle of fire between the existing firing line and the target line on Juliet and Kilo ranges, the range floor will be constructed so the area between the target line and STAPP will be lower than the range floor between the firing lines and the target line. This difference in elevation should provide the same level of protection provided by the sand boxes on Tango Range. However, this will be assessed when the STAPP has been installed.

5.4 As outlined in the Tango Range OMMP and in sections 3.1 and 4.1, sampling of the water reservoir in STAPP was based on precipitation events. However, because we are aware the system collects water more frequently regardless of precipitation, the system has been checked more often than originally planned. One thought is the excess water is a result of condensation build-up in the system. As shown in Figure 8, in April 2008, a tube was inserted through the system's upper membrane so it can be inspected frequently and without opening up it up. The system will now be checked weekly regardless of precipitation to assess whether condensation or rain is the cause of the excess water. Juliet and Kilo ranges will similarly be modified for quick visual inspections. The positive note is the STAPP system does contain water and prevents the potential release of chemicals from lead ammunition affecting the environment.



Figure 8. Modification to STAPP, access port to water collection reservoir tube.

5.5 The MANG hired the US Army Corps of Engineers, the New England District, to manage the Congressional-add money that was awarded to the MANG for bullet containment systems. Part of their responsibilities will include developing the plans for the berm construction and for quality control/quality assurance of the selected bullet containment system, the selected system being the STAPP system. Additionally, the Corps will have an individual assigned to oversee the project on a daily basis and create a photo-log of the total project.

5.6 Based on the observations made during the construction of the berm for Tango Range, it was determined that a berm construction plan for Juliet and Kilo ranges be developed to ensure the materials of the berm would not have an adverse affect to the STAPP system, reduce ricochet hazards, and minimize erosion. The berm installation plan has been coordinated through the SARWG. The berm is a standard berm design the

US Army Corps of Engineers constructs for military small arms ranges. On Juliet Range, the existing berm will be re-graded to add earthen material to re-shape the berm so STAPP can be installed. On Kilo Range, the berm will be relocated and built from scratch.

5.6.1 The berm(s) will be built to ensure the soil directly below the STAPP system is free of rocks and debris greater than two inches. It will consist of two layers; one will be a three-foot layer of soil free of rocks greater than two inches and a second layer of six inches of screened sand. The STAPP system is installed on the sand layer and requires a base of sand three-inches thick.

5.6.2 Additionally, during the berm construction, the berm and the range floor at the base of the STAPP system will be graded to minimize erosion and surface water runoff. The area between the target line and the base of STAPP will be graded with existing soils to avoid creating compacted soil areas that could then hold standing water.

5.7 When STAPP was sent to Camp Edwards in 2006 for the demonstration / validation the actual process for the complete construction of the system was not included. Due to the observations made and photographed during STAPP installation and the inspection of the system from June 2006 through August 2007, it was determined that an installation plan should be provided to then develop quality control and quality assurance (QC/QA) metrics. The purpose was, and is, to ensure the STAPP system is built to effectively contain fired rounds and minimize any potential release of fired munitions into the ecosystem.

5.7.1 The STAPP installation QC/QA plan identifies the type of material that will be used with associated design specifications. The steps for installation are identified and they include the framework and hardware to assemble, a geotextile fabric as a protective bottom liner on the sand, a rubber membrane that is laid down on the fabric and overlaps the frame work, the type and depth of the rubber granular material, and the upper membrane. The QC/QC also outlines how the depth of the rubber granules are measured to ensure the appropriate depth and how the seams of the upper membrane are overlapped, inspected, and then glued. Furthermore, the QC/QA identifies the critical points of the installation that must be inspected and approved before the next step of the installation can proceed.

5.7.2 At the beginning of the project the STAPP personnel will conduct a gluing demonstration on a piece of the upper membrane approximately three-feet long as a test piece. This will be available for inspection throughout the entire installation process. This demonstration will show how the glue will be applied and checked during the installation. In addition, the glue, LOCTITE 401, will be kept in a controlled environment and not left in the sun when not in use. Additionally, if the surface temperature of the upper membrane exceeds 105 degrees F, the gluing of the seams will be delayed until the material and daytime temperature cool. Also, once all the seams have been glued and inspected, the seams will be re-inspected 24 hours later before the system and its overall installation is approved.

5.7.3 On Juliet Range, the STAPP system is 120-feet long and will have a bottom liner that is one piece and 45mil in thickness, and any seams in the material will be completed by the manufacturer. On Kilo Range, the STAPP system is 200-feet long. In order to have the bottom liner in one piece, the thickness of the liner will be 40mil. Again, any seams will be completed by the manufacturer prior to shipping. This will avoid any field gluing of the bottom liner material. The minimum requirement in thickness of the bottom liner by STAPP is 30mil. The liners on both ranges will be inspected for integrity, excessive bunching of material, as well as over-stretching of the material.

5.8 The MANG has used an XRF measuring device on soils containing tungsten-nylon 5.56mm rounds and lead residue from small arms ammunition. The XRF is a field tool that can provide immediate metals data to form decisions to improve monitoring. As a result of its effectiveness the MANG has purchased the XRF and will incorporate its use into the soil sampling of Tango Range as well as Juliet and Kilo ranges.

6.0 As a requirement of both referenced documents, the MANG will conduct a mass balance of the STAPP system. By the fall of 2008 the STAPP system will be taken apart and the rubber granular medium removed, and the bullet fragments will be separated from the rubber granules. The rubber granules will be returned to the STAPP system and additional granules added if necessary. A mass balance will be conducted to assess a percentage of rounds captured by weight, measuring the weight of rounds fired versus the weight of the metal collected from the system. The mass balance provides a known percentage of the calculated weight of the bullets fired versus the weight of material recovered that has been contained and not introduced into the environment. The scientific analysis will be compared to the visual observation. The two assessments should support that the overall maintenance and monitoring methods used for Tango Range demonstrate that the management practices are reducing the potential of leaching lead from small arms training by at least 90%.

7.0 The Tango Range OMMP, to include the STAPP bullet catcher, is an effective system to manage small arms training on a berm range. The real key to the success of the management of the range and small arms training is the frequent observations and inspections of the training and then influencing quick modifications to increase the protection of the ecosystem as well as improve the quality of training. This Report and the Juliet and Kilo berm construction and STAPP installation plans will be available to the public.

Appendix L
Comment Letters



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 1
 1 CONGRESS STREET, SUITE 1100
 BOSTON, MASSACHUSETTS 02114-2023

AE



October 26, 2006

Robert W. Golledge, Jr., Secretary
 Executive Office of Environmental Affairs
 Attention: MEPA Office, Aisling Eglington, EOEA No. 5834
 100 Cambridge Street, Suite 900
 Boston, MA 02114-2524

Re: Notice of Project Change for the Massachusetts Military Reservation, Final Area-Wide Environmental Impact Report

Dear Secretary Golledge:

The U. S. Environmental Protection Agency (EPA) has reviewed the Notice of Project Change submitted by the Massachusetts National Guard (MANG) for the Massachusetts Military Reservation, dated September 15, 2006. According to the submission, "the Massachusetts National Guard proposes to modify an Environmental Performance Standard regarding lead-bullet ammunition at select small arms firing ranges at Camp Edwards." The NPC presents a process for approving this change. Although the NPC briefly discusses EPA's role in the process, we thought it was important to highlight what we believe are the key steps in the process and the information that will be required by EPA to approve this change.

In February and May 1997, EPA issued two Administrative Orders under the authority of the Safe Drinking Water Act for the MMR. These Administrative Orders required, among other things, the implementation of studies to evaluate the nature and extent of contamination resulting from military training activities at MMR. These Orders also prohibited the firing of certain munitions, including lead ammunition, at the Training Range and Impact Area, including the small arms ranges, until the completion of these studies and any activities necessary to mitigate impacts. Finally, these Orders required the implementation of pollution prevention measures as a condition for receiving approval to resume training with lead ammunition.

The NPC contains a timeline of the tasks that must be completed according to the MANG to complete the process for approving the change and allowing the use of lead-bullet ammunition (see Figure 2). It is EPA's belief that the timeline presented in the NPC does not include all of the critical tasks as required by EPA's Orders. Below is a summary of the critical tasks that must be completed and approved by EPA before the change will be approved:

1

1. The investigation of the ranges that are proposed for use with lead must be completed. The investigation must include the collection of both soil and groundwater data to fully characterize the extent of contamination at these ranges. The results of the investigation must be submitted in a Remedial Investigation (RI) Report which includes a risk assessment. This report must be reviewed and approved by EPA. Currently, EPA awaits the submission of these reports and it is our understanding that draft reports will be submitted to EPA for review in December 2006. 2
2. If the RI Report concludes that contaminants are present at levels that pose an unacceptable risk to human health or the environment, including the sole source aquifer, a Feasibility Study must be developed and response actions must be completed. The resumption of training can not interfere with the implementation of response actions. This report and any activities must be reviewed and approved by EPA. 3
3. The MANG has hired the US Geological Survey (USGS) and the Cold Regions Research and Engineering Lab (CRREL) to conduct a Lead Fate and Transport Study. The results of this study must be reviewed and approved by EPA. It is our understanding that a draft report will be submitted to EPA for review in December 2006. 4
4. After the completion of the investigation and cleanup, a pollution prevention plan must be developed and submitted to EPA for review and approval. The pollution prevention plan must include an evaluation of the pollution prevention technologies available for a particular range and demonstrate maximum feasible use of these technologies. Currently, a draft Pollution Prevention Plan has been submitted to EPA for review. We have initiated our review of this plan; however, this plan can not be fully evaluated by EPA until after the studies and cleanup actions have been completed. 5
5. After the completion of the studies and approval of the pollution prevention measures by EPA, the Administrative Orders must be modified to eliminate the prohibition on the use of lead-ammunition. 6
6. Throughout the steps above, the public needs to be informed of the results of each of these steps and provided an opportunity to comment. 7


EPA considers this change to be a significant change and one that requires careful consideration of the environmental impacts. It is also important to note that EPA has a significant role in approving this change although our role is not clearly articulated in the NPC itself.

The MANG has proposed a phased approach for the reinstatement of the use of lead ammunition at MMR. According to the NPC, there are eight specific ranges identified for future training with lead with a goal of reinstating these in three separate phases and completing the first phase by April 2007. EPA is currently focusing its review on the ranges in the first phase: Tango and Echo. Decisions by EPA regarding the other ranges identified in Phase 2 and 3 will be made at a later date after the steps identified above have been completed for those ranges.

We appreciate the opportunity to review this NPC and will keep you informed of any comments we provide on the process or the documents generated to support the final decision.

If you have any questions, please contact me at 617-918-1210.

Sincerely,



Lynne A. Jennings
MMR Team Leader

Cc: Shawn Cody, Massachusetts National Guard
COL William Fitzpatrick, Massachusetts National Guard
Mark Begley, Environmental Management Commission
Len Pinaud, Massachusetts DEP
Kent Gonser, Impact Area Groundwater Study Program



COMMONWEALTH OF MASSACHUSETTS
MASSACHUSETTS SENATE
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AE

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COMMITTEES:
HIGHER EDUCATION, (CHAIR)
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ELDER AFFAIRS
ENVIRONMENT, NATURAL RESOURCES
AND AGRICULTURE
REVENUE

October 27, 2006

Robert W. Golledge, Jr., Secretary
Executive Office of Environmental Affairs
Attention MEPA Office [Aisling Eglington], EOE No. 5834
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Notice of Project Change to the Final Area-Wide Environmental Impact Report for the Massachusetts National Guard Properties at MMR

Dear Secretary Golledge:

This proposed project change involves alteration of the current prohibition on the firing of lead-bullet ammunition and modification of one of the Environmental Performance Standards set forth in the FEIR.

The firing of lead ammunition was expressly forbidden in the FEIR, the Environmental Performance Standards, and the USEPA's Administrative Order. Now new information has come to light that appears to indicate that the use of different ammunition and new methods of pollution prevention may be the best course for both environmental protection of the Upper Cape Water Supply Reserve and effective military training at the MMR. A thorough review is in order before a change is made, and the Massachusetts National Guard has presented a series of steps that contemplates such a review. The Guard is currently doing a lead study and working on its pollution prevention plan, both of which should be completed before the Environmental Management Commission takes action on the requested changes. In addition, they have said that they will be doing an Environmental Assessment under NEPA, through which alternative methods of pollution prevention would be examined.

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My belief is that it would be appropriate to certify the Notice of Project Change as adequate review under MEPA as long as that certification makes it clear that all of the proposed steps are to be covered in the overall review of the proposal, so that there is adequate information and public participation to ensure that the Environmental Management Commission can make an informed decision. The Guard should present a

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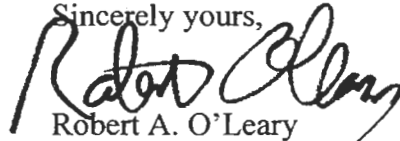


plan for the operation, maintenance, and monitoring of the ranges where lead is to be fired, and an effective process should be set up to address how future changes to both the type of ammunition used and appropriate mitigation would be handled. The entire review should be completed before any firing of lead ammunition begins.

10

Thank you for the opportunity to comment on this important issue.

Sincerely yours,



Robert A. O'Leary
STATE SENATOR
Cape and Islands District

RAO/shr

Memorandum

To: Sharon Stone
Through: Millie Garcia-Surette
Gary Moran
From: Leonard Pinaud
Date: 30 October 2006
Re: EOEA Notice of Project Change (NPC) #5834 for the Massachusetts
Military Reservation Final Area-Wide Environmental Impact Report

CAST

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OCT 30 2006

MEPA

"For Use in Intra-Agency Policy Deliberations"

The Massachusetts Department of Environmental Protection (MassDEP) Southeast Regional Office, Federal Facilities Remediation Section, Bureau of Waste Site Cleanup (BWSC) has reviewed the EOEA Notice of Project Change (NPC) #5834 for the Massachusetts Military Reservation Final Area-Wide Environmental Impact Report and has the following comments.

The subject document is proposed by the Massachusetts National Guard (MANG) to provide the public, the regulatory community and other local, state and federal entities with an opportunity to review and comment on their proposal to: 1) enhance the management of certain small arms ranges (SARs) at Camp Edwards in a phased approach, based on funding and training priorities, with range-specific best management practices (BMPs) and pollution prevention plans, and; 2) return to the use of lead ammunition at these small arms ranges on Department of Defense (DoD) required weapons systems in accordance with current DoD standards.

As background, the current prohibition on lead ammunition stems from two sources. First, in May 1997, the Environmental Protection Agency issued Administrative Order 2 under the Safe Drinking Water Act, which prohibited the firing of certain munitions, including lead ammunition, at the Training Range and Impact Area. The Order provides a process for requesting a return to use of lead ammunition, provided steps are taken to ensure maximum feasible use of pollution prevention technologies. In addition, the MANG proposed the prohibition on lead ammunition in the 2001 Final Environmental Impact Report (2001 FEIR).

The MANG also proposed in the 2001 FEIR to use tungsten-nylon ammunition, as it was believed to be non-toxic and immobile. However, since that time, there have been growing concerns about the toxicity and mobility of tungsten ammunition. In February 2006, tungsten was detected in the groundwater near a range at MMR where this ammunition was used, and the MANG suspended the use of tungsten-nylon ammunition. The MANG states in the NPC that training of soldiers at the MMR is severely limited due

to the current ban on the use of lead bullet ammunition at Camp Edwards as specified in the 2001 FEIR and the fact that the current alternative ammunition (tungsten-nylon bullet) identified in the 2001 FEIR is no longer a viable training alternative at Camp Edwards due to the environmental concerns referenced above.

The NPC includes a discussion of the phasing of the use of lead-bullet ammunition at Camp Edwards SARs as follows:

- Phase I: Tango Range and Echo Range
- Phase II: Sierra East/West Ranges, Alpha Range, Juliet Range and Kilo Range
- Phase III: KD Range, ISBC Range and other ranges (unspecified) as needed

The NPC states that the MANG expects to return to live fire training with lead ammunition at the identified Phase I Ranges by the 2007 MANG annual training cycle beginning in April 2007. It is MassDEP's understanding that the MANG is in the process of developing a schedule for the return to live fire training with lead ammunition at the Phase II and Phase III Ranges identified above.

The NPC identifies that major elements of the pollution prevention plans and BMPs for the SARs, including the phase I ranges, are currently under development by the MANG and are therefore only discussed in the NPC on a conceptual level. In addition, the phase I ranges are currently under construction and are undergoing modifications to their respective designs. MassDEP is currently participating in a small arms range working group with the U.S EPA, the MANG, the MMR Environmental Management Commission (EMC), the MMR Environmental and Readiness Center (E&RC) and the Army Environmental Center (AEC). This working group was established to discuss in detail range design, BMPs, pollution prevention plans, community involvement opportunities and the investigation and remediation of specific small arms ranges. This group is currently working to review and refine the schedule submitted as an attachment to the NPC (Figure 2 in the NPC) to ensure that it includes all the necessary tasks that must be performed before returning to the use of lead at Camp Edwards. These tasks should include:

1. Performance of a soil and groundwater investigation and the submittal of an investigation report. In addition, a plan for remediation which may be necessary at each range proposed for returning to the use of lead ammunition should also be submitted. 11
2. Submission of the MANG's lead fate and transport study to MassDEP, EMC and EPA for review. 12
3. A Pollution Prevention Plan for each range proposed for returning to the use of lead ammunition that:
 - a. Maximizes bullet recovery and recycling;
 - b. Prevents/minimizes bullet fragmentation and ricochets; 13

*Minimize lead
+ waste ingestion*

- c. Prevents/minimizes the leaching of range associated metals and other contaminants to the groundwater;
 - d. Includes appropriate monitoring requirements, such as soil, groundwater and lysimeter pore water monitoring, and action levels that will trigger operational or design changes.
4. Development of a public involvement plan to adequately inform the public concerning the return to the use of lead, the pollution prevention plan, and other issues related to these changes.] 14

MassDEP will continue active participation within the small arms range-working group to refine these tasks and the related schedule. In addition, the MassDEP will review and comment on the individual documents specified above and on other identified documents as necessary.

Finally, the project proponent is advised that the Camp Edwards Impact Area and Training Range is classified as a disposal site (Release Tracking Number (RTN) 4-15031) pursuant to M.G.L. c.21E and 310 CMR 40.0000, the Massachusetts Contingency Plan (the MCP). As such, the proponent is advised that, if oil and/or hazardous materials not previously reported to MassDEP are identified during the implementation of this project, notification pursuant to the MCP must be made to MassDEP, if necessary. A Licensed Site Professional (LSP) may be retained to determine if notification is required and, if need be, to render appropriate opinions. The LSP may evaluate whether risk reduction measures are necessary or prudent if contamination is present. The MassDEP BWSC may be contacted for guidance if questions regarding cleanup arise.] 15

TO: Aisling Eglington
MEPA Analyst
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2524

Phone: (617) 626-1024
Fax: (617) 626-1181

FROM: Mark Bogley, EMC

DATE: 10/30/06

SUBJ: **FAX** EMC Comments

Pages: 4





AE

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
ENVIRONMENTAL MANAGEMENT COMMISSION

Building 1204, Camp Edwards, MA 02542-5003
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Governor

KERRY HEALEY
Lieutenant Governor

ROBERT W. GOLLEDGE, Jr.
Secretary

DAVID M. PETERS
STEPHEN H. BURRINGTON
ARLEEN O'DONNELL
Commissioners



Secretary Robert W. Golledge, Jr.,
Executive Office of Environmental Affairs
Attention: MEPA Office, Aisling Eglington
100 Cambridge St., Suite 900
Boston, Massachusetts 02114

October 30, 2006

Project Name: Final Area-Wide Environmental Impact Report (EIR) for Massachusetts National Guard Properties at MMR
Proponent: The Massachusetts National Guard (Mass Guard)
Location: The Massachusetts Military Reservation-Camp Edwards
Document Reviewed: Notice of Project Change, dated September 15, 2006
EOEA Number: 5834

Dear Secretary Golledge:

The Environmental Management Commission (EMC), as you know, was established by Massachusetts General Law Chapter 47 of the Acts of 2002. The EMC and its staff oversees the northern training areas which are known both as Camp Edwards and as the Upper Cape Water Supply Reserve. The purpose of the EMC, as stated in the legislation, is to ensure the permanent protection of the drinking water supply and wildlife habitat. The EMC ensures, by oversight, monitoring and evaluation, that all military and other activities on the Reserve are consistent with this purpose.

As the Executive Director for the Environmental Management Commission, I would like to make the following comments on behalf of the Commission for your consideration in response to the above noted Notice of Project Change (NPC) - Massachusetts Military Reservation (EOEA # 5834).

EMC comments on the Mass National Guard's September 15, 2006 NPC, EOE # 5834

A ban on the use of lead bullets had been proposed by the Mass Guard in the Final Environmental Impact Report (FEIR) dated May 15, 2001. In the FEIR, the use of tungsten bullets was proposed because tungsten was believed at the time to be both non-toxic and immobile. Pollution prevention systems for the small arms ranges and specific monitoring of the groundwater at the ranges were not included in the FEIR, in part due to the belief that tungsten was a "Green Ammunition." Since then, tungsten has been found in the groundwater at some of the ranges where tungsten bullets were fired. The NPC proposes to change how the ranges are used. Firing lead ammunition into collection systems designed and operated to prevent the distribution of lead into the environment and monitoring their performance is the core of the NPC. In order to use lead ammunition in training, changes in both the U.S. Environmental Protection Agency's Administrative Order that restricted the use of lead ammunition and the Environmental Management Commission's Environmental Performance Standards, which also have a ban on the use of lead ammunition, will need to be amended.

Overall, the change proposed in this NPC appears to be a reasonable direction for both the Upper Cape Water Supply Reserve and the Mass Guard in terms of environmental protection and compatible military training. The proposed pollution prevention techniques, use of best management practices, and regulatory oversight will provide important safeguards. A number of additional reviews and approvals, as explained in the NPC, are also required prior to any training with lead ammunition in the Upper Cape Water Supply Reserve. The Environmental Management Commission will carefully consider a proposed change to the Environmental Performance Standards, and envisions the need for a set of standards specific to the stewardship of small arms ranges. Pollution prevention plans will need to be crafted for each range, addressing the activities proposed on that range. The use of lead ammunition, if approved, will initially be granted on only the T and E ranges. When the Mass Guard has demonstrated the ability to design and operate those ranges in an environmentally sound manner, additional ranges will be considered case by case.

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Since the NPC was filed, the Mass Guard has initiated a number of actions that will help ensure that the project is implemented in a careful and reasoned manner. A draft of the Pollution Prevention Plan has been distributed to the EMC, MassDEP, the Environmental Protection Agency, the EMC's Advisory Councils, and the public. The Mass Guard has also committed to completing an Environmental Assessment under the National Environmental Policy Act (NEPA). The above actions are key steps in gathering public input to the proposed change in ammunition and more importantly in the evaluation of the alternatives that should be considered in the Range Pollution Prevention Plan.

As part of the overall Pollution Prevention strategy, a range-specific operation, maintenance, and monitoring plan must be developed for each small arms range. Such a plan will help assure that high quality pollution prevention systems are selected and built with measures of performance in mind, and that they are operated in a manner that does not allow the systems to deteriorate to a level that could potentially allow contamination of the resources in the Reserve. The monitoring requested by the EMC on the small arms ranges for tungsten helps illustrate the importance of validating assumptions on the operation of the small arms ranges.

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EMC comments on the Mass National Guard's September 15, 2006 NPC, EOE # 5834

On behalf of the Environmental Management Commission, I request that you consider incorporating the following requirements into your decision on the NPC. The requirements will help ensure additional public input and mitigation or prevention of environmental impacts associated with the activities proposed in the NPC:

- 1) A requirement to establish action levels, acceptable to the EMC, for the lysimeter / soil pore water monitoring. The action levels will trigger alternative designs, operations or procedures on the applicable range. 18
- 2) A requirement for detailed annual updates on range operations and pollution prevention methods, monitoring, and alternatives in the Annual State of the Reservation Report. 19
- 3) A requirement to work with the EMC and its Advisory Councils and other stakeholders to develop an enforceable Environmental Performance Standard for management of the small arms ranges that will be as protective as the current Environmental Performance Standards that prohibit the use of lead ammunition. 20
- 4) A recommendation for the Mass Guard to hold an informational meeting for the general public to provide an update on the pollution prevention plan and other relevant aspects of this project prior to implementation of the proposed change. 21
- 5) Development of a range-specific operation, maintenance, and monitoring plan for each small arms range 22
- 6) A prohibition of the use of lead bullets in a manner that does not provide for:
 - a. Bullet recovery and recycling
 - b. Prevention of bullet fragmentation and ricochets
 - c. Prevention of sub-surface metals percolation23
- 7) A requirement for an update of the Section 61 findings to address the change or changes associated with this MEPA review process. 24

If you or your staff has any questions about the above letter, please contact me at (508) 968-5127. The Environmental Management Commission and staff appreciate the opportunity to comment on this Notice of Project Change.

Sincerely,

Mark J. Begley
Executive Director / Environmental Officer

cc: EMC Commissioners
MassDEP SERO
EPA
Mass Guard



Association to Preserve Cape Cod
PO Box 398
Barnstable, MA 02630
Phone: 508-362-4226
Toll free: 877-955-4142
Fax: 508-362-4227



Fax

To: Aisling Eglinton

From: Tara Nye

Fax: 617-626-1181

Date: 10/27/06

Pages: 3, including cover

The following are comments for the Massachusetts Military Reservation
Notice of Project Change, EOE # 5834. The original copy will follow via
U.S. mail.



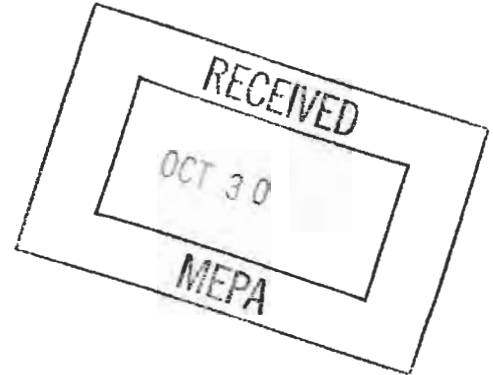
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October 27, 2006

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Phone 508-362-4226
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Mr. Robert W. Golledge, Jr., Secretary
Executive Office of Environmental Affairs
MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114
Attn: Aisling Eglinton



Re: EOE # 5834

Dear Mr. Secretary:

The Association to Preserve Cape Cod (APCC) is a non-profit environmental organization dedicated to the preservation of Cape Cod's natural resources and quality of life. Founded in 1968 and currently representing over 5,500 members, APCC is the oldest and largest environmental organization on Cape Cod.

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On behalf of APCC, I am pleased to submit comments on the Notice of Project Change to the Final Area-Wide Environmental Impact Report (EOEA # 5834).

APCC recommends that a Supplemental FEIR be required in order to allow for further development of the Small Arms Range (SAR) Pollution Prevention (P2) Plan as it is relevant to the ongoing MEPA Notice of Project Change. The purpose of the P2 Plan is to identify best management practices to support use of small arms at Camp Edwards in a manner that meets training requirements, protects human health and safeguards the environment. With the Massachusetts National Guard's (MANG) impending request to use lead-bullet ammunition, it is imperative to first know how projectiles, residue and solid waste associated with the weapons and ammunition will be contained, collected and recycled.

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APCC supports the MANG's intent to review and incorporate the newest technological, design, and management advances for small arms range maintenance and pollution prevention. APCC also supports an adaptive approach to the P2 plan that will allow for annual updates and modifications based on ongoing review of monitoring data and recent advances in range monitoring and bullet containment systems.

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APCC strongly recommends immediate and long term monitoring of surface and pore water, with appropriately placed well(s). Monitoring for lead should also be conducted on surface and subsurface soil samples, as

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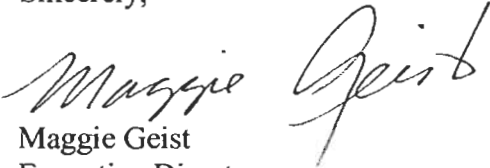
well as on leachate where applicable.

Given that these ranges are located on top of the Upper Cape groundwater supply, APCC recommends that the MANG be required to equip each SAR, regardless of ammunition type, with containment devices, monitoring wells and other pollution prevention systems before changes in ammunition type are allowed to ensure that lead will not contaminate the groundwater of Cape Cod.

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Thank you for the opportunity to comment.

Sincerely,



Maggie Geist
Executive Director

Lawrence P. Cole, PhD
P. O. Box 431
South Harwich, MA 02661
coleslaw1@verizon.net
(508) 432-8482

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OCT 30 2006

MEPA

30 October 2006

Secretary Robert W. Golledge, Jr.
Executive Office of Environmental Affairs
Attn: MEPA Office [Aisling Eglington], EOE No. 5834
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Golledge:

For identification purposes, I am the current chairman of the Community Advisory Council (CAC), which advises the Environmental Management Commission (EMC) that monitors military training on Camp Edwards to determine whether, in general, it is compatible with environmental protection, and in particular, it is in compliance with the Environmental Performance Standards (EPSs) contained in Chapter 47 of Massachusetts General Laws, all of which you are directly familiar with.

I am writing about the Noticed of Proposed Change to the Final Area-Wide EIR for Massachusetts National Guard (MANG) Properties at MMR, although not to report a CAC view on whether what the MANG has proposed to do to gain approval by the EMC is adequate for the EMC to make a decision, because the Council has not, as a committee, taken a position on that. That is because the role of the CAC in this matter is to advise the EMC on the proposed change in the EPS governing the firing of ammunition on Massachusetts Military Reservation (MMR) ranges. Also, we will be working on drafting language for a substitute EPS to implement the proposed change if it is approved.

You may recall that when the problems with tungsten began to appear over two years ago, the CAC voted to recommend to the EMC that it ask the Scientific Advisory Council (SAC) to look into the feasibility of going back to the use of lead ammunition on Camp Edwards on upgraded ranges that would capture and contain the spent ammunition. The point being that it wouldn't matter what the material in the bullets was if it were not going to get into the ground and, subsequently, into the ground water. Also, there have existed for some time technologies for trapping lead ammunition and methods for managing ranges where lead is fired that have been tested and proven, but that is not true for tungsten.

The EMC has endorsed the upgrading of the ranges and ammunition capture, containment, and recycling as the guiding concept for future range use, and now the MANG has submitted a specific plan to get there. I believe the Environmental Officer, Mr. Mark Begley, a nationally recognized expert in range management practices, has advised the MANG regarding the plan.

Writing now as an individual and not on behalf of the CAC, it is my view that contracting with an outside expert entity to review literature and MMR groundwater data pertaining to lead fate and transport; having the Ground Water Study Program conduct its planned tests in the range area to establish a baseline; having studies conducted by US Geological Service; coordinating with the Army Environmental Center; taking a phased approach to range upgrades; customizing the renovations to each individual range according to the type of weapons to be fired, the type of target course, and the terrain; testing what is installed to see if it works; installing lysimeters and test wells to monitor for metal; and planning to periodically remove the metal; ought to provide a sufficient basis for the EMC, with the advice of the SAC, to render a decision about the technical issues. In addition, the Environmental and Readiness Center (E&RC) has prepared extensive plans for public outreach that should enable the CAC to advise the EMC regarding public acceptance or concerns about the proposed change.

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Mr. Secretary, on 10 October the E&RC conducted a very successful tour of the base for the public. 133 people turned out and 40 more had to be put on a waiting list for another tour next spring. I attended in order to see what the public's reactions and questions were. One of the stops on the tour was the range where the STAPP Environmental Bullet Catcher system has been installed in a sand berm. That was very interesting, but the stop that put this issue in perspective was in the Visiting Officer Quarters area where a platoon of infantry was practicing clearing a building where insurgents or jihadis might be hiding. They were part of Delta Company of the 181st Infantry Regiment, which will be deployed to Iraq after the first of the year. In explaining how his company was preparing to be activated, the company commander asserted that the ban on firing weapons at Camp Edwards was hindering their training up to active Army standards for their mission in Iraq, which is to provide security. That is because the Devens Reserve Training Center is not large enough to handle the training needs of all the National Guard and Reserve units that need to fire their weapons for qualification. "Devens is stacked up". Thus, it is essential that firing be allowed to resume at Camp Edwards as soon as the proper environmental safeguards can be put in place, and the process needs to be expedited.

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Yours truly,

Larry Cole

Eglington, Aisling (ENV)

From: Minos Gordy [minost@comcast.net]
Sent: Sunday, October 29, 2006 11:09 PM
To: Eglington, Aisling (ENV)
Subject: NPC of EOE#5834

Dear Secretary Golledge:

Since 1997 I have participated and attended a great many sessions regarding the environmental concerns of the Army Guard at Camp Edwards. Based on my experiences with target ranges I have tried to help the Army adopt a plan for range management that fulfills training goals while protecting the ground water. I have read those parts of the NPC that are of interest to me and attended the Army's presentation. Although there are some details to be worked out in practice, I believe that those will be only adjustments and that the Army will use good engineering practices and provide careful monitoring of all emanations from the ranges. The disposition of the ranges and the materials chosen to begin the pilot program appear to be most favorable for protecting the ground water.

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If more detailed opinions or suggestions are needed, I am available to Environmental Affairs.

Sincerely, Minos Gordy, 40 Cove Island Rd., Centerville, MA 02632, 508-775-2839