

**Ravenna Army Ammunition Plant
Restoration Advisory Board (RAB)**

**Meeting Minutes
September 18, 2002**

1. Call to Order and Reading of the Minutes

The meeting was called to order by Lt. Col. Tom Tadsen at the Paris Township Hall, Freedom, Ohio at 6:00 p.m. Secretary Denise Gilliam took attendance with 13 present, 3 excused and 9 absent (Ms. Sarah Lock, Mr. Floyd Banks, the Charlestown Representative, Mr. Kevin Cooper, Ms. Irene Glavies-Lutz, Mr. Howard Furl, Mr. Walter Landor, Mr. Milan Markov, and Dr. Courtenay Willis). Lt. Col. Tadsen made the motion to suspend with the reading of the minutes; it was seconded by Ms. Becky Carter and passed. Due to the number of presenters and the subject matter, Lt. Col. Tadsen stated that we would jump right into the actual meat of the meeting.

2. Response to TAPP Comments on the Report on the Biological Field-Truthing Effort at Winklepeck Burning Grounds. Dr. Barney Cornaby, Science Applications International Corporation (SAIC)

Dr. Cornaby reintroduced himself to the board. He stated that he would be talking about URS' review of the Biological Ground Truthing Work at the Winklepeck Burning Grounds. Dr. Cornaby thanked the board as well as URS for their input. He stated that 19 comments were made regarding the report. He remarked that the URS document (dated July 10,2001) utilized only 12 pages to summarize and evaluate more than 120 pages of report text, tables, and figures and 240 pages of appendices. Dr. Cornaby stated that he would go through comment by comment. He stated that there were 7 comments that had a high value. They caused significant changes in the study and the report. There were 8 comments that led to explanations or clarification of a topic or issue. Dr. Cornaby said that they really sharpened the way we were reporting certain information. He stated that there were 4 comments that resulted in no action being taken. For the purpose of clarity I have broken down the comments as Dr. Cornaby did.

Comments that Prompted Significant Changes

| No. | URS/RAB Comment | Army/SAIC Response |
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| 1 | Lack of reference site soil samples | Dr. Cornaby replied that this comment was of extremely high worth. So they obliged by performing 21 sampling events at three of the reference sites; the airstrip, the borrow site, and near A-9 building. |
| 2 | Interdependencies of vegetation measurements | A discussion of vegetation interdependencies was added to the report and the text on vegetation metrics was rearranged according to new groupings. |
| 3 | Implications of low mammal trapping success on conclusions | Dr. Cornaby clarified that basically the initial comment was that not enough animals were trapped for what the initial study called for. Originally the statistical designed system would incorporate information gathered from 180 specimens. Because that number was not obtained, the statistical analyses of mammal results have been eliminated and replaced with a converted analysis to weight-of-evidence analysis (weight-of-evidence means use of many types and qualities of information to find the truth.) |
| 4 | Factors influencing presence of exotic | Dr. Cornaby stated that there were more exotic plant species present than was initially thought URS thought this was |

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| | species. | underreported. The vegetation metrics results and discussion sections were rearranged, recognizing exotic species as a separate metric for species composition. The statistical analysis was retained and weight-of-evidence analysis was added. All the actual statistical analysis states the same. |
| 5 | Derivation (origination) and source of ecological screening values. This was an important objective of the study. | Continued search for dose-response model to build ecological protection levels and found the Hill model. Much of the ecological screening values discussion was moved to a new RVAAP Facility-Wide Ecological Risk Work Plan to be published in the future. Dr. Cornaby showed a picture of burn pad #67. There were bare patches with no vegetation; the soil in this area was sampled and the data was used in the Hill Model. He then showed a chart with various chemicals and their concentrations that were found. He stated that some of the measurements show a relationship between some of chemicals and vegetation: the higher the chemical concentration the lower the percent cover of vegetation. |
| 6 | Uncertainties concerning historical chemical use in Risk Assessment Decision-Making Process | The Risk Assessment Decision-Making Process Chapter was moved to the new RVAAP Facility-wide Ecological Risk Work Plan to be published in the future. |
| 7 | URS stated that the study should concentrate on the mean of the population, so that the information gathered would not be so confusing. | The Ohio EPA agrees with this comment. So many people prefer an approach with some type of simple screen and not elaborate statistical comparisons. The Risk Assessment Decision-Making Process chapter was moved to a new RVAAP Facility-wide Ecological Risk Work Plan to be published in the future. |

Dr. Cornaby stated that all seven of these comments were helpful and influenced the document. Mr. Earl Miller asked if the areas where animals were trapped had thin or thick vegetation. Dr. Cornaby replied that the areas were basically the same. The bald patch was found to be too small to distinguish the animal population as compared to the plant community. Mr. Miller stated that he attended the RAB Tour of the installation and made the observation that insects in his yard tend to eat the foliage evenly, yet at the arsenal he noticed areas that were noticeably more chewed the rest of the surrounding vegetation. Could this be attributed to the chemicals? Dr. Cornaby asked if Mr. Miller remembered what part of the arsenal that he noticed this. Mr. Miller replied, no. Dr. Cornaby stated that between two and five percent of vegetation is the usual amount that insects eat; however, they do at times have breakouts or epidemics and eat more in localized area. Dr. Barbara Andreas noted that with a disturbed species what you would expect to find replacement by exotic species. Dr. Cornaby remarked that he wished that she had been on the team from its inception because while the Army team expected exotics, there were more than expected at the burning grounds. Dr. Andreas added that rodents aren't going to care about the vegetation. Did the exotic vegetation affect the eating habits of the rodents? Dr. Cornaby stated that the rodents probably eat these plants too and that only a few would exotics really matter, e.g., kudzu or vines. He stated that the team is undecided about how to view many of exotic species.

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| 8 | Tissue concentrations of chemicals in food | Dr. Cornaby stated that while tissue analysis is a good idea, it is also an expensive one. Tissue analysis is an exposure (not an |
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| | web species: bioaccumulation/ exposure versus direct ecological effects. In other words why were tissue analyses not taken? | effects measure). The study concentrated on the ecological effects to the plants and mammals. |
| 9 | Tissue concentrations of chemicals in receptor species: bioaccumulation versus direct ecological effects | The response was the same as previous, direct mammal effects were the emphasis of the study instead of tissue concentrations or bioaccumulation because tissue concentrations help to determine ecological exposure. The emphasis was on the end result of any contamination and not on all the intermediate explanations in the food pathways. |
| 10 | Ecological protection levels not sufficiently protective unless based on lognormal estimate of the mean | Dr. Cornaby explained the less protective bias of the upper confidence limit of the mean for lognormal distributions in small samples and why the normal distribution used was more protective. That is why the data were placed into a normal distribution. |
| 11 | Upper confidence limit versus lower (overly protective) confidence limit on the mean for any ecological protection level. | Dr. Cornaby clarified the relative value of the 95% lower confidence limit and the 95% upper confidence limit but deferred discussion of ecological protection levels except where the Hill dose response model is statistically warranted. |

The following comments prompted better explanations and clarifications.

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| 12 | Wilcoxon Rank Sum test versus t-test. Basically the comment was whether or not the correct test was used. | Dr. Cornaby clarified the a priori selection of the Wilcoxon Rank sum test and illustrated that use of the t-test would not significantly affect the conclusions. He stated that they used the correct test. He stated that there are various statistics and the test that was chosen best sorts it out. |
| 13 | Statistical relationships using Analysis of Variance Approach (ANOVA) | A discussion was added to the report regarding the Hill dose response method and explained the rationale for considering but dismissing the analysis of variance approach. |
| 14 | Plant sensitivities to chemical toxicity: exotics and chemical tolerance. In other words, why was the toxicity tolerance of the plants researched? | Dr. Cornaby replied that a literature search had been conducted, but that they were unable to find any reference material for the mixture of chemicals on the installation. He stated that a broader discussion of exotics and the reasons for their presence has been included. He noted that the lack of published knowledge is why the study needed to be conducted: to find out how plants responded in the real world at the Winklepeck Burning Grounds. |
| 15 | Why wasn't sampling performed year round? Single versus multi-season | There were professional botanists and others present. A bang up job was performed during the time that the sampling took place. The extensive single-season sampling extended over 8 weeks and resulted in valid relative comparisons. |

| | sampling | |
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| 16 | Woody species versus herbaceous species site composition as a source of uncertainty. | Dr. Cornaby stated that the trees were not sampled because they were not on the pads. |
| 17 | Plant sensitivities to chemical toxicity: microhabitat | In the next version of the report there will be enhanced discussion of burning pad microhabitats as a function of fires, physical disturbance, as well as chemicals. |
| 18 | Total reproductive effects versus sperm count and morphology as independent factors | Literature was added about thresholds and the statistical analysis was changed to the weight of evidence approach for mammals. |

Dr. Cornaby stated that URS performed a useful service. Seven of the comments produced significant changes in the study and in the revised report. Eight of the comments resulted in enhanced explanations or clarifications of specific topics or concepts. Four of the comments were either deferred or refuted with additional substantive information.

The draft final version of the biological field-truthing report will incorporate the soil sampling results from reference sites, revised vegetation metric groupings with both statistical and weight-of-evidence analyses and revised mammal material using a weight-of-evidence approach. In addition the development of a few ecological protection levels (using the hill model) with emphasis on plants will be added. Some extrapolation of “safe” soil chemical concentrations from the burning pads to other locations as well as additional explanations and clarifications occasioned by the URS review and other inputs from the Ohio EPA and the Army will also be included.

The report will not include the risk assessment decision –making process chapter, which is deferred to a new RVAAP Facility-Wide Ecological Risk Work Plan to be published in the future. The biological field-truthing study should reduce the number, duration, and cost of future ecological studies at other locations at Ravenna. Dr. Cornaby noted that the study would not diminish the Army’s commitment to protect the environment but rather permit more focused decision-making. He stressed to the RAB that they and their reviewer URS are essential elements in this decision making process.

Mr. Miller asked if any of the burning pads have water or are they all flat lands. Mr. John Jent, from the US Army Corps of Engineers, stated that the reference areas were chosen due to the fact that they matched the pads environment as closely as possible. Mr. Miller clarified that his question was whether or not any waterways cross the pads and enter into creeks or additional water pathways. Mr. Patterson stated that the study didn’t concentrate on that, it was a terrestrial study. Water studies will be conducted at a different time. Mr. Jent added that the Army National Guard has conducted fish studies in the past. Dr. Andreas questioned why lichens moss was not included in the study given that it is highly sensitive to environmental changes. Dr. Cornaby replied that while they have been used in other studies they were not included in this one. He stated, however, that the moss had been found, please refer to **Attachment A**.

Dr. Cornaby stated that the trend of the study suggested that the Winklepeck Burning Grounds did not negatively influence the small mammal community’s structure and function. He stated that there are patterns in nature that are studied and these patterns are still intact at this area.

Dr. Cornaby closed his presentation at 7:12 p.m. At this point Lt. Col. Tadsen thanked Dr. Cornaby for his presentation. Ms. Joanne Barch of URS stated that Dr. Cornaby did a great job reporting the changes and that hopefully URS will get an opportunity to look at the new report as well. Mr. Patterson replied that the current RAB budget does allow for that. Lt. Col. Tadsen added that the meetings that Dr. Cornaby referred to with the various agencies involved very lively discourse. He said that the points were controversial, but that everyone sat down and hashed it out until a consensus was reached. He stated that this level of dedication would continue throughout the IRP program.

3. Presentation on Proposed Burning of Excess Production Buildings. Presenters are Mr. Mark Vess, MKM Engineers, Inc. and Mr. Ernie Neal, Neal Environmental Services.

Mr. Patterson explained to the board that the process that MKM would be presenting is very important. He stated that while it is not a part of the IRP program there is an overlap. He stated that this type of technology would really benefit RVAAP. A lot was learned from the demolition of Load Lines 12 and 1. This process will ensure continued safety. Mr. Vess introduced himself to the board and stated that many might remember him from when he presented 2 ½ years ago. He stated that when the government decided to begin cleaning up their facilities that it was a hazardous proposition. When demolition and UXO removal was being conducted by hand a lot of people were getting hurt. The last time that he talked to the RAB he told them about unique techniques that MKM was utilizing such as shape charges and other remote technology to make UXO removal safer. What was learned since then was that often times explosives are found where they were expected to be found and they were also found in areas where they were not expected. Back in 1942 liquid explosives were pumped through pipes and poured into shell casings. If the process pipe broke, the system was shut down. The visible explosives were cleaned up, but there still remained some in the walls, undetectable to the human eye. These explosives have been there for years, even decades. He asked the RAB to keep this in mind as he continued on with the presentation. Burning offers the best answer to safely remove UXO and explosives. It is the best method from a safety and quality standpoint to ensure that all of the explosives are gone. For each site an Explosive Safety Submission (ESS) is written. This is the proposed procedure for the elimination of explosive contamination. Quality standards have to be achieved. Mr. Vess stated that MKM's goal as well as the Army's is to ensure that the area where the Load Line stood is safe enough for his and everyone else's grandchildren to play on.

RVAAP initiatives include the submittal of the ESS to the OSC, a partnership agreement with Ohio EPA, Akron Regional Air, Quality Management District Health Department and the RAB and complete explosive decomposition. These areas need to be cleaned so that the property can be made available to Ohio Army National Guard as a training facility. Mr. Vess stated that his job is to ensure that the areas are safe for all. Safety is what is behind this process. The safest method is the thermal decomposition of explosives. Explosives are a mixture of different materials. They are designed to create energy that does work. Any explosive compound has a decomposition temperature of no more than 800 degrees. Mr. Vess stated that if a surface temperature of 1200 degrees can be achieved and maintained for a certain period of time, then all of the explosive contaminants will be eliminated. He stated that there are procedures are utilized to reach these temperatures can be reached and maintained. OSC has procedures regarding these temperatures and MKM will work in compliance with them. Mr. Vess showed the RAB slides of the RVAAP facility and the operations flow diagram. He stated that the explosives and propellants present at RVAAP are the most sensitive types. Each have their own safety precautions. They all have

different makeups. All of them are extremely flammable and their sensitivity increases over time. All are mass detonating. He explained that over time these explosives go through changes. This makes demolition of the load lines harder due to the presence of production equipment.

Mr. Vess showed a picture of a melt pour building at RVAAP. He stated that they are in pretty good condition for their age. They were designed to stand and take a blast. Some of them are flame resistant in some ways. Some of the walkways are covered. Anything porous cannot be decontaminated because the explosives can be retained in that material. Again he reminded the RAB that explosives could be where you least expect them. Mr. Vess showed more pictures of buildings on the arsenal. Some of them included buildings with extensive piping systems and process equipment. He stated that every place that there is a bend or elbow in the pipe there is a potential for explosives. He said that previously people would cut pipe like this and send it down to the scrap yard, where they would further cut it with a torch, as a result deaths occurred. Many crates still left in the wet storage area at the arsenal have explosives crystallized on them. Any manual handling or disposal of these could result in explosive flashing. Mercury has been found in most of the thermostats and there are still a variety of organic hazards in the various buildings.

Mr. Vess stated that MKM has experience in decontaminating similar production facilities at other Army ammunition plants. Joliet Army Ammunition Plant is one of them. Here MKM fine-tuned their shape charges, which have been perfected for dismantling process equipment. He showed the RAB members pictures of process pipe at Joliet AAP, clean up of organic debris at Ravenna AAP and a picture of the actual burn of the load line at Cornhusker AAP. Mr. Vess showed pictures of pipes from Joliet AAP. He stated that they looked into the piping here using fiber optics. There were over 100 lbs. of explosives in the pipe, beyond where the fiber optics could see. Shape charges were utilized to cut the pipe and the resulting explosion blew a large hole in the floor. If conventional methods had been used to cut this pipe three (3) people probably would have died. Mr. Vess showed the RAB members photos of other AAPs where gross explosive contamination was recovered. He showed them fiber optic views of explosive filled pipes. The pipes had been cut with an explosion proof cutter so that the amount of explosives could be viewed without injury.

He showed the RAB members pictures depicting scenarios at other facilities where large amounts of explosives had been found, like 57 pounds were found under a steel ramp built in 1952. A bomblet was found perched on a wall beam where evidently someone had stuck it and then forgot it; it had to be blown in place.

The RAB members were then presented with a map of the installation that showed the preliminary hazard analysis of the area. The areas with red arrows are the ones that MKM feels hold an imminent threat; those with yellow arrows should be inspected in more depth.

The proposed approach for the burn at RVAAP includes collecting archival data and analysis of the hazards. An ESS will be written for each individual site as well as a work plan. RVAAP is fortunate that environmental issues as well as safety can be handled hand in hand. Mr. Vess stated that all types of factors must be considered. Questions such as, which way does the wind blow, is snow desirable, etc. He stated that parameters for the burn must be designed, and after the burn, the residuals must be cleaned up, and the concrete and soils must be tested before disposal.

The steps for the thermal destruction of the Load Lines are as follows:

- Sweep floor debris: organics, peeled paint chips, and explosives

- Pick up visible propellant and suspect explosives around buildings
- Clear and grub for access to and around the buildings
- Remove hazardous materials of environmental concern
- Inspect and desensitize bulk explosives in process equipment/pipes
- Set up safety and environmental controls:
 - Notifications/permits
 - Weather monitoring
 - Fire breaks (isolation)
 - Back burns
 - Thermocouples, etc.
 - 72-hour fire watch
 - Fire fighting equipment
- Prepare area for burn: placement of dunnage and heat sensors
- Thermal destruction

Mr. Vess informed the RAB that on previous burns MKM has overachieved the base line temperatures for explosive decon thresholds. Hundreds of burn temperature monitoring devices are dispersed throughout the burn area. With these the temperature of the burn can be measured ensuring that it reaches the decon level. Mr. Vess stressed that the only way to safely eliminate explosive safety hazards is with thermal destruction. He then showed the RAB video segments of burns that have been conducted at Cornhusker AAP and Sunflower AAP. Mr. Vess closed his presentation at 8:11.

Mr. Ernie Neal stated that the burning of the load lines fits into regulatory requirements. He stated that the Ohio EPA will allow a burn if there is a significant safety threat. He read the open burning provision that states;

“Disposal of ignitable or explosive materials where the Ohio EPA determines that there is no practical alternative method of disposal...” OAC 3745-19-01

Mr. Neal told the RAB that first you must state the purpose of the burn, the duration, ensure isolation, state the location and the distance across roads. He informed them that dunnage would have to be brought in because most of the buildings here at RVAAP are concrete and steel. The open burning application requirements are as follows:

- Application made to Akron Regional Air Quality Management District
- Purpose, nature and quantity of burn
- Scheduled dates of burn
- Location, maps, distance to residences, roadways, airfields, etc.
- Favorable climatic conditions
- Minimize emissions

Mr. Neal informed the RAB that since explosives are considered hazardous waste it would fall under hazardous waste regulation OAC 3745-68-82:

“Open burning of hazardous waste is prohibited except for the open burning and detonation of waste explosives. Waste explosives include waste, which has the potential to detonate and bulk military propellants, which cannot safely be disposed...”

Mr. Neal showed the RAB a chart showing the isolation distances. He assured the RAB that they would have ample distance required from any residence or business, etc. He also noted to them that any asbestos at RVAAP would be removed prior to the burn.

Mr. Neal stated that the amount of lead in the paint has been calculated. He said that the amount of lead found in the paint in 26 buildings is less than a pound. He stated that even if we burned all of the buildings in one day (which won't be done) it would still be less than ½ pound of lead. He reminded the RAB that the floor sweepings would be removed prior to the burn.

Mr. Neal told the RAB that they would be meeting with USEPA to find sample methods for PCBs in paints.

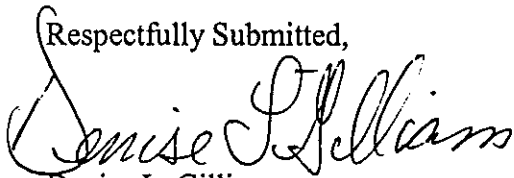
Mr. Vess interjected that at all previous burns the press was invited to witness the burn. He stated that MKM met with city officials and a partnering agreement was initiated. There was a positive reaction from all of those involved in the Cornhusker AAP burn. He stated that data from the burn was turned over to the media afterwards. He said that the whole premise of the burn is to ensure that this area is safe for all.

Mr. Thomas Smith asked what the timetable was for this. Mr. Patterson replied that they were waiting for regulators, but hoping that it would occur within in the next 2-4 months. Mr. Richard Callahan, MKM, told the RAB that they were meeting with the USEPA on October 26, 2002 in Chicago, Illinois. Mr. Patterson added that they had a meeting with regulators at the plant three weeks ago. Lt. Col. Tadsen asked whom did MKM work with from the USEPA in Cornhusker. Mr. Neal stated that he didn't work that project, but that the thresholds are national and with the info that we have now we will be well below them. Mr. Francis Zigmund stated that Cornhusker is in Region 7 and that the state was also actively involved in the burn. Lt. Col. Tadsen asked Mr. Vess how many people have been killed attempting to decon in the last three years. Mr. Vess replied that there have been 10 deaths. He stated that practice bombs were the biggest hazards. He told the RAB a story of a tank that had been sent to a scrap yard for processing after it's removal from Joliet AAP. At the yard a technician began attempting to cut the tank with a torch when he heard a loud bang. He reported the noise to his supervisor who sent him back out to continue cutting, the tank exploded and the technician died instantly. MKM Engineers, Inc. closed their presentation at 8:30.

4. Scheduling of Next Meeting

The next meeting was scheduled for November 20th, 2002 at the Freedom Town Hall in Freedom Township. Lt. Col. Tadsen adjourned the meeting at 8:35 p.m.

Respectfully Submitted,



Denise L. Gilliam
RAB Secretary

DG/dg

Enclosures: Attachment 1

ATTACHMENT A

Note: Dr. Cornaby and other field team members conferred about the lichen/moss question posed by Dr. Andreas, after the RAB Meeting. He requested that the following clarifications be presented to the RAB:

- Lichens and moss were definitely candidates for study in the planning stages of the field.
- There were many options for what to study and the consensus votes (Ohio EPA, the Army Corp of Engineers, and other parts of the Army including local Ravenna leaders and SAIC) went to a few metrics that emphasized soil and higher plants.