

QUARTERLY PROGRESS REPORT

July 1, 2001 – September 30, 2001

**PROJECT TITLE: Environmental Impacts of Lead Pellets at Shooting Ranges
& Arsenical Herbicides on Golf Courses in Florida**

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WORK ACCOMPLISHED DURING THIS REPORTING PERIOD:

1. Field abrasion experiment was completed in order to quantify the physical removal of Pb from bullets passing through the berm soil of shooting ranges.
2. Soil samples were collected from the berm of a newly opened shooting range in Florida on a monthly basis, to corroborate experimental results from abrasion study.
3. Soil samples were characterized in laboratory. Leachability tests were conducted using EPA method 1312 (SPLP).

SIGNIFICANT RESULTS ACHIEVED:

1. Pb levels in the sand resulting from the abrasion experiment were on average 90 mg/kg. The average mass of Pb abraded from each bullet was 41 mg (1.5% of total bullet).
2. Soil samples were taken from a 3 month old shooting range to corroborate experimental results.
3. The rifle range berm Pb concentrations were elevated as high as 1142 mg/kg. Pistol range berm Pb concentrations were as high as 193 mg/kg. These values are well above the Florida soil background concentration (geometric mean= 0.42 mg/kg (Chen et al. (2000))).
4. Pb concentration from the pistol range was spread over the height of the berm compared to the rifle range. This was probably due to the inaccuracy of pistols, as opposed to rifles.
5. When compared to ranges with more years of operation, the GTR rifle range showed considerable elevated Pb concentration. Pistol range Pb concentrations were not as great, but were also significant.

Table 1 Project milestones

Tasks	1st quarter	2nd quarter	3rd quarter	4th quarter
Sample Collection	⊗	⊗		
Sample analysis	⊗	⊗	×	
Mobilization test		⊗	×	×
Remediation test			×	×
Quarterly report	⊗	⊗	×	×
Annual report				×

⊗: Task that has been accomplished according to the originally proposed timetable.

×: Task need to be accomplished in accordance with the proposal.

INFORMATION DISSEMINATION ACTIVITIES:

- ◆ Posters titled “Quantification of the physical removal of Pb from bullets passing through the berm soil of shooting ranges” and “Determination and assessment of soil lead contamination in Florida Shooting Ranges”, were presented at the University of Florida Soil and Water Science Graduate Research Forum

TAG MEETINGS:

- ◆ The research team is contacting the technical advisory group members for this project and scheduling a half-day TAG meeting at the University of Florida, Gainesville, FL. based on the time availability of all TAG members.

WORKS TO BE ACCOMPLISHED DURING THE NEXT THREE MONTHS:

- ◆ Weathering study involving lead powder in soil to simulate abraded lead.
- ◆ Lab tests for the phosphate rock application for the Pb contaminated shooting soils.
- ◆ Collect intact soil cores for column leaching studies.
- ◆ Determine if Humic and Fulvic acid are contributing to Pb migration in South Florida shooting range.