DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC

1 November 2002

MEMORANDUM FOR U.S. NRC, Region IV
Division of Nuclear Materials Safety
Attn: Ken Brockman, Director

NOV 05 2002

FROM: AFMOA/SGZR
110 Luke Avenue, Room 405
Bolling AFB DC 20332-7050

SUBJECT: Clarification Request for C-74L Decommissioning Plan

Attached, you will find two documents that provide clarification to several items related to the C-74L decommissioning plan, Elgin AFB, Florida. Range C-74L is an active firing range in which Air Force munitions are tested. The area is contaminated with depleted uranium debris. NRC Region IV requested, via phone, additional information after an initial review of the range decommissioning plan.

If you have any questions, please contact me at 202-767-4307 or e-mail, david.pugh@pentagon.af.mil.

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USAF Radioisotope Committee Secretariat
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Attachments:
1. NRC Document and Clarification Request for C-74L Decommissioning Plan
2. MDC Document

NRC Document and Clarification Request for C-74L Decommissioning Plan

1. **The DCGL for the soil is 600 pCi/gm. Please provide a copy of the calculation.**

   The $DCGL_w$ of 500 pCi/gm was determined using the RESRAD program in 1999. The parameters used in the RESRAD program were developed and approved by the Eglin Low Level Radioactive Material (LLRM) Partnering Team during their meeting in March 1999. A compilation of the RESRAD parameters used and a RESRAD run using RESRAD version 6.0, which uses those parameters is provided as Attachment 1 titled, *Compilation of RESRAD Parameters for Low-Level Radioactive Materials Depleted Uranium Investigations*. The $DCGL_{emc}$ (44 kcpm) using a FIDLER is equivalent to the $DCGL_w$ for a small area. Currently all FIDLER readings below one half 44 kcpm will be investigated and the DU fragment removed.

   The lifetime excess cancer risk of 3 E-04 and a dose limit of 25 mrem/yr. The DU contamination at RW-41 Test Area C-74L is not a homogenous mixture as used by RESRAD to calculate dose. DU contamination at C-74L exists as hot spots or small hot areas throughout the controlled area. The hot spots/areas are caused by DU fragments and particles predominately from 1 to 50 grams lying in the top 6 inches of soil.

   The $DCGL_w$ provided is for the industrial scenario, additional radiological surveys and use of a residential $DCGL_w$ would be required prior to releasing the site for residential use. A new final status survey would be required. Unexploded ordnance concerns currently do not allow for the unrestricted use of the site.

2. **The MDCR for the area is 14.7 pCi/gm. Please provide a copy of the calculation.**

   The MDC calculation is provided as Attachment 2 in a document titled, "*Establishing the Minimum Detectable Concentrations of Depleted Uranium Penetrator Fragments At Eglin AFB Ranges Using The Field Instrument For The Detection of Low Energy Radiation (FIDLER).*

   MARSSIMS provides the equation for determining the MDCR.

3. **What is the proposed background for the soil, the building, and water?**

   The proposed background for the soil is as follows:

Soil Background DU Level:	0.06 pCi/g to 0.7 pCi/g
FIDLER Soil Background Reading:	5 kcpm
Gross Alpha Groundwater:	< 1.0 pCi/L
Total Uranium Water Well:	- 24.41 pCi/L

   Note: USACE will provide the background readings for the building.

4. **What is the size of the restricted area?**

   The size of the restricted area is approximately 174,000 square feet or 3.99 acres. Attachment 3 is a Figure, which shows the controlled area at the site as the Compound. The compound is the radioactive material restricted area, which is being remediated.

5. **There appears to be a disagreement about the number of water wells in the vicinity of the site. The NRC could not identify where they found discrepancies in the number of water wells.**

   The paragraph in question was wrong. There are only two drinking water wells located within one mile of Test Area C-74L. The information provided by one of the references (Becker and others; 1990) indicating the C-74L water well was 58 feet deep was in error. The water well at C-74L contained in building number 9373 is 644 feet deep. The only other drinking water well within one mile of Test Area C-74L is located approximately 0.5 miles away at Test Area C-74L. This drinking water well has been abandoned and is no longer used.

   The hydrogeology paragraph provided in question 9 below correctly describes the water wells located within one mile of Test Area C-64 and the makeup of the two aquifers located beneath the site.

6. **The document mentioned that a well house was built after DU testing. Was the well house constructed on contaminated soil?**

   The soil under the well house was not surveyed for radioactive material prior to the well house being built. DU fragments have been found in locations around the well house. The soil under the well house was not surveyed as part of the final status survey performed by USACE in September 2002.

7. **Please elaborate on the transportation and disposal procedures for the waste.**

   This information will be provided by AFIERA, Brooks AFB, Texas.

8. **Please describe the chemical forms of the radionuclides.**

   The waste DU was in the form of 30 mm DU penetrators. The 30 mm DU penetrators are a alloy containing mainly depleted uranium. A complete 30mm penetrators weights approximately 300 grams. The resulting waste depleted uranium is in the form of solid uranium oxide and possible uranium metal in the inner core of a larger DU fragment.

9. What is the nearest resident location to the firing range?

The Eglin AFB Reservation surrounds the test area on all sides. The nearest possible residential location is approximately 3.6 miles away northwest of the site. Based on current dose assessments members of the public will not receive any radiation exposure from Test Area C-74L due to DU contaminated soil or from future DU remediation operations.

10. Please describe the meteorological, climatological, geological, and seismological conditions of the area.

Climatological and Meteorological Conditions

Eglin AFB has a humid, semitropical climate. Winters are mild, with occasional frost between November and February. Average annual rainfall at the National Weather Service Station at Niceville, Florida is 63.34 inches. The annual rainfall since 1931 has ranged from a low of 31.01 inches in 1954 to a high of 95.43 inches in 1975. July and August are the wettest months, with 8.7 and 7.26 inches respectively. Mean annual temperature is 66.2°F; mean monthly temperature ranges from 49.9°F to 80.8°F. July is the hottest month, with a mean maximum temperature of 90.8°F and mean minimum temperature of 70.9°F, and January the coldest month, with a mean maximum temperature of 61.6°F and a mean minimum temperature of 38.2°F.

Rainfall occurs as a result of both thunderstorms and frontal-type weather systems. A frontal-type system is due to the convergence of polar and tropical air masses and is associated with a low-pressure system. A thunderstorm occurs when warm, onsite air rises high in the troposphere and then cools, releasing its condensed moisture. Local thunderstorms frequently occur in late afternoon or evening during the summer months of June through September. Thunderstorms can be quite intense but are generally of short duration. Frontal storms, which usually occur during the winter months, produce showers of lower intensity and longer duration than thunderstorms and cover a large geographic area. The majority of rainfall generally falls during the summer months. The wettest month is July and October is the driest month.

Tropical storms and hurricanes can drop heavy rain. These storms occur during the months of June through November, with over half of them during the month of September. September hurricanes of 1906, 1950, and 1953 each dropped 12in of rain over the Choctawhatchee Bay area.

Current climatological conditions for the months of October through December are provided as attachment 4.

Seismological Conditions

Florida is classified as a stable geological area. This means that, with respect to probable damage from the largest expected distant earthquake, some areas may experience tremors, with only minor damage, such as broken windows or glassware.

Florida does not have any volcanoes or documented active faults, which are the two geological events, that cause earthquakes. No tremors were reported by Gainesville seismographic station from December 1978 through January 1991. This information can be found in Attachment 5, *Special Publication No. 35, Florida's Geological History and Geological Resources*, The Florida Geological Survey, Division of Resource Management, Department of Environmental Protection,

Physiography

IRP Site No. RW-41 is located within the Western Highlands Physiographic District of the Gulf Coastal Plain Physiographic Province (Northwest Florida Water Management District [NWFWMD], December 1996). The area surrounding the site is characterized by flat to rolling uplands with elevations ranging from 200 to 250 feet above mean sea level (MSL). The uplands are dissected by perennial creeks within relatively steep ravines. The relief between the bottom of the ravines and the surrounding uplands is generally between 50 and 90 feet.

Rocky Creek is located about 700 feet south of the site. A tributary to Rocky Creek is located about 1800 feet west of the site. A small dammed pond is located within the western tributary.

Presently, the site has a sparse vegetative cover of brush and grasses over sandy soils. The area within the gun corridor is cleared and covered with an approximately six-inch clay layer. An asphalt-covered earthen berm bounds the site on the southern edge to inhibit runoff into Rocky Creek. The asphalt covering the berm is cracked in many places. A shallow drainage ditch trending northeast has been constructed to draw storm water away from the eastern part of the RCA.

The site itself exhibits little relief, although the terrain around the site is wooded and slopes steeply to the southeast, south, and southwest toward Rocky Creek and its tributaries. Dominant trees are slash pine and turkey oak with isolated stands of live oak. Palmettos, beach sage, and grasses constitute the underbrush. A moderately well developed erosion gully leading down toward Rocky Creek has developed along a dirt road extending southeast of the site (Figure 2.3).

Hydrogeology

Specific hydrogeologic conditions were estimated from site conditions and regional hydrogeologic maps.

Geologic literature indicates that the surficial aquifer beneath this site extends to an approximate depth of 125 feet bls (Hayes and Barr, 1983). The Pensacola Clay, which acts as an aquiclude and separates the sand and gravel (surficial) aquifer from the underlying Floridan aquifer system, is about 160 feet thick and extends to a depth of approximately 285 feet bls (Maslia and Hayes,

1988). The sand and gravel aquifer occurs under water-table conditions. On the basis of site topography, the groundwater is approximately 50 to 60 feet bls. Groundwater flow directions within the sand and gravel aquifer at the site are anticipated to have a southward component towards the Rocky Creek tributaries.

Two Eglin water supply wells, Well Nos. 37 and 38, are located at the main Test Area C-74 facility, located approximately 0.5 miles northwest of Test Area C-74L. Well Nos. 37 and 38 are associated with Building Nos. 9352 and 9373, respectively. Well No. 37 has been abandoned (Robeen, 1998). Well No. 38 is used only during munitions firing missions and is completed within the Floridan aquifer system at a depth of 644 feet bls. Both the thickness of the Pensacola Clay (160 feet) and the likely direction of groundwater flow at Test Area C-74L (eastward) preclude Well No. 38 from being considered a potential target for contaminant migration from IRP Site No. RW-41. This supply well is located on site just across the asphalt road from Building No. 9372, the site control building. Again, based on the anticipated direction of groundwater flow, this well is located hydraulically up gradient of the RCA. No other water supply wells are known to exist within a one-mile radius of the site (USACE, 1994).

Surface Waters

Rocky Creek and its associated tributaries are classified as Class III bodies of water, designated for use for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife (FDEP, FAC 62-302.400 and 62-302.600).

Because of the relatively low site relief and the site's sandy soils, most storm water run-off at the site would percolate into the subsurface or be subjected to evapotranspiration. During heavy precipitation, some storm water run-off may enter nearby drainage ditches and be transported to the upper tributaries of Rocky Creek.

11. Are there any endangered species in the area?

Eglin AFB is home to the snail darter, indigo snake and the red cockaded woodpecker. All of which are endangered species. Information provided by Eglin Environmental Management office indicates that the stream that runs south of the controlled area at Test Area C-74L contains the snail darter. The stream is approximately 200 feet beyond the controlled area. The land immediately after the controlled area slopes down to the stream. Currently a berm located in the southern back of the controlled area will prevent silt and contaminated soil from being released from the controlled area. Additional silt fencing will be placed at the rear of the controlled area as indicated by washed out areas to prevent silt from leaving the controlled area. Also use of manual remediation of hot spots/areas instead of mechanical removal of the top 6 inches of soil in the controlled area will significantly reduce the chance of silt and soil removal from the controlled area which could effect the habitat of the snail darter.

The indigo snake has been seen in the area of Test Area C-74L but does not live within the radioactive material controlled area, which is being remediated. Remediation activities will not affect the habitat of the indigo snake on Eglin AFB land ranges.

There are no red cockaded woodpecker colonies within Test Area C-74L.

12. Are there any cultural resources that may be impacted?

Information provided by Eglin AFB Environmental Management office indicates there are no cultural resources in the area which may be impacted by the remediation of RW-41 Test Area C-74L.

13. Are there any natural resources in the vicinity of the range?

Information provided by Eglin AFB Environmental Management office indicates there are no natural resources in the vicinity of RW-41 Test Area C-74L which would be affected by the remediation project.

14. From the previous radiation surveys, please identify the ambient exposure rates.

Ambient exposure rates are not available from previous radiation surveys of Test Area C-74L. Current ambient exposure rates are described in the answer to question 16.

15. Please describe how ALARA will be achieved.

The site ALARA program was described in Item Number 11, paragraph 4, provided in the original decommissioning plan submittal.

16. Please demonstrate that doses to the average member of the critical group are ALARA.

The critical group at RW-41 Test Area C-74L is the range worker. The background at Test Area C-74L ranges from 5 to 7 microR/hr depending upon the soil type. Clay having the greatest exposure reading and white sand the lowest exposure reading. Exposure levels around the fence line of the controlled area range from 4 to 8 microR. Exposure levels within the gun corridor range between 3 and 7 microR/hr. Exposure levels within the controlled area range from a low of 5 microR/hr, which covers the majority of the controlled area, to 30 microR which was located on the surface of the dirt pile. The dirt pile contains DU fragments from the gun butt sand. Areas of elevated exposure (8 to 15 microR/hr) are located within the controlled area just south of the gun corridor.

The range workers are normally at the site less than two weeks each month and work mainly within the building and the gun corridor. The range workers do not work in the controlled area.

Using the highest exposure reading, which was found on the dirt pile within the radioactive material controlled area, a duration of 250 workdays per year for 8 hours a day the maximum radiation exposure due to the DU contaminated soil would be 60,000 microR/year or 60 mR/yr. This is below the 100 mR/hr radiation exposure allowed the public. (250 workdays was used for the calculation based on the input parameters for the RESRAD calculation).

30 microR/hr x 250 days/yr x 8 hr/day = 60,000 microR/yr or 60 mR/yr.

The actual exposure should be based on the highest radiation level within the gun corridor, which the range worker will be exposed to. This radiation exposure is 8 microR/hr (1 microR/hr above background). Workers are present on site normal less than 10 days each month, for 8 hours a day. This equates to 120 workdays per yr. Radiation exposure to the workers is 7,680 microR/yr or 7.7 mR/yr, which is the same as the exposure due to background radiation levels at the site.

8 microR/hr x 120 days/yr x 8 hr/day = 7,680 microR/yr or 7.7 mR/yr.

This is approximately 1.0 mR/yr above natural background radiation exposure for a year. The range workers radiation exposure due to DU contaminated soils is considered ALARA.

17. **Included as Attachment 6, is Figure1.3 from the Site Work Plan for your information.**