

U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Solana Road Radiation Site - Removal Polrep
Final Removal Polrep



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region IV

Subject: POLREP #2
Final POLREP - Removal Action Complete
Solana Road Radiation Site
B4K3
Ponte Vedra Beach, FL
Latitude: 30.2281280 Longitude: -81.3765250

To: Shane Hitchcock, USEPA R4 ERRB

From: Terry Stilman, On-Scene Coordinator

Date: 9/11/2012

Reporting Period: 5/24/12 - 8/30/12

1. Introduction

1.1 Background

Site Number:	B4K3	Contract Number:	S4-07-03
D.O. Number:	0119	Action Memo Date:	4/25/2012
Response Authority:	CERCLA	Response Type:	Time-Critical
Response Lead:	EPA	Incident Category:	Removal Action
NPL Status:	Non NPL	Operable Unit:	
Mobilization Date:	5/8/2012	Start Date:	5/8/2012
Demob Date:	8/30/2012	Completion Date:	8/30/2012
CERCLIS ID:		RCRIS ID:	
ERNS No.:		State Notification:	
FPN#:		Reimbursable Account #:	

1.1.1 Incident Category

Time Critical Removal Action

1.1.2 Site Description

Prior to development into a beachside resort and golfing community, the city of Ponte Vedra was known as "Mineral City". The National Lead Company operated a sand mine along 17 miles of oceanfront, removing the small percentages of heavy metal-bearing minerals in the sands. Minerals such as rutile and ilmenite were recovered for their titanium content, which was needed during World War I for steel production. The operation was started in 1914 and continued into the 1920s when the mine was closed due to a depressed demand for steel after the war. One of the ancillary minerals in the sand is monazite. It is believed that concentrating monazite during the mineral separation process may have produced tailings piles. While actual production records are not available, it is believed that this technologically-enhanced naturally-occurring radioactive material (TENORM) could have later been used as fill or simply knocked down and spread out once the mine closed and properties in the area were developed.

1.1.2.1 Location

The center of the Site covers approximately ½ acre of land at 7 Solana Road in Ponte Vedra Beach, St. Johns County, Florida, and includes the aerial extent of contamination. The Site is in a predominantly residential area, approximately one block from the Atlantic Ocean. Historic use of the land included sand mining operations and a residential structure reportedly removed in 2008. The site is bordered to the south by Solana Road, the west and east by occupied residential structures and to the north by a lake on the 4th fairway of the Ponte Vedra Inn Golf Club.

1.1.2.2 Description of Threat

During a May 2011 golf-tournament in Ponte Vedra, Florida, the Florida Department of Transportation (FDOT), with assistance from the United States Department of Energy (DOE) Radiological Assistance Program (RAP), performed a radiation survey of the surrounding area using a truck-mounted portable scanner. DOT and DOE reported an instance of elevated gamma radiation from the empty lot at 7 Solana Road. Calculated dose rates from DOT and DOE measurements on the 7 Solana Road property were found to be as high as 1.21 millirem per hour (mrem/hr). This roughly correlates to an annual exposure of 7,623 millirem per year (mrem/yr). The Florida Department of Health (DOH) responded and collected samples of soil for analysis by gamma spectroscopy. Samples collected by DOH showed thorium²³² at 80 picocuries per gram (pCi/g) and radium²²⁶ at 47 pCi/g. Based on the levels of contamination found, DOH requested

EPA assistance to further characterize the nature and scope of the contamination at 7 Solana Road.

The EPA Region 4, with assistance from the Environmental Response Team (ERT), conducted an investigation at the site on June 6, 2011. ERT surveyed the 7 Solana Road property with a GPS-tracked ATV-mounted survey detector. The collected data was used to generate a contour map detailing the location of two 'hotspots' on the property. Both of these hotspots trailed off to the edge of the 7 Solana Road property and extended onto neighboring property or into Solana Road. ERT concluded that the gamma radiation levels on the property were approximately 200 times the normal background of 6 microrem per hour ($\mu\text{rem/hr}$). ERT also recommended further assessment.

1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results

In order to investigate the possibility that tailings were used over large areas of Ponte Vedra Beach, EPA Region 4, EPA's Radiological Emergency Response Team (RERT) and DOH initiated a neighborhood-wide assessment in November of 2011. RERT performed a survey of over 600 acres of residential properties surrounding 7 Solana Road using a van-mounted Mobile Radiation Directional Scanning System (MRDSS) that is able to determine radiation levels at a distance. Prior to surveying, RERT determined the average background concentration in the area to be 6 $\mu\text{rem/hr}$, or about 38 mrem/year. The MRDSS traveled the public thoroughfares and compared the readings to background levels. The site-specific threshold for determining whether further characterization was warranted on a property agreed to by EPA and DOH was 100 mrem/yr over the background level, or 138 mrem/year.

Once characterization for a given property was complete, the property was assigned to one of three tiers based on the exposure dose rate of the occupants.

Tier 1 – If the derived dose rate is less than 138 mrem/yr, no further investigation was needed at this time.

Tier 2 - If the derived dose rate is below 538 mrem/yr but exceeds 138 mrem/yr, further action may be warranted on a case-by-case basis.

Tier 3 - If the derived dose rate exceeds 538 mrem/yr prioritization for further action should be given.

Only the properties surrounding 7 Solana Road exhibited gamma radiation levels above the threshold of 138 mrem/yr. RERT and START collected dose rate data from points on the 7 Solana Road property as well as along the roadway and public sidewalks down Solana Road and Rutile Drive. Although exposure values with hand-held instruments taken from the roadway did not indicate any areas with exposure values over the site-specific threshold of 138 mrem/year, the more sensitive instrumentation on the van-mounted scanner indicated several areas which possibly exceeded this threshold located at some distance off the roadway coinciding with 13 properties near 7 Solana Road. Additional assessment is recommended for these other properties.

Only one property, 7 Solana Road, was assigned to Tier 3. During the November 2011 investigation, RERT collected samples of the soil on 7 Solana Road and submitted it to the National Air and Radiation Environmental Laboratory (NAREL) for spectrographic analysis. NAREL confirmed the presence of both thorium and uranium decay-chain daughter products. After review of the data by EPA toxicologists, it was determined that radium²²⁶ and radium²²⁸ were the two leading risk radionuclides on the property. Spectrographic analysis showed the average activity of radium²²⁶ in the top 10 inches of soil was 281 pCi/g and fell to 85.3 pCi/g at approximately 30 inches below the surface. Radium²²⁸ activity ranged from 643 pCi/g to 112 pCi/g within the same depth range.

On May 21 - 23, OSCs Stilman and Berry, RERT, START and ERRS returned to the Site to collect samples to characterize the soil for disposal and determine the extent of contamination on the property. A direct push hydraulic sampler was used to collect 50 core samples from the two 'hotspots' on site to determine the extent of the excavation. Samples were taken from 10 foot grids at one to two foot intervals from surface to 8 feet below surface. The samples were field screened to determine exposure levels. Field screening was conducted by RERT. START used the results to prepare a 3D model of the contamination zone and calculated a volume of approximately 300 cubic yards of soil requiring excavation. Additionally, for each core section which RERT determined met the OSCs removal screening criteria (twice background or approximately 20 $\mu\text{R/hr}$), a portion was retained and these were composited into two disposal profile samples, one for each discrete hotspot. ERRS contracted with a laboratory to analyze the soil, including radionuclides. The laboratory determined the Thorium²³² concentrations of the two samples to be 221 and 308 pCi/g. Ra²²⁶ was 215 and 211 pCi/g, and Ra²³⁸ was 559 and 573 pCi/g.

2. Current Activities

2.1 Operations Section

2.1.1 Narrative

Based on the presence of elevated Ra²²⁶ and Ra²²⁸, the EPA Region 4 Superfund Division Director approved the use of CERCLA funds to remove contaminated soils from the Site.

2.1.2 Response Actions to Date

Removal activities began on August 20, 2012. Prior to mobilization, ERRS contracted with US Ecology in Grand View, ID, to accept the waste. OSC Stilman requested RERT assist with air monitoring and sampling, worker safety, equipment and personnel screening, and waste transport documentation. One RERT personnel mobilized to the site along with 3 Region 4 Radiation Task Force Leaders (RTFL). On August 20, EPA OSCs Stilman and Berry, ERRS, RERT and the RTFLs mobilized to the site to begin removal activities. START mobilized to the site the following day.

SOIL REMOVAL

Excavation began at the northern hotspot, which abutted the driveway of the neighboring property at 5 Solana Road. A Fluke Victoreen hand-held rate meter was used to guide excavation until the twice-background attainment goal was met for surficial soils, 30 microrem/hr. Previous assessments had set the background in this area at 6 microrem/hr. However, the average lowest observable level during the removal was 15 microrem/hr. This is likely due to decreased resolution among varying instruments at the lower end of the energy range and is not indicative of interference from contamination on the site. For this removal action, the same instrument was used for exposure determinations, and 15 microrem/hr was considered background. Soils below grade were excavated to the extent practical. The hotspot traversed the property line and ran under the driveway of 5 Solana Road. Additionally, the subsurface extent of radiation in this area was greater than determined by the core sampling. The area was initially estimated to be approximately 70 cubic yards in volume; ERRS excavated an estimated 125 cubic yards of material from the area before reaching the attainment goal for surficial soils. The entire area was excavated to a minimum depth of 2 feet below ground surface (bgs). Some of the area was also excavated to 4 feet bgs. Soil removed from the bottom of the 4-foot excavation was removed from the hole and screened. This soil achieved the attainment goal of less than 30 microrem/hour. The highest readings were from the exposed soil below the driveway, with exposure rates at a 1-foot distance at nearly 1 millirem per hour. This areal continuation of the hotspot will be investigated by FL DOH in their post-removal assessment.

Similarly, excavation at the southern hotspot removed surficial soils (0-2 foot bgs) above the attainment goal of 30 microrem/hour. Approximately 225 cubic yards of contaminated soil was removed from the southern hotspot. Soils along the public right-of-way fronting Solana Road, which carries electrical, water, sewer, natural gas, cable television and telephone lines were not excavated. Soil past the 2-foot depth along the wall formed along the right-of-way were left in place. The highest reading collected from a 3-foot distance before placement of a soil cover was approximately 270 microrem/hour. This area along the right of way will also be investigated further during the FL DOH post-removal assessment.

DISPOSAL

A total of 438 tons of contaminated soil was shipped off-site as non-hazardous, non-regulated material. DOT provides for an exemption of material such as this at 49 CFR 173.401(B)(4), so no placarding or special handling was required. The material was transported to US Ecology in Grand View, ID, where it was interred in their landfill. Each truck was screened before moving off site to ensure the activity of the material in each vehicle still met the facility's waste acceptance criteria. Excavation and disposal at the site was completed by August 29, 2012. In addition to the contaminated soil, one roll-off box of palm trees was removed from the site. The palm trees were removed to aid in excavation of the contaminated soils. The trees were screened by RERT prior to placing in the box, and no elevated radiation was observed from either the trees themselves (through uptake of radionuclides) or in the dirt on the trunks. The root balls were disposed of with the soil. Also, included in the disposal were all PPE and plastic sheeting which had contacted contaminated soil.

AIR AND PERSONNEL MONITORING

RERT collected dust samples during excavation and truck loading activities. Based on RERT's suggestion and in coordination with the EPA and ERRS health and safety team, EPA set the site action level at the Derived Air Concentration (DAC) of Thorium²³², as that is the lowest and most restrictive of the radionuclides present on site. A DAC is the concentration of a given radionuclide in air which, if breathed by a worker for a year (2,000 hours) would result in that worker reaching their annual intake limit. The samples were collected once every hour from 8/20 until 8/23, and after the first day's samples were counted, personnel downgraded from Level C to Level D respiratory protection. Throughout the removal, RERT and the RTFLs collected and counted samples, shifting to a 2-hour sample collection time beginning on 8/23. No sample showed levels at or near the DAC. RERT calculated the total internal exposure for the average worker on site to be 1.07 mrem for the time spent on site. The NRC sets limits to workers of 5 rem/year whole body dose and 50 rem/year for any particular organ.

Additionally, since the monitors were placed on the site perimeter, they could reasonably be used to estimate the off-site migration of radioactive dust during the removal action. The EPA has set an airborne inhalation limit for the general public of 10 mrem/year from any one source or activity. Using the 1.07 mrem value calculated by ERT, EPA did not exceed the limit for general public airborne inhalation.

Personal dosimeters were worn by all personnel actively working on the site. Readings averaged between 1 and 5 mrem for the entire project. The highest exposure encountered was 6.2 mrem cumulative exposure for the excavator operator. Thermoluminescent dosimetry badges (TLDs) were worn by all personnel and will stand as the dose of record for each individual. These will be read quarterly and are not available at the time of this PolRep.

PERSONNEL AND EQUIPMENT SCREENING

Prior to any vehicles, personnel, or equipment moving off site, RERT and the RTFLs performed surface screening to eliminate off-site migration of contamination. Personnel were frisked with a hand-held scanner prior to exiting the work zone and departing the site each day. A limit of 1.5 times the background rate was established for personnel decontamination, which was generally a boot and/or hand wash. At the end of the project, ERRS decontaminated the equipment and RERT collected swipe samples from both the loader and excavator. Transport vehicles, once loading was complete, were brushed clean and taken to a staging area where a full vehicle scan was performed prior to being released. Release levels were set as per Atomic Energy Commission (AEC) Regulatory Guide 1.86, at 20 disintegrations per minute (dpm)/100cm² for alphas from Radium decay and 200 dpm/100cm² for beta/gamma associated with natural decay chains. Exit surveys were performed by frisking all equipment using a pancake probe and performing swipes on a reasonable amount of surface area of the equipment. This practice was eliminated once the alpha probes proved useless in high temperature environments. Swipes were then counted using the pancake probe on a 1 minute count. The pancake probe has a much lower efficiency for alphas so any elevation above background was suspected of contamination. Equipment was immediately decontaminated with wipes and Radiac wash and swiped again. If contamination continued to be suspected, a brush and high pressure water were

used to decon the equipment. Additional swipes used to verify contamination levels were counted on an iSolo alpha/beta counter. No equipment was allowed to exit the site without being decontaminated and screened, including hand tools, hoses, and safety equipment. These hand tools were frisked with a pancake probe prior to being released.

RESTORATION

Once excavation was finished, ERRS brought in 20 truckloads of clean fill. Each load was screened by RERT to ensure no radiological contamination was present. The radiologically-released equipment was used to spread the soil and grade the site. Grass seed was spread throughout the impacted area, and a landscape subcontractor was hired to replace several mature ligustrum shrubs along the border with 5 Solana Road. Repairs to the irrigation system at 5 Solana Road were also made.

POST-REMOVAL SCREENING

Upon completion of backfilling, RERT performed a site screening, using a hand-held rate meter and a GPS. Data points were set at a roughly 25-foot interval along the southern 3/4 of the property where soil was disturbed. Readings were recorded at waist-height (3 feet above the ground). With the exception of the public right-of-way in the front of the lot, most of the readings were at or below the twice-background (30 microrem/hr) attainment goal. Calculations by EPA radiation physicists show the average exposure, using the Superfund Residential Exposure Scenario, would result in an annual exposure of 107 millirem/yr. The Superfund Exposure Scenario projects a resident will be exposed to the soil for 350 days a year, with 16 hours per day indoors and 2 hours per day outdoors. Since no home is constructed on the property, EPA uses an 18-hour outdoor exposure scenario. In reality, using the Superfund Residential Exposure Scenario for a vacant lot is impractical. Construction of a residence on the property would significantly lower the exposure values for residents through the shielding benefit provided by the foundation slab. EPA expects the actual dose rate for future residents to be at or near background levels once a residence is actually constructed.

In addition, OSC Berry performed similar screening along Solana and Rutile Roads in the public right-of-way for several hundred feet down each road. Readings taken from the edge of the roadway indicated exposure rates averaging 20 microrem/hr dropping off to around 15 at the distant end of the survey area. Previous assessments had set the background in this area at 6 microrem/hr. However, the lowest observable level after the removal was 15 microrem/hr. This is likely due to decreased resolution among varying instruments at the lower end of the energy range and is not indicative of actual contamination from the site. For purposes of this screening, 15 microrem/hr is considered background. The FL DOH will investigate these properties fully during their post-removal assessment. All removal activities were completed by August 30, 2012.

2.1.4 Progress Metrics

<i>Waste Stream</i>	<i>Medium</i>	<i>Quantity</i>	<i>Manifest #</i>	<i>Disposal Method</i>	<i>Disposal Facility</i>
Radiation Contaminated Soils	Soil	438 tons	1-21	Landfill	US Ecology

2.2 Planning Section

2.2.1 Anticipated Activities

2.2.1.1 Planned Response Activities

EPA response activities are complete at 7 Solana Road.

2.2.1.2 Next Steps

FL DOH is planning to perform additional assessments at the 4 properties contiguous to 7 Solana Road. Based on these results, additional properties may be assessed as necessary.

2.3 Logistics Section

No information available at this time.

2.4 Finance Section

Estimated Costs *

	Budgeted	Total To Date	Remaining	% Remaining
Extramural Costs				
ERRS - Cleanup Contractor	\$564,000.00	\$481,450.00	\$82,550.00	14.64%
TAT/START	\$40,940.00	\$10,553.00	\$30,387.00	74.22%
Intramural Costs				
Total Site Costs	\$604,940.00	\$492,003.00	\$112,937.00	18.67%

|-----|-----|-----|-----|-----|

* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

2.5 Other Command Staff

No information available at this time.

3. Participating Entities

3.1 Cooperating Agencies

Florida Department of Health

Florida Department of Environmental Protection

4. Personnel On Site

5/08

EPA - 1
ERRS - 1

5/21 - 5/23

EPA - 2
START - 1
ERRS - 1
RERT - 1

8/20 - 8/29

EPA-3
START-1
ERRS-4
RERT/RTFLs - 4

5. Definition of Terms

No information available at this time.

6. Additional sources of information

No information available at this time.

7. Situational Reference Materials

No information available at this time.