

6 MAR 1991

AMSNC-SF

Mr. John Madera
Nuclear Regulatory Commission, Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Madera:

Due to changes in circumstances concerning the site remediation at Fort Bragg, North Carolina, this Command is requesting an amendment to the decontamination plan prepared by Chem-Nuclear Systems, Incorporated, and submitted in our letter dated November 8, 1990.

On January 23, 1991, Mr. John Pelchat, Nuclear Regulatory Commission, Region II, met with Mr. Kelly Crooks of our Safety Office to discuss the proposed changes. Mr. Pelchat reviewed the remediation areas and made recommendations which we are prepared to implement.

The disposal area within the ammunition supply point was policed of all radioactive light antitank weapon sights on the surface and then graded approximately 2 inches to 1.5 feet to retrieve the sights below grade. The soil was collected in a pile approximately 30 feet wide by 75 feet long by 10 feet high. The pile was to be sifted and the sights collected. However, live ammunition was discovered in the pile, creating a personnel hazard for any sifting operations. We propose to secure the pile and let the Pm147 decay to a nonradioactive state before release. Actions taken to secure the pile would include building a small berm around the bottom to prevent runoff; erecting a security fence with proper posting around the pile to prevent unauthorized access; annually collecting and analyzing soil samples from potential runoff areas; and performing maintenance checks on a periodic basis by the Fort Bragg radiation protection officer. Given that Pm147 has a half-life of 2.6 years and the newest of the light antitank weapon sights are at least 15 years old, all sights currently contain less than 100 microcuries. The sights will be nonradioactive in about 8 years and authorized for release by the year 1999.

9702060043 910108
PDR ADOCK 03014796
C PDR

36511m - Ft Bragg (becon) (Donnell) (Donnell-IV)

Excavation of the trenches in the Directorate of Personnel and Community Activities Recycling and Residue Yard is resulting in a volume of debris of several thousand cubic feet. The possibility of this debris being contaminated with Pm147 is remote, since the sights have been removed from the debris. The cost of disposal of such a large volume is prohibitive. Therefore, we propose to dispose of the material at a Fort Bragg landfill. The debris will be monitored for contamination by conducting swipe tests on 50 swipes per 1,000-cubic foot basis. Any material containing removable contamination greater than 1,000 disintegrations per minute, per 100 square centimeters will be removed and disposed as radioactive waste.

The decontamination plan also specified the use of sifting equipment provided by the Air Force. The sifter was provided but was determined not to be viable for this operation. Instead, a 6-foot by 10-foot sieve with 4-inch openings was constructed from 3/4-inch reinforcement bar to handle the sifting. The size and strength of this sieve was necessary to handle a bucketload of debris and soil from a front-end loader.

The points of contact are Mr. David Skogman, AMSMC-SFS, (309) 782-2962; Mr. Kelly Crooks, AMSMC-SFS, (309) 782-2969; and Mrs. Katheryn LaFrenz, AMSMC-SFS, (309) 782-2965.

Sincerely,

SIGNED

David T. Morgan, Jr.
Colonel, U.S. Army
Chief of Staff

AMSMC-SFS (385-11m)

16 DEC 1993

MEMORANDUM FOR Commander HQ XVIII Airborne Corps, Directorate of
Safety, ATTN: AFZA-SA, Ft. Bragg, NC 28307-5000

SUBJECT: Promethium 147 Radioactive Light Antitank Weapon Sights
Burial Site At the Ammunition Supply Point

1. References:

a. Letter, HQ, AMCCOM, AMSMC-SF, 6 March 1991, no subject
(encl 1).

b. Letter, U.S. Nuclear Regulatory Commission Region III,
6 December 1993, no subject (encl 2).

2. Reference 1a requested approval from the Nuclear Regulatory
Commission (NRC) to let the radioactive material decay to a
nonradioactive state in the subject unauthorized burial site.
Reference 1b provided this approval. However, conditions stated
in reference 1a, paragraph 3 must be adhered to until it is
determined that the radioactive material has decayed to a safe
level. To fully comply with this recent amendment to the
license, it is requested that your appointed radiation protection
officer (RPO) perform regular visits to the area to ensure that
all required signs are posted, and the berm is clear of all
obstructions. The RPO must also work with the security office to
ensure that the security fence is well maintained and provides
adequate protection to prevent access to unauthorized personnel.
In addition, your office must coordinate with the appropriate
office to ensure the soil is analyzed annually. Finally, your
office must generate and retain adequate documentation for these
actions, as this information may be requested by the NRC or other
interested parties.

3. The POC is Mr. Ronald Cravecoeur, AMSMC-SFS, DSN 793-2065.

2 Encls
as

SIGNED

RUSSELL D. HARTWIG
Acting Chief, Systems Chemical
and Radiation Division

CF:

Commander U.S. Army Forces Command, ATTN: AFFI-SO (Mr. Clements),
Ft. McPherson, GA 30330-6000 (w/encls)
Commander U.S. Army Materiel Command, ATTN: AMCSF (Mr. Manfre),
Alexandria, VA 22333-0001 (w/encls)

Encl 5

Legend

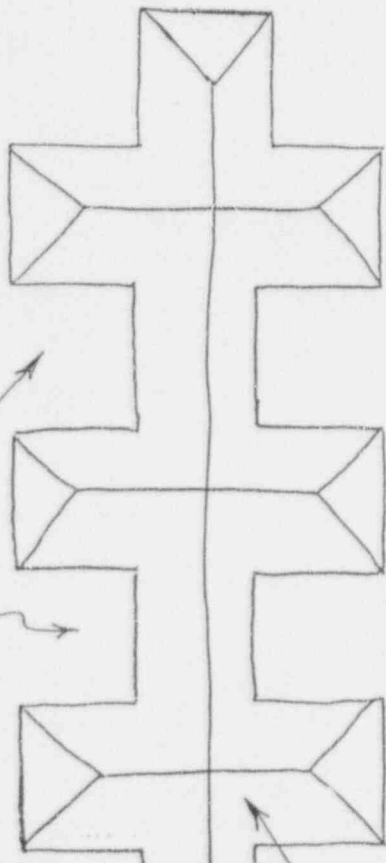
- telephone pole
- ☐ surveillance camera
- ⊗ soil sample location

NORTH

6

Approximate edge of gravel

AMMO STORAGE



DIRT BERMS

FB-10

FORMER DIRT PILE LOCATION

FB-9

RAIL DOCK

GRAVEL AREA

RAIL SPUR

Encl 6

ASP ROAD FOR HARD TOP

Slight depression



FB-3

FB-6

FB-5

FB-4

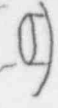
FB-7

FB-8

FB-1

Wooden post

Culvert



2 January 1997

MEMORANDUM FOR RECORD

SUBJECT: Identification Of Photographs Taken 17 December 1996
Within The Ft Bragg Ammunition Supply Point (ASP)

The following photographs were taken within the Ft Bragg ASP at the North end of the Deployment Readiness Brigade (DRB) storage area on 17 December 1996 by IOC Radiation Protection Officer (RPO), Mr Kelly Crooks. The pictures are numbered 1-25 and are described in the following paragraphs:

1. The first hole dug with the backhoe in the DRB earthen barrier. This hole is designated D-1 on hand drawn map.
2. Another picture of D-1 showing Chemnuclear representative, taking readings.
3. Another picture of D-1. The backhoe is pushing the dirt back into the hole. Wooden overhead storage canopy shown on the left.
4. The second hole dug (D-2) with the backhoe in the DRB earthen barrier.
5. The third hole dug (D-3) with the backhoe in the DRB earthen barrier.
6. One, of two, pieces of barbed wire found in the gravel traffic area.
7. Another picture of hole D-3 with Chemnuclear representative.
8. Northern end of DRB earthen barrier. Security fence on west side of ASP in the background.
9. Former location of dirt pile in the immediate foreground. Surveillance camera on sliver/white pole next to telephone pole. Grassey field gently sloping downgradient to shallow ravine.
10. The fourth hole (D-4) dug with the backhoe. This hole dug in the grassey field slightly to the north of former dirt pile location.
11. The dirt from D-4 being inspected for possible LAW sight debris.

12. The fifth hole (D-5) dug with the backhoe. This hole dug in the former location of the dirt pile. Location of D-1 is in the background.
13. Close-up of hole D-5.
14. The sixth hole (D-6) dug with the backhoe. Chemnuclear representative taking readings. This hole dug in gravel traffic area roughly half way between former dirt pile location and nearest portion of DRB earthen barrier.
15. Close-up of hole D-6.
16. Dirt from hole D-6 being inspected for possible LAW sights debris.
17. The seventh hole (D-7) dug with the backhoe. This hole dug a short distance into the grassey field from the gravel traffic area.
18. Old run-off barrier, running approximately east-west. Security fence in the background.
19. IOC representative holding examples of expended small caliber ammunition components. Similiar components were found in numerous locations in the area. Wooden overhead storage canopy in the background. Location of D-1 on far right.
20. Standing water next to culvert where water samples taken. Culvert runs east-west under railroad tracks.
21. Slight ditch running north-south. Surveillance camera on sliver/white pole. Wooden overhead storage canopies and the northern end of the DRB earthen barrier in the background. Location of D-1 just to the right of the surveillance camera.
22. IOC representative searching for LAW sight debris. Numerous locations were searched in this manner. Slight ditch which runs downgradient into a slight depression behind the IOC representative.
23. Non-LAW related debris at edge of grassey field not far from railroad culvert.
24. Railraod culvert and standing water.
25. Pieces of warning sign found in the grassey field.

④ Holes dug with backhoe

AMMO STORAGE

APR 24 1964

RAIL
ROCK

5000
2000
3000

End 8

TOP ROAD
SSA
1

Approximate
location of
barbed
pieces

FORMER
DIRT PILE
LOCATION

Slight depression

Wooden
post

NORTH

Inc 8

240130

x ↑
extension-up sign
Approximate location

**CHEM-NUCLEAR SYSTEMS, INC.**

DEFENSE CONSOLIDATION FACILITY
P.O. Box 828 • Barnwell, South Carolina 29812

January 6, 1997
JRLF-0001.97

Department of the Army
HQ, U.S. Army, Industrial Operations Command
AMSIO-ACE-D (Capt. John Bolsinger)
Rock Island, IL 61299-6000

SUBJECT: FT. BRAGG DOSE ASSESSMENT REPORT

Dear Capt. Bolsinger:

Chem-Nuclear Systems Consolidation Facility Unit 573 (CNCF) is pleased to submit the Ft. Bragg Dose Assessment Report for your review. I have included a copy of the report prepared by Steve Blitchington, the CNCF Health Physics Manager. This report confirms that the hazards from these materials to the general public are minimal.

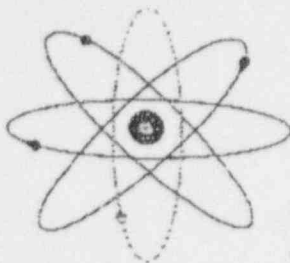
Please review this report and if any questions should arise, please contact Steve or me directly at (803) 259-1119.

Sincerely,

John Lash
Program Manager, Field Projects & Business
Development

Attachments
Assessment report (4 pages)
GEL Analysis(6 pages)

c Paradox (47153)



CHEM-NUCLEAR CONSOLIDATION FACILITY INTEROFFICE MEMO

Date: 1/6/97

To: John Lash

CC: Mark Whittaker, Rich Campbell

From: Steve Blitchington

Subject: DOSE ASSESSMENT FOR FT. BRAGG
EMERGENCY RESPONSE (PM-147 LAW
ROCKET SIGHTS)

The purpose of this letter is to provide a dose assessment for personnel due to the burial of Light Anti-Tank Weapon (LAW) Rocket Sights at Ft. Bragg, North Carolina containing Promethium 147 (Pm-147). The following data, which was provided by Mr. Gary Buckrop of the U.S. Army Industrial Operations Command, and the results of lab analysis performed by Environmental Physics, Inc. of Charleston, S.C., of the five soil samples and one water sample taken at Ft. Bragg were used to perform my assessment:

KNOWN INFORMATION

1. The maximum total number of LAW Rocket Sights is estimated to be 2500
2. The minimum total number of LAW Rocket Sights is estimated to be 500.
3. The total activity of Pm-147 per LAW Rocket Sight was calculated to be 3 mCi in 1977 (I will use 1/1/78 since the exact manufacturing date was not provided).
4. The radiological half-life of Pm-147 is 2.62 years. Pm-147 decays by β^- decay with a maximum beta energy of 0.224 Mev and an average beta energy of 0.070 Mev. Pm-147 does not emit any gamma rays.
5. The total volume of the material suspected to be contaminated with Pm-147 is estimated to be 17,500 cubic feet.
6. It is assumed that the Pm-147 LAW Rocket Sights are homogeneously distributed in the soil at a 1 foot thickness.

1/6/97

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7. It is assumed that the material is covered with 6 inches of gravel (ie. crushed rock).
8. It is assumed that the density of the material is 1.1 gm/cc. This value was obtained from the most recent revision of the following publication: "The Data Collection Handbook To Support Modeling The Impact Of Radioactive Material In Soil" Report Number ANL-EAIS-8 by Argonne National Labs. This publication list the average density of soil to be between 1.1 and 1.6 gm/cc. I will use the more conservative value of 1.1 gm/cc for my calculations.

LAB ANALYSIS DATA

1. The type of analysis requested was for Pm-147 in soil/water.
2. The minimum detection limit requested was 100 pCi/gm or 100 pCi/liter.
3. The analytical method used was EPA-EERF-PM-01-1.
4. The detection limit (DL) listed on the lab report is equal to the Minimum Detectable Activity (MDA) for their counting system.
5. The samples were counted at two standard deviations.
6. The sample analysis showed the following:

<u>SAMPLE</u>	<u>DETECTION LIMIT</u>	<u>PM-147 ACTIVITY</u>
Sample #1(Soil)	0.526 pCi/gm	-0.107 (+/- 0.208) pCi/gm
Sample #1(Soil)	0.487 pCi/gm	0.189 (+/- 0.210) pCi/gm
Sample #1(Soil)	0.421 pCi/gm	-0.176 (+/- 0.161) pCi/gm
Sample #1(Soil)	0.439 pCi/gm	-0.0896 (+/- 0.174) pCi/gm
Sample #1(Soil)	0.428 pCi/gm	0.127 (+/- 0.183) pCi/gm
Sample #1(Water)	14.6 pCi/liter	-10.0 (+/- 0.5.68) pCi/liter

CALCULATIONS

1. Worst Case Pm-147 Activity Calculation:

$$2500 \text{ sights} \times 3 \text{ mCi/sight} = 7500 \text{ mCi}$$

$$\text{Decay corrected activity} = A = 7500 \text{ mCi} e^{-(.693/2.62 \text{ yrs}) \times 20 \text{ yrs}}$$

$$A = 37.81 \text{ mCi} \times 1.0 \text{ E9 pCi/mCi} = 3.781 \text{ E10 pCi}$$

1/6/97

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2. Best Case Pm-147 Activity Calculation:

$$500 \text{ sights} \times 3 \text{ mCi/sight} = 1500 \text{ mCi}$$

$$\text{Decay corrected activity} = A = 1500 \text{ mCi} e^{-(.693/2.62 \text{ yrs}) \times 20 \text{ yrs}}$$

$$A = 7.562 \text{ mCi} \times 1.0 \text{ E9 pCi/mCi} = 7.562 \text{ E9 pCi}$$

3. Pm-147 Concentration:Worst Case:

$$17,500 \text{ ft}^3 / 3.5314 \text{ E-5 ft}^3/\text{cc} = 4.96 \text{ E8 cc}$$

$$4.96 \text{ E8 cc} \times 1.1 \text{ gm/cc} = 5.45 \text{ E8 grams}$$

$$3.781 \text{ E10 pCi} / 5.45 \text{ E8 grams} = 69.362 \text{ pCi/gm}$$

Best Case:

$$17,500 \text{ ft}^3 / 3.5314 \text{ E-5 ft}^3/\text{cc} = 4.96 \text{ E8 cc}$$

$$4.96 \text{ E8 cc} \times 1.1 \text{ gm/cc} = 5.45 \text{ E8 grams}$$

$$7.562 \text{ E9 pCi} / 5.45 \text{ E8 grams} = 13.872 \text{ pCi/gm}$$

EVALUATION

1. 99.5% of the original Pm-147 has decayed away with the worst case total residual activity being 37.81 mCi.
2. The worst case calculated activity would result in a concentration of 69.362 pCi/gm, the highest detected concentration in any of the soil samples taken was only 0.189 (+/- 0.210) pCi/gm. The average concentration in the collected soil samples is less than analytical background; the calculated dose to an individual from contact with this material is zero.
3. Since Pm-147 is primarily a β^- radiation emitter, external dose to personnel will be minimal.
4. Due to the relatively low Pm-147 half life of 2.62 years, the isotope has already decay by 7.63 half lives making it for all practical purposes no longer present. The Pm-147 will decay by 10 half lives in 6.21 years from now, which is considered the amount decay necessary to assume that no activity is present.
5. The lab analysis shows that no Pm-147 is present in the samples that were taken which further supports decay and the presence of very low levels of Pm-147 in the soil and water.

1/6/97

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6. Also the LAW Rocket Sights are covered with a gravel layer which prevents direct contact with personnel.

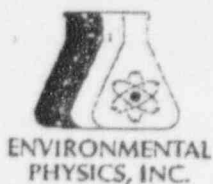
CONCLUSION

The potential dose to personnel is zero mRem.

Please review this assessment, and if you have any questions, please don't hesitate to discuss them with me.

Steve Blitchington

CNCF Health Physics Manager



ENVIRONMENTAL PHYSICS, INC.

A General Engineering Laboratories, Inc. Affiliate.

CERTIFICATE OF ANALYSIS

Client: Chem-Nuclear Systems, Inc.
Post Office Box 828
Barwell, South Carolina 29812
Contact: Steve Blitchington

cc: CNUC00996

Report Date: December 31, 1996

Page 1 of 1

Sample ID : #1 SOIL
Lab ID : 9612415-01
Matrix : Soil
Date Collected : 12/17/96
Date Received : 12/19/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological											
Promethium-147 - 2 items											
Promethium-147	U	-0.107	+/- 0.208	0.526	10.0	pCi/g	1.0	TCW	12/31/96	0717	95521 1
Weight of Sample, Pm-147		6.00			mg						

M = Method	Method-Description
M1	EPA EERF PM-01-1

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

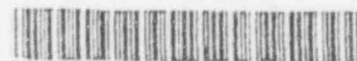
J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

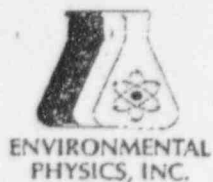
U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed
in accordance with General Engineering Laboratories
standard operating procedures. Please direct
any questions to your Project Manager, Nancy Slater at (803) 556-8171.

Reviewed By





ENVIRONMENTAL PHYSICS, INC.

A General Engineering Laboratories, Inc. Affiliate.

CERTIFICATE OF ANALYSIS

Client: Chem-Nuclear Systems, Inc.
Post Office Box 828
Barnwell, South Carolina 29812
Contact: Steve Blitchington

cc: CNUC00996

Report Date: December 31, 1996

Page 1 of 1

Sample ID : #2 SOIL
Lab ID : 9612415-02
Matrix : Soil
Date Collected : 12/17/96
Date Received : 12/19/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological											
Promethium-147 - 2 items											
Promethium-147	U	0.189	+/- 0.21	0.487	10.0	pCi/g	1.0	TCW	12/31/96	0733	95521 1
Weight of Sample, Pm-147		6.30				mg					

M = Method

Method-Description

M 1

EPA EERF PM-01-1

Notes:

The qualifiers in this report are defined as follows:

ND Indicates that the analyte was not detected at a concentration greater than the detection limit.

J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

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Reviewed By





ENVIRONMENTAL PHYSICS, INC.

A General Engineering Laboratories, Inc. Affiliate.

CERTIFICATE OF ANALYSIS

Client: Chem-Nuclear Systems, Inc.
Post Office Box 828
Barnwell, South Carolina 29812
Contact: Steve Blitchington

cc: CNUC00996

Report Date: December 31, 1996

Page 1 of 1

Sample ID : #3 SOIL
Lab ID : 9612415-03
Matrix : Soil
Date Collected : 12/17/96
Date Received : 12/19/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological											
Promethium-147 - 2 items											
Promethium-147	U	-0.176	+/- 0.161	0.421	10.0	pCi/g	1.0	TCW	12/31/96	0750	95521 1
Weight of Sample, Pm-147		6.50				mg					

M = Method

Method-Description

M 1

EPA EERF PM-01-1

Notes:

The qualifiers in this report are defined as follows:

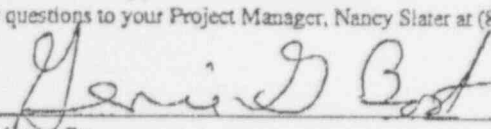
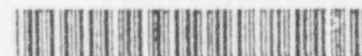
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J indicates presence of analyte at a concentration less than the reporting limit (RL) and greater than the detection limit (DL).

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CERTIFICATE OF ANALYSIS

Client: Chem-Nuclear Systems, Inc.
Post Office Box 828
Barnwell, South Carolina 29812
Contact: Steve Blitchington

cc: CNUC00996

Report Date: December 31, 1996

Page 1 of 1

Sample ID : #4 SOIL
Lab ID : 9612415-04
Matrix : Soil
Date Collected : 12/17/96
Date Received : 12/19/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological											
Promethium-147 - 2 items											
Promethium-147	U	-0.0896	+/- 0.174	0.439	10.0	pCi/g	1.0	TCW	12/31/96	0806	95521 1
Weight of Sample, Pm-147		7.10				mg					

M = Method	Method-Description
M 1	EPA EERF PM-01-1

Notes:

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* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Nancy Slater at (803) 556-8171.

Reviewed By



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A General Engineering Laboratories, Inc. Affiliate

CERTIFICATE OF ANALYSIS

Client: Chem-Nuclear Systems, Inc.
Post Office Box 828
Barnwell, South Carolina 29812

Contact: Steve Blitchington

cc: CNUC00996

Report Date: December 31, 1996

Page 1 of 1

Sample ID : #5 SOIL
Lab ID : 9612415-05
Matrix : Soil
Date Collected : 12/17/96
Date Received : 12/19/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological											
Promethium-147 - 2 items											
Promethium-147	U	0.127	+/- 0.183	0.428	10.0	pCi/g	1.0	TCW	12/31/96	0823	95521 1
Weight of Sample, Pm-147		7.20				mg					

M = Method

Method-Description

M 1

EPA EERF PM-01-1

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

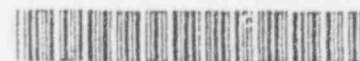
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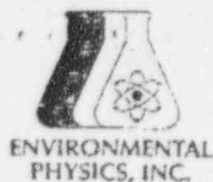
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Client: Chem-Nuclear Systems, Inc.
Post Office Box 828
Barnwell, South Carolina 29812
Contact: Steve Blitchington

cc: CNUC00996

Report Date: December 31, 1996

Page 1 of 1

Sample ID : #6 WATER
Lab ID : 9612415 06
Matrix : GroundH2O
Date Collected : 12/17/96
Date Received : 12/19/96
Priority : Routine
Collector : Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	M
Radiological											
Promethium-147 - 2 items											
Promethium-147	U	-10.0	+/- 5.68	14.6	10.0	pCi/l	1.0	TCW	12/28/96	2013	95557 1
Weight of Sample, Pm-147		7.50			mg						

M = Method	Method-Description
M 1	EPI A-020

Notes:

The qualifiers in this report are defined as follows:

ND indicates that the analyte was not detected at a concentration greater than the detection limit.

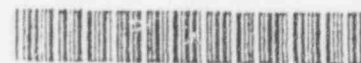
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U indicates that the analyte was not detected at a concentration greater than the detection limit.

* indicates that a quality control analyte recovery is outside of specified acceptance criteria.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories standard operating procedures. Please direct any questions to your Project Manager, Nancy Slater at (803) 556-8171.

Reviewed By/



PROJECT: LAW ROCKET DEBRIS REMOVAL
 NUMBER: UNASSIGNED
 LOCATION: FORT BRAGG, NC
 CONTRACTOR: UNASSI NED

LABOR	HOURLY RATE	NUMBE PEOPLE	NUMBE DAYS	HOURS PER DAY	ITEM SUBTOTAL	SUBTOTAL
Broker S.T.	\$22.84	1	20	8	\$3,654.40	
C.H.P.	\$78.14	1	2	8	\$1,250.24	
TECH.	\$29.02	3	20	8	\$13,929.60	
HP	\$49.12	1	4	8	\$1,571.84	
PM	\$66.98	1	30	8	\$16,075.20	
H&S Supr.	\$40.19	1	30	8	\$9,645.60	
Clerical	\$12.00	1	5	8	\$480.00	
TOTAL LABOR=					\$46,606.88	
SUB-TOTAL PROJECT COST=					\$46,606.88	
FRINGE BENEFITS (71.63%)					\$33,384.51	
SUBTOTAL					\$79,991.39	
G&A (13.1%)					\$10,478.87	
SUBTOTAL					\$90,470.26	
FEE (15%)					\$13,570.54	
TOTAL LABOR =					\$104,040.80	\$104,040.80

MI & E	QUANTIT	NO. OF DAYS/HR	COST PER	ITEM SUBTOTAL	SUBTOTAL
AIR FARE	6		\$700.00	\$4,200.00	
LODGING	6	27	\$60.00	\$9,720.00	
PER DIEM	6	28	\$28.00	\$4,704.00	
SUBTOTAL				\$18,624.00	
G&A (13.1%)				\$2,439.74	
SUBTOTAL				\$21,063.74	
FEE (15%)				\$3,159.56	
TOTAL MI&E =				\$24,223.31	\$24,223.31

TRAVEL AND EXPENSES	NO. OF QUANTIT	DAYS/HR	COST PER	ITEM SUBTOTAL	SUBTOTAL
RENTAL CAR	2	28	\$40.00	\$2,240.00	
GAS				\$200.00	
SUBTOTAL=				\$2,440.00	
G&A (13.1%)				\$319.64	
SUBTOTAL=				\$2,759.64	
FEE (15%)				\$413.95	
TOTAL =				\$3,173.59	\$3,173.59

SUPPLIES	QUANTITY	COST PER	ITEM SUBTOTAL	SUBTOTAL
Front end loader rental & delivery			\$1,500.00	
Forklift rental & delivery			\$1,500.00	
Sample analysis (TCLP)	2	\$2,500.00	\$5,000.00	
General supplies (PPE, lumber, gas, phone, copying, etc.)			\$5,000.00	
SUBTOTAL=			\$13,000.00	
TAX (8.75%)			\$1,137.50	
SUBTOTAL=			\$14,137.50	
G&A (13.1%)			\$1,852.01	
SUBTOTAL=			\$15,989.51	
FEE (15%)			\$2,398.43	
TOTAL SUPPLIES =			\$18,387.94	\$18,387.94

TRANSPORTATION	NO. OF TRIPS	MILEAGE MILEAGE	RATE	ITEM SUBTOTAL	SUBTOTAL
Ft Bragg, NC to Clive, UT	55	2500	\$2.20	\$302,500.00	
DEMURRAGE				\$5,000.00	
SUBTOTAL=				\$307,500.00	
G&A (13.1%)				\$40,282.50	
SUBTOTAL=				\$347,782.50	
FEE (15%)				\$52,167.38	
TOTAL TRANSPORT =				\$399,949.88	\$399,949.88

DISPOSAL	QUANTIT (FT3)	UNIT PRICE	NEW CHG	TAX	ITEM SUBTOTAL	SUBTOTAL
ENVIROCARE	17500.0	\$8.00			\$143,360.00	
SURCHARGE	0.0	\$0.00			\$0.00	
TOTAL DISPOSAL=					\$143,360.00	\$143,360.00
TOTAL PROJECT COST =						\$693,135.50

ASSUMPTIONS:

1. Rates are based on current IOC contracts.
2. Labor includes plan and final report development.
3. Disposal volume based on estimated volume of pile.
4. Material is acceptable at Envirocare of Utah as low activity soil. No mixed waste present.
5. Soil is shipped bulk by gondola truck. No packaging.
6. No regulatory or weather related delays.