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NAS FORT WORTH
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PRELIMINARY ASSESSMENT SITE INVESTIGATION OF RADIUM CONTAMINATION OF WATER WELL OFF BASE WEAPONS STORAGE AREA NAS FORT WORTH TX

1/1/1992

ARMY CORP OF ENGINEERS

File: 17G
A.F.

NAVAL AIR STATION
FORT WORTH JRB
CARSWELL FIELD
TEXAS

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 96

US Army Corps
of Engineers
Fort Worth District

PRELIMINARY ASSESSMENT
RADIUM CONTAMINATION
WEAPONS STORAGE AREA
CARSWELL AIR FORCE BASE, TEXAS

FOR
UNITED STATES AIR FORCE
JANUARY 1992

PRELIMINARY ASSESSMENT/SITE INVESTIGATION OF
RADIUM CONTAMINATION
WATER WELL AT OFF BASE WEAPONS STORAGE AREA
CARSWELL AIR FORCE BASE, TEXAS

1. INTRODUCTION: As requested by Carswell Air Force Base, Environmental Office, the Fort Worth District, Corps of Engineers, conducted a preliminary assessment of radium contamination at the subject site. This report describes the assessment and makes recommendations for remedial investigations to follow.

2. INVESTIGATIONS:

a. **Ground Water**. Samples from the operational water well in Building 8504 have been taken periodically by Carswell Bioenvironmental Engineering and tested for gross alpha activity and chemically tested for radium 226 and 228. Samples were taken from November 1987 to present, as regulations require. Most of these samplings were done quarterly rather than monthly. Test results from 8 of 19 samplings to date produced combined radium 226/228 contents above the limit of 5 pCi/l for State drinking water standards. However, none of the gross alpha values exceeded the 15 pCi/l State drinking water standards. Tests of three of the eight samplings produced values at least twice the maximum allowed, while the other five had test values only slightly above the maximum value permitted. Test values of gross alpha activity varied widely, but presented no recognizable pattern, appearing almost randomly. Normally, concentrations of ground-water contaminants change gradually because ground water moves through the earth slowly. Rainfall data were plotted against gross alpha activity to discover if any relationship between the two might exist. A positive correlation between the two was found between the earliest datum in November 1987 and August 1989. This means that in each instance of positive correlation when the gross alpha value rose, the monthly rainfall datum rose also, and at approximately the same rate. As the values diminished, both gross alpha activity (radium concentration) and monthly rainfall fell together. A plot of these values accompanies this report. It should be noted that correlation, or absence of correlation between the two sources of data is influenced to some extent by which day of each sampling month water samples were taken.

b. **Soil Borings**. Twelve shallow soil borings were dug and sampled on the downslope side of Building 8503 in which maintenance was performed on nuclear weapons. Three other borings of the same type were drilled along the ridge crest on which Building 8503 is located, assuming them to represent background radium contents. Samples from all 15 shallow borings were taken between a depth of 0.5-foot and 1.5 feet. The pattern of soil radium content anticipated was only partially realized. While higher radium content was found on the downslope side of Building 8503 as expected, higher radium content was also found in all three of the "background" borings along the top of the ridge. Plate 1 shows the boring locations. See Table 1 for summary of soil sample analysis. Complete laboratory report is at Appendix A.

c. **Radioactive Disposal Area**. Two borings, 18 feet deep, were drilled with an auger and sampled at each 2 feet advance in hole depth. These borings were located in line with the three 12-inch, sealed, cast iron pipes which contain radioactive waste. The pipes were embedded in the earth to a depth of 18 feet.

TABLE 1

SOIL TEST RESULTS
CARSWELL AIR FORCE BASE
WEAPONS STORAGE AREA
TESTS FOR PRESENCE OF RADIUM 226 AND 228
TEST METHOD 9315

BORING NUMBER	SAMPLE DEPTH RANGE	TEST RESULTS TOTAL pCi/g (RADIUM)
8A-1	1.5' - 2.0'	2.711
8A-1	3.5' - 4.0'	1.927
8A-1	5.5' - 6.0'	2.755
8A-1	7.5' - 8.0'	2.715
8A-1	9.5' - 10.0'	1.057×10^{2}
8A-1	11.5' - 12.0'	3.284
8A-1	13.5' - 14.0'	3.451
8A-1	15.5' - 16.0'	2.919
8A-1	17.5' - 18.0'	3.589
8A-2	1.5' - 2.0'	2.435
8A-2	3.5' - 4.0'	2.922
8A-2	5.5' - 6.0'	3.038
8A-2	7.5' - 8.0'	3.515
8A-2	9.5' - 10.0'	3.688
8A-2	11.5' - 12.0'	2.453
8A-2	13.5' - 14.0'	3.170
8A-2	15.5' - 16.0'	3.018
8A-2	17.5' - 18.0'	3.033
4HA-3	0.5' - 1.5'	4.065
4HA-4	0.5' - 1.5'	4.566
4HA-5	0.5' - 1.5'	2.786
4HA-6	0.5' - 1.5'	2.369
4HA-7	0.5' - 1.5'	4.184
4HA-8	0.5' - 1.5'	5.139
4HA-9	0.5' - 1.5'	4.537
4HA-10	0.5' - 1.5'	4.190
4HA-11	0.5' - 1.5'	4.025
4HA-12	0.5' - 1.5'	3.905
4HA-13	0.5' - 1.5'	3.974
4HA-14	0.5' - 1.5'	2.475
4HA-15	0.5' - 1.5'	4.164
4HA-16	0.5' - 1.5'	4.892
4HA-17	0.5' - 1.5'	4.030

The borings were drilled approximately 7 feet beyond each end of the line of cast iron pipes (see Plate 1 for boring locations). Radium content of all but one of the samples from these two borings was in a range which will probably prove to be within background radium content (1.927 to 3.688 pico Curies per gram). One sample had a radium content of 105.7 pico Curies per gram, very significantly beyond the background range for radium. This sample was from 9.5 to 10.0 feet in boring 8A-1.

3. TEXAS REGULATORY REQUIREMENTS (GENERALIZED).

a. **Soils.** Maximum content of radium 226 and radium 228 above background level allowed in soils averaged over any 100 square meter area is 5 pico Curies per gram averaged through the first 15 centimeters of soil, and 15 pico Curies per gram averaged over the thickness of each 15 centimeter thick layer below the surface layer.

b. **Drinking Water.** Maximum content of radium 226, radium 228, and gross alpha activity follow:

(1) Maximum combined radium 226 and 228 is 5 pico Curies per liter.

(2) Maximum gross alpha activity allowed is 15 pico Curies per liter.

4. CONCLUSIONS.

a. **Radium Source.** Location of the original source of radium contamination is not yet known. It is speculated that the original source was Building 8503 where nuclear weapons were maintained. Alternatively, it has been suggested that the original source of radium was luminous instrument dials and the like, which may have been disposed of in a dump at the Weapons Storage Area. The pattern of radium contamination of shallow soils, so far as it has been developed, suggests that some secondary radium contamination may have occurred because of leaking waterlines and/or sewer lines. Correlation between rainfall and gross alpha values, together with the rapid changes in the gross alpha values, suggests the possibility of a defective seal between the casing and the hole in the water well in Building 8504, allowing radium contaminated rainfall runoff to quickly descend from the near surface to the producing interval of the well, resulting in rapidly changing radium concentrations in produced well water. See Plate 2, "Plot of Rainfall vs Radium Concentrations in Well Samples."

b. **Water Wells.** Of two water wells at subject facility, only well IAW 161-44 in Building 8504 remains operational.

c. **Background Radium Content.** The range of natural background radium 226/228 content has not yet been established unambiguously in the subject area. Additional shallow soil samples should be taken to adequately define the contents of naturally occurring radium. These samples should be collected as remotely as possible from likely polluting activity as can be contrived. The three samples already taken and tested to represent background appear to have been located too close to areas of activity and possibly within minor drainages which could have introduced radium contaminated surface runoff.

d. **Creek Contamination.** It is not yet known whether the north and south forks of Live Oak Creek are contaminated with radium. Water samples from both

forks will be needed to determine this.

e. **Strong Radiation Sources.** A strong total gamma source (radium) appears to be located very near where sample E (9.5 to 10.0 feet in depth) was taken in boring 8A-1 (boring located on the south side of the Radioactive Disposal Area). Sample E tested 105.7 pCi/g (total gamma).

f. **Radium Contaminated Ground-Water Recharge.** Paluxy ground water produced by well IAW 161-44 is believed contaminated with radium 226/228 by one of two possible mechanisms: (1) radium contaminated water percolating downward from the ground surface behind the casing of the well to the producing interval of the well (failed grout seal between the well casing and the wall of the hole); and (2) radium contaminated rain runoff flowing to the south, downslope into the south fork of Live Oak Creek. Also, the septic sewer system filter bed is located next to a steep bedrock slope which descends directly to the creek. The filter bed is located on the Walnut Formation, only a few feet above the top of the Paluxy aquifer. The Walnut is considered to have hydraulic conductivity too low for ground-water flow, and is suspected to have insufficient ability to hold or dispose of all effluent from the sewer system. If this is correct, excess effluent probably returns to Live Oak Creek. If radium contaminated surface water reaches the creek, by whatever route, it is likely to be picked up by well IAW 161-44 only if the well develops a pumping cone of depression in the water table of the Paluxy aquifer sufficiently deep to reverse the normal ground-water gradient from creek bank to Live Oak Creek, instead allowing ground water to flow from the creek to the well. If well IAW 16-44 produces radium contaminated water from Live Oak Creek, the contaminated water is being recycled by means of the sanitary sewer system. Data have not yet been developed to adequately define the route(s) of radium contaminants from source to well IAW 161-44.

should be well:
32-12-902 TWC

5. **RECOMMENDATIONS.**

a. **Remedial Investigations Consisting Of:**

(1) Additional record searches and interviews should be conducted to obtain more information on radium source locations(s) and other pertinent matters. Especially important are the as-built drawings of the water well in Building 8504 and those of the water and sanitary sewer systems. Electric and sample logs of both the well in Building 8504 and the abandoned well in Building 8502 will be extremely important for determining zonation of the Paluxy aquifer and of significant help in locating the most hydraulically conductive portions of it. Length of the normal pumping period of the well into Building 8504 to replenish water in the water tower adjacent to the well, and the typical period between pumpings are desired data. Information on any dump areas not yet reported and what was placed in them is of special interest. Air Force nuclear authorities will be consulted as to whether maintenance of weapons in Building 8503 could have allowed any radium 226/228 to be released.

(2) Soil borings - background (naturally occurring) radium content. Ten borings 1.5 feet deep, one sample per boring.

(3) Soil borings - sanitary sewer system filter bed. Five borings approximately 5 feet deep, two samples per boring.

(4) Stream samples - North and South Forks of Live Oak Creek - eight water samples, four samples each fork.

(5) Well water samples - two samples for radium anion determination

(6) Pump test of water well IAW 161-44. This test depends upon installation of an **"air line"** in the well through which water levels in the well can be measured while the well is being pumped. The test is designed to discover the magnitude of piezometric slope change to be expected within normal pumping and shutdown periods. If conditions permit, attempt will be made to determine hydraulic conductivity of the Paluxy aquifer by means of the pumping test.

(7) Walnut test boring. Two borings approximately 15 feet deep located near the top of the ridge in the vicinity of well in Building 8504. These borings are to be cored and water pressure tested to better define hydraulic properties of the Walnut Formation.

(8) Continue plotting monthly rainfall against radium content of the well in Building 8504 as developed by Carswell Bioenvironmental Office.

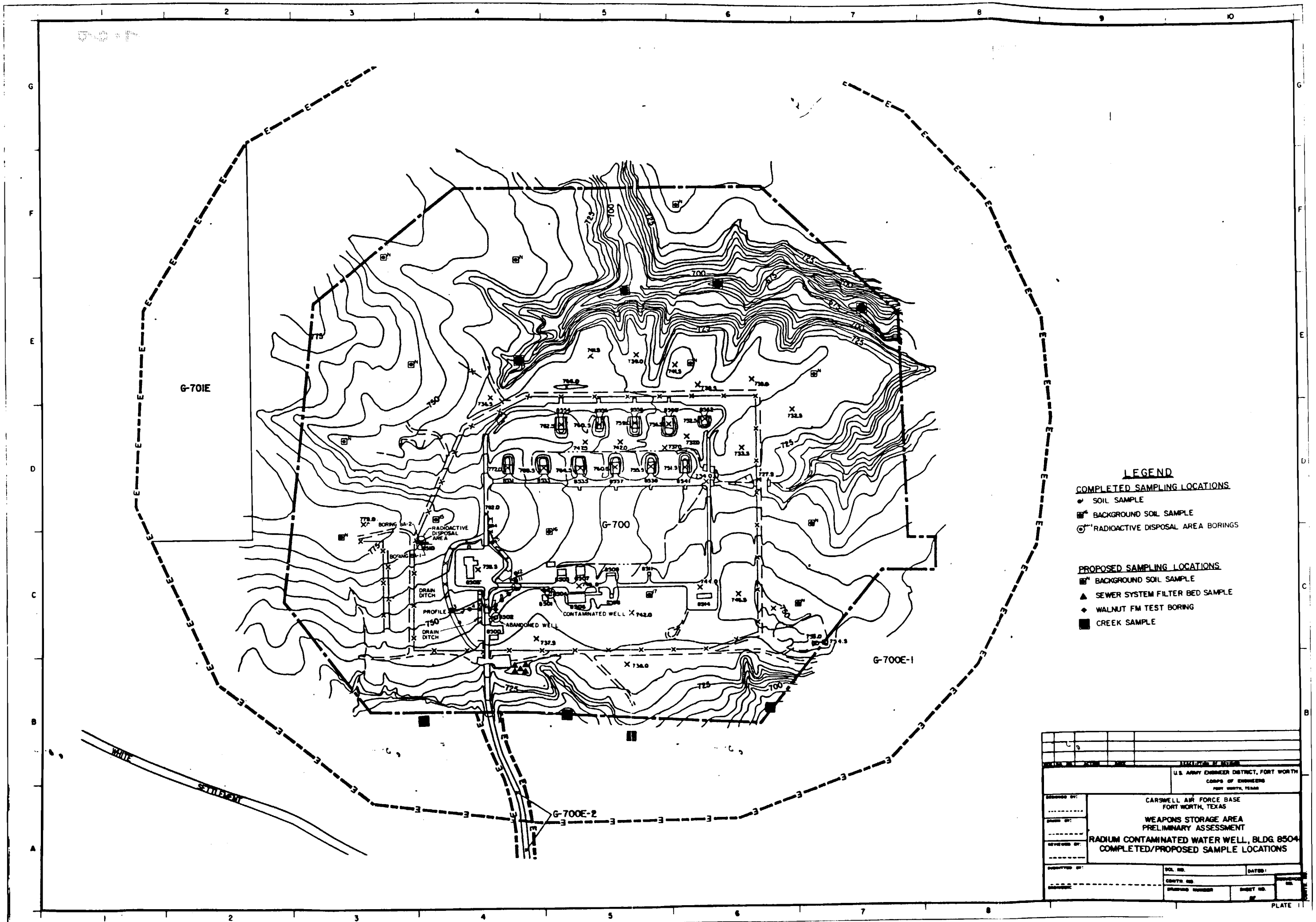
(9) Prepare a report covering results of above investigations.

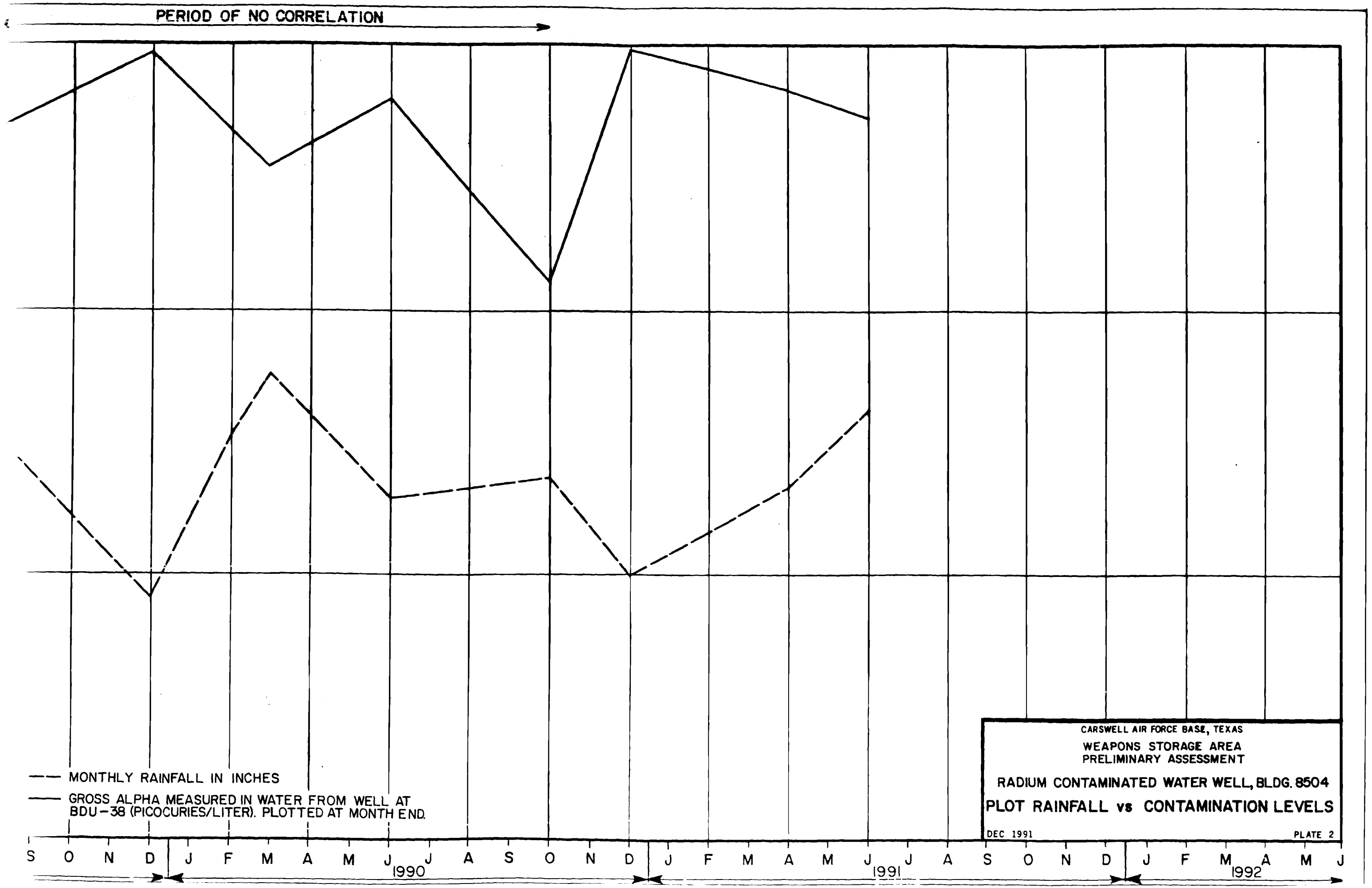
b. **Radioactive Disposal Area.** Prepare remedial design for removal of the three 12-inch diameter cast iron pipes and any surrounding contaminated soil.

6. **COST ESTIMATE.**

a.	Drilling and Sampling.	$ 4,000
b.	Water Sampling.	500
c.	Laboratory Analysis	1,000
d.	Pump Test, Well 161-44.	3,000
e.	Walnut Foundation Borings	3,000
f.	Administration/Report.	8,000
g.	Design/Prepare Plans and Specs Remedial Action - Radioactive Disposal Area.	17,500
	SUB TOTAL	**37,000**
h.	Remedial Action - Radioactive Disposal Area.	30,000
	TOTAL	**$67,000**

7. Above task will be accomplished in FY92.


G-701E
G-700
G-700E-1
G-700E-2
RADIOACTIVE DISPOSAL AREA
BORING SA-2
BORING SA-1
DRAIN DITCH
PROFILE
ABANDONED WELL
CONTAMINATED WELL
WHITE SETTLEMENT
LEGEND
COMPLETED SAMPLING LOCATIONS
SOIL SAMPLE
BACKGROUND SOIL SAMPLE
RADIOACTIVE DISPOSAL AREA BORINGS
PROPOSED SAMPLING LOCATIONS
BACKGROUND SOIL SAMPLE
SEWER SYSTEM FILTER BED SAMPLE
WALNUT FM TEST BORING
CREEK SAMPLE
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS
CARSWELL AIR FORCE BASE
FORT WORTH, TEXAS
WEAPONS STORAGE AREA
PRELIMINARY ASSESSMENT
RADIUM CONTAMINATED WATER WELL, BLDG. 8504
COMPLETED/PROPOSED SAMPLE LOCATIONS
PLATE 1



CARSWELL AIR FORCE BASE, TEXAS

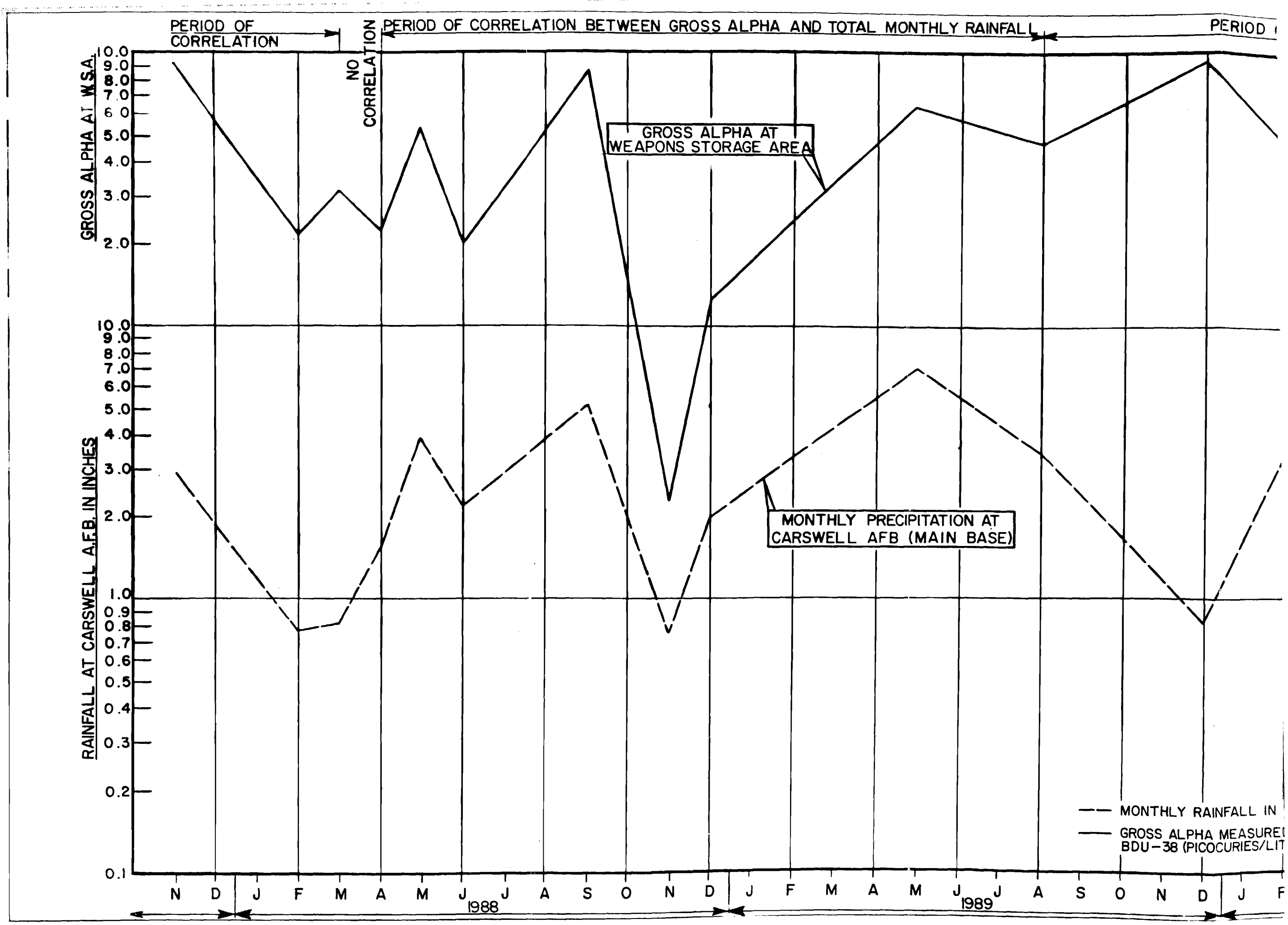
WEAPONS STORAGE AREA
PRELIMINARY ASSESSMENT

RADIUM CONTAMINATED WATER WELL, BLDG. 8504

PLOT RAINFALL vs CONTAMINATION LEVELS

DEC. 1991

PLATE 2


PERIOD OF CORRELATION
NO CORRELATION
PERIOD OF CORRELATION BETWEEN GROSS ALPHA AND TOTAL MONTHLY RAINFALL
PERIOD
GROSS ALPHA AT W.S.A.
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
GROSS ALPHA AT WEAPONS STORAGE AREA
RAINFALL AT CARSWELL A.F.B. IN INCHES
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
MONTHLY PRECIPITATION AT CARSWELL AFB (MAIN BASE)
MONTHLY RAINFALL IN
GROSS ALPHA MEASURED
BDU-38 (PICOCURIES/LIT
N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1988
1989

APPENDIX A

RESULTS OF CHEMICAL ANALYSIS OF SOIL SAMPLES
WEAPONS STORAGE AREA
CARSWELL AIR FORCE BASE, TEXAS

CORPS OF ENGINEERS

SOUTHWESTERN DIVISION LABORATORY

DALLAS, TEXAS

SOUTHWESTERN [illegible] LAB[illegible]ORY, CORPS OF ENGINEERS
[illegible] Street
[illegible] 75235

SUBMITTAL OF SWDED-[illegible] REPORT [illegible] (140 pages)

PROJECT: Fort Worth D[illegible] ontract No.
Feature: Carswell AFB
Weapons Storage Area

TEST REQUEST NO.: E[illegible]
Date Requested: 22 August 199
Date Accepted: 27 August 1991

From: Melvin Green
Chief, Geotechnical Branch

MATERIAL: Th[illegible]

Weapons [illegible] Analyses

Date Rec[illegible]

COMMENTS

[illegible]

[illegible]

07 October 1991

for

Signature

Stephen Brooks

SOUTHWESTERN DIVISION LABORATORY, CORPS OF ENGINEERS
4815 Cass Street
Dallas, Texas 75235

SUBMITTAL OF SWDED-GL REPORT 15398

PROJECT: FORT WORTH DISTRICT FEATURE: CARSWELL AFB WEAPONS STORAGE AREA	Report submitted for payment OCTOBER 1991
TEST REQUEST NO: E87910315 Dated: 22 AUGUST 1991 Received: 27 AUGUST 1991	COST CODE RG1032125080099 DISTRICT: FORT WORTH

	COST
OUTSIDE TESTING	$ 2,475.00
+10%	$ 247.50
	$ 2,722.50
TOTAL AMOUNT DUE THIS REPORT	$ 2,722.50
TOTAL AMOUNT BILLED TO DATE	$ 2,722.50
BALANCE REMAINING ON CURRENT DA 544	$ 1,402.50

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number nuclide conf.value ---------- Activity (pCi/g) ----------

			measured		decay corrected	saturation
1	RA-226	.9991	2.428E+00	+ 0.01%	2.428E+00	0.000E+00
2	AC-228	.9916	2.827E-01	+ 5.30%	2.827E-01	0.000E+00
			---------		---------	---------
	BA-1 A 1.5-2.0		2.711E+00		2.711E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** [illegible] **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	15	338.40	338.5[illegible]	[illegible]	3.209E-01	7.155E-02
2	28	911.07	911.25	[illegible]	2.650E-01	3.134E-02
3	30	968.90	968.99	[illegible]	2.843E-01	6.499E-02

						3.134E-02
RA-226						
1	8	186.[illegible]	185.9[illegible]	[illegible]	2.429E+00	2.242E-01

						2.242E-01

SAMPO 90, 1990 PA,MN,JF. 20-Sep-1991 15:49:15

```
*****************************************************************************
*                                                                           *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T          *
*                                                                           *
*****************************************************************************
```

SCIENTECH, INC., 2105 LUNA RD., CARROLLTON, TX

Sample description: 1-2730
Spectrum file name: AA04749
Sample identifier : AA04749
Sample size : 5.400E+02 g
Measured by : KAS

Start of irradiation : 28-Aug-1991 at 16:43: 8
End of irradiation : 28-Aug-1991 at 16:43: 8
Collect started on : 28-Aug-1991 at 16:43: 8
Collect ended on : 28-Aug-1991 at 18:23: 8

Irradiation time : years 0 days 0 hours 0 minutes
Decay time : years 0 days 0 hours 0 minutes
Live time: 6.000E+03 s real time: 6.000E+03 s dead time: .00 %

Shape calibration requested : GEOM
Shape calibration used : DEFAULT
Created : 1-Jan : 0: 0: 0
Modified : 1-Jan : 0: 0: 0

Energy calibration requested GEOM
Energy calibration used GEOM
Created : 26-Aug-1991 16:34:14
Modified : 26-Aug-1991 16:40:44

Efficiency calibration requested : GEOM
Efficiency calibration used GEOM
Created : 26-Aug-1991 16:43:35
Modified 26-Aug-1991 16:43:35

Last search discrimination level: 4.
Last search FROM channel 1 TO channel 4086
Last fitting discrimination level: 5.
Last fit FROM channel 1 TO channel 4096
Identification energy tolerance 1.
Minimum intensity conv. factor 1.
Gamma reference library ..\LIBRARY\RADIUM.ILF
with 2 isotopes and 4 gamma lines

MDA library name: ..\LIBRARY\RADIUM.ILF
MDA energy tolerance: 1.00 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked background file: NONE
Energy tolerance for peaked background subtraction: 1.00 keV
Threshold factor for peak areas: 1.

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	.9980	1.418E+00 +	18.20%	1.418E+00	0.000E+00
2	AC-228	.9910	5.097E-01 +	9.21%	5.097E-01	0.000E+00
			1.927E+00		1.927E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	10	338.40	338.47	-.07	5.713E-01	2.445E-01
2	16	911.07	911.30	-.23	5.653E-01	1.001E-01
3	17	968.90	968.91	-.01	3.550E-01	2.116E-01
						1.001E-01
RA-226						
1	6	186.00	185.89	.11	1.418E+00	7.724E-01
						7.724E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    15:51:53
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2731
Spectrum file name:  AA04750
Sample identifier :  AA04750
Sample size       :   4.300E+02 g
Measured by       :  KAS

Start of irradiation              :  28-Aug-1991 at  19:12:20
End of irradiation                :  28-Aug-1991 at  19:12:20
Collect started on                :  28-Aug-1991 at  19:12:20
Collect ended on                  :  29-Aug-1991 at   8:15:40

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  4.699E+04 s real time:  4.700E+04 s   dead time:   .01 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1    0: 0: 0
                        Modified  :   1-Jan-   1    0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel    4086
Last fitting discrimination level:    5.00
Last fit        FROM channel       1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured			decay corrected	saturation
1	RA-226	.9982	2.152E+00	+-	8.40%	2.152E+00	0.000E+00
2	AC-228	.9920	6.031E-01	+-	4.29%	6.031E-01	0.000E+00
			2.755E+00			2.755E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	17	338.40	338.52	-.12	5.347E-01	9.260E-02
2	29	911.07	911.22	-.15	6.110E-01	3.687E-02
3	32	968.90	969.01	-.11	6.732E-01	5.210E-02

						3.687E-02
RA-226						
1	10	186.00	185.89	.11	2.152E+00	3.050E-01

						3.050E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    15:54:20
*************************************************************************************
*                                                                                   *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T                   *
*                                                                                   *
*************************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2732
Spectrum file name:  AA04751
Sample identifier :  AA04751
Sample size       :   5.650E+02 g
Measured by       :  KAS

Start of irradiation              :  29-Aug-1991 at    8:18:52
End of irradiation                :  29-Aug-1991 at    8:18:52
Collect started on                :  29-Aug-1991 at    8:18:52
Collect ended on                  :  29-Aug-1991 at    9:58:52

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9987	2.274E+00 +- 12.86%	2.274E+00	0.000E+00
2	AC-228	.9739	4.409E-01 +- 8.78%	4.409E-01	0.000E+00
			2.715E+00	2.715E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	11	338.40	338.64	-.24	4.390E-01	2.080E-01
2	16	911.07	911.22	-.15	4.417E-01	6.434E-02
3	17	968.90	969.19	-.29	4.409E-01	1.630E-01
						6.434E-02
RA-226						
1	7	186.00	185.91	.09	2.275E+00	7.079E-01
						7.079E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    15:58:11
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2733
Spectrum file name:  AA04752
Sample identifier :  AA04752
Sample size       :   3.790E+02 g
Measured by       :  KAS

Start of irradiation              :  29-Aug-1991 at  20: 1:52
End of irradiation                :  29-Aug-1991 at  20: 1:52
Collect started on                :  29-Aug-1991 at  20: 1:52
Collect ended on                  :  30-Aug-1991 at   8: 8:13

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  4.354E+04 s real time:  4.358E+04 s   dead time:   .09 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1    0: 0: 0
                        Modified  :   1-Jan-   1    0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel    4086
Last fitting discrimination level:    5.00
Last fit        FROM channel       1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	.9953	1.052E+02 +-	6.92%	1.052E+02	3.922E+00
2	AC-228	.9756	5.142E-01 +-	5.81%	5.142E-01	3.993E+00
			1.057E+02		1.057E+02	7.916E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	24	338.40	338.58	-.18	6.478E-01	2.775E-01
2	48	911.07	911.29	-.22	4.986E-01	9.099E-02
3	52	968.90	969.17	-.27	4.834E-01	1.569E-01

						9.099E-02
RA-226						
1	14	186.00	185.83	.17	1.052E+02	8.985E-01

						8.985E-01

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17: 7:14
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2734
Spectrum file name:  AA04753
Sample identifier :  AA04753
Sample size       :   4.980E+02 g
Measured by       :  KAS

Start of irradiation              :  30-Aug-1991 at  15:43:42
End of irradiation                :  30-Aug-1991 at  15:43:42
Collect started on                :  30-Aug-1991 at  15:43:42
Collect ended on                  :  30-Aug-1991 at  17:23:42

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:           1.00 keV
MDA decision limit 1-alpha:    95.00 %
MDA detection limit 1-beta:    95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9991	2.932E+00 +- 12.74%	2.932E+00	0.000E+00
2	AC-228	.9830	3.529E-01 +- 11.36%	3.529E-01	0.000E+00
			3.284E+00	3.284E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.65	-.25	4.192E-01	2.199E-01
2	15	911.07	911.25	-.18	3.214E-01	9.319E-02
3	16	968.90	969.00	-.10	3.696E-01	2.016E-01

						9.319E-02
RA-226						
1	5	186.00	186.08	-.08	2.931E+00	7.696E-01

						7.696E-01

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9997	2.273E+00 +- 12.74%	2.273E+00	0.000E+00
2	AC-228	.9831	1.616E-01 +- 22.87%	1.616E-01	0.000E+00
			2.435E+00	2.435E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	352.20	-13.80	0.000E+00	2.671E-01
2	14	911.07	911.40	-.33	1.616E-01	7.838E-02
3	14	968.90	911.40	57.50	0.000E+00	2.288E-01

						7.838E-02
RA-226						
1	5	186.00	185.95	.05	2.273E+00	6.769E-01

						6.769E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:16:31
*********************************************************************************
*                                                                               *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T              *
*                                                                               *
*********************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2736
Spectrum file name:  AA04755
Sample identifier :  AA04755
Sample size       :   4.740E+02 g
Measured by       :  KAS

Start of irradiation              :  31-Aug-1991 at  11:21:34
End of irradiation                :  31-Aug-1991 at  11:21:34
Collect started on                :  31-Aug-1991 at  11:21:34
Collect ended on                  :  31-Aug-1991 at  13: 1:34

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :     1.00
Minimum intensity conv. factor   :     1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:           1.00 keV
MDA decision limit 1-alpha:    95.00 %
MDA detection limit 1-beta:    95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:       1.00 keV
Threshold factor for peak areas:       1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9978	2.244E+00 +- 14.57%	2.244E+00	0.000E+00
2	AC-228	.9886	6.785E-01 +- 8.01%	6.785E-01	0.000E+00
			2.922E+00	2.922E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	10	338.40	338.54	-.14	6.303E-01	2.584E-01
2	16	911.07	911.23	-.16	6.410E-01	9.394E-02
3	17	968.90	969.06	-.16	8.090E-01	1.848E-01

						9.394E-02
RA-226						
1	5	186.00	185.88	.12	2.244E+00	8.658E-01

						8.658E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:19:59
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2737
Spectrum file name:  AA04756
Sample identifier :  AA04756
Sample size       :   4.650E+02 g
Measured by       :  KAS

Start of irradiation                :  31-Aug-1991 at  13:48:28
End of irradiation                  :  31-Aug-1991 at  13:48:28
Collect started on                  :  31-Aug-1991 at  13:48:28
Collect ended on                    :   1-Sep-1991 at  17:35:21

Irradiation time                    :      0 years   0 days  0 hours  0 minutes
Decay time                          :      0 years   0 days  0 hours  0 minutes
Live time:  1.000E+05 s real time:  1.000E+05 s   dead time:   .01 %

Shape calibration requested         :  GEOM3
Shape calibration used              :  DEFAULT
                         Created    :   1-Jan-   1    0: 0: 0
                         Modified   :   1-Jan-   1    0: 0: 0

Energy calibration requested        :  GEOM3
Energy calibration used             :  GEOM3
                         Created    :  26-Aug-1991   16:34:14
                         Modified   :  26-Aug-1991   16:40:44

Efficiency calibration requested    :  GEOM3
Efficiency calibration used         :  GEOM3
                         Created    :  26-Aug-1991   16:43:35
                         Modified   :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel    4086
Last fitting discrimination level:    4.00
Last fit        FROM channel        1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:           1.00 keV
MDA decision limit 1-alpha:    95.00 %
MDA detection limit 1-beta:    95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	.9991	2.227E+00 +-	7.62%	2.227E+00	3.197E+00
2	AC-228	.9767	8.107E-01 +-	3.57%	8.107E-01	3.255E+00
			3.038E+00		3.038E+00	6.452E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	21	338.40	338.55	-.15	7.409E-01	6.449E-02
2	38	911.07	911.35	-.28	8.255E-01	2.709E-02
3	41	968.90	969.12	-.22	8.764E-01	4.411E-02
						2.709E-02
RA-226						
1	12	186.00	185.93	.07	2.228E+00	2.193E-01
						2.193E-01

```
SAMPO 90, 1990 PA,MN,JR.                                  20-Sep-1991    17:22:33
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2738
Spectrum file name:  AA04757
Sample identifier :  AA04757
Sample size       :   4.720E+02 g
Measured by       :  KAS

Start of irradiation              :   1-Sep-1991 at  15:32:24
End of irradiation                :   1-Sep-1991 at  15:32:24
Collect started on                :   1-Sep-1991 at  15:32:24
Collect ended on                  :   1-Sep-1991 at  17:34:17

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  7.312E+03 s real time:  7.313E+03 s   dead time:   .01 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1    0: 0: 0
                        Modified  :   1-Jan-   1    0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel    4086
Last fitting discrimination level:    4.00
Last fit        FROM channel       1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9999	2.603E+00 +- 12.57%	2.603E+00	0.000E+00
2	AC-228	.9716	9.127E-01 +- 5.65%	9.127E-01	0.000E+00
			3.515E+00	3.515E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	10	338.40	338.51	-.11	9.330E-01	2.189E-01
2	18	911.07	911.39	-.32	7.291E-01	1.136E-01
3	20	968.90	969.15	-.25	1.126E+00	1.058E-01

						1.058E-01
RA-226						
1	5	186.00	185.97	.03	2.603E+00	8.388E-01

						8.388E-01

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:25:45
*****************************************************************************
*                                                                           *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T          *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2739
Spectrum file name:  AA04758
Sample identifier :  AA04758
Sample size       :   4.580E+02 g
Measured by       :  KAS

Start of irradiation              :   1-Sep-1991 at  17:35:32
End of irradiation                :   1-Sep-1991 at  17:35:32
Collect started on                :   1-Sep-1991 at  17:35:32
Collect ended on                  :   2-Sep-1991 at   7:20:17

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  4.948E+04 s real time:  4.949E+04 s   dead time:    .02 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	.9997	2.805E+00 +-	8.02%	2.805E+00	0.000E+00
2	AC-228	.9747	8.828E-01 +-	3.82%	8.828E-01	0.000E+00
			3.688E+00		3.688E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	21	338.40	338.57	-.17	8.107E-01	9.934E-02
2	34	911.07	911.33	-.26	8.670E-01	4.545E-02
3	37	968.90	969.15	-.25	9.961E-01	6.528E-02

						4.545E-02
RA-226						
1	12	186.00	185.96	.04	2.805E+00	3.500E-01

						3.500E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:28:11
*************************************************************************************
*                                                                                   *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T                  *
*                                                                                   *
*************************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2740
Spectrum file name:  AA04759
Sample identifier :  AA04759
Sample size       :   4.820E+02 g
Measured by       :  KAS

Start of irradiation              :   2-Sep-1991 at   7:43:52
End of irradiation                :   2-Sep-1991 at   7:43:52
Collect started on                :   2-Sep-1991 at   7:43:52
Collect ended on                  :   2-Sep-1991 at   9:23:52

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked background file:  NONE
Energy tolerance for peaked background subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9998	2.048E+00 +- 15.10%	2.048E+00	0.000E+00
2	AC-228	.9747	4.053E-01 +- 11.47%	4.053E-01	0.000E+00
			2.453E+00	2.453E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.64	-.24	5.463E-01	2.093E-01
2	14	911.07	911.39	-.32	3.484E-01	8.688E-02
3	14	968.90	911.39	57.51	0.000E+00	3.130E-01

						8.688E-02
RA-226						
1	5	186.00	185.96	.04	2.048E+00	8.442E-01

						8.442E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:30:38
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2741
Spectrum file name:  AA04760
Sample identifier :  AA04760
Sample size       :   5.080E+02 g
Measured by       :  KAS

Start of irradiation              :   2-Sep-1991 at   9:57:52
End of irradiation                :   2-Sep-1991 at   9:57:52
Collect started on                :   2-Sep-1991 at   9:57:52
Collect ended on                  :   2-Sep-1991 at  11:37:52

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:   .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                         Created  :   1-Jan-   1     0: 0: 0
                         Modified :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                         Created  :  26-Aug-1991   16:34:14
                         Modified :  26-Aug-1991   16:40:44

Efficiency calibration requested :  GEOM3
Efficiency calibration used       :  GEOM3
                         Created  :  26-Aug-1991   16:43:35
                         Modified :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	.9991	2.703E+00	+- 12.57%	2.703E+00	0.000E+00
2	AC-228	.9706	4.673E-01	+- 9.11%	4.673E-01	0.000E+00
			3.170E+00		3.170E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:32:50
*********************************************************************************
*                                                                               *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T               *
*                                                                               *
*********************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2742
Spectrum file name:  AA04761
Sample identifier :  AA04761
Sample size       :   5.510E+02 g
Measured by       :  KAS

Start of irradiation              :   2-Sep-1991 at  12: 3:38
End of irradiation                :   2-Sep-1991 at  12: 3:38
Collect started on                :   2-Sep-1991 at  12: 3:38
Collect ended on                  :   2-Sep-1991 at  13:43:38

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel       1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9999	2.626E+00 +- 12.20%	2.626E+00	0.000E+00
2	AC-228	.9868	3.916E-01 +- 10.00%	3.916E-01	0.000E+00
			3.018E+00	3.018E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	10	338.40	338.55	-.15	3.974E-01	2.173E-01
2	15	911.07	911.26	-.19	3.743E-01	1.019E-01
3	16	968.90	969.06	-.16	4.197E-01	1.551E-01

						1.019E-01
RA-226						
1	6	186.00	186.02	-.02	2.626E+00	7.767E-01

						7.767E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:39:41
*************************************************************************************
*                                                                                   *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T                  *
*                                                                                   *
*************************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2743
Spectrum file name:  AA04762
Sample identifier :  AA04762
Sample size       :   5.910E+02 g
Measured by       :  KAS

Start of irradiation              :   2-Sep-1991 at  15: 5:40
End of irradiation                :   2-Sep-1991 at  15: 5:40
Collect started on                :   2-Sep-1991 at  15: 5:40
Collect ended on                  :   2-Sep-1991 at  16:45:40

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance   :    1.00
Minimum intensity conv. factor    :    1.00
Gamma reference library           :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:       1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9988	2.584E+00 +- 12.72%	2.584E+00	0.000E+00
2	AC-228	.9845	4.494E-01 +- 8.77%	4.494E-01	0.000E+00
			3.033E+00	3.033E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.59	-.19	5.714E-01	2.163E-01
2	14	911.07	911.21	-.14	3.528E-01	9.546E-02
3	15	968.90	969.11	-.21	5.693E-01	1.771E-01

						9.546E-02
RA-226						
1	5	186.00	185.91	.09	2.585E+00	6.601E-01

						6.601E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:43:27
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2744
Spectrum file name:  AA04763
Sample identifier :  AA04763
Sample size       :   4.170E+02 g
Measured by       :  KAS

Start of irradiation              :   3-Sep-1991 at   8: 4: 8
End of irradiation                :   3-Sep-1991 at   8: 4: 8
Collect started on                :   3-Sep-1991 at   8: 4: 8
Collect ended on                  :   3-Sep-1991 at  21:11:34

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  4.724E+04 s real time:  4.725E+04 s   dead time:   .01 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                         Created  :   1-Jan-   1     0: 0: 0
                         Modified :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                         Created  :  26-Aug-1991    16:34:14
                         Modified :  26-Aug-1991    16:40:44

Efficiency calibration requested :  GEOM3
Efficiency calibration used       :  GEOM3
                         Created  :  26-Aug-1991    16:43:35
                         Modified :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel       1 TO channel     4096
Identification.energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured			decay corrected	saturation
1	RA-226	.9999	3.323E+00	+-	7.84%	3.323E+00	0.000E+00
2	AC-228	.9888	7.426E-01	+-	4.24%	7.426E-01	0.000E+00
			4.065E+00			4.065E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	21	338.40	338.60	-.20	6.780E-01	1.087E-01
2	34	911.07	911.23	-.16	7.349E-01	3.368E-02
3	37	968.90	968.98	-.08	8.552E-01	4.165E-02

						3.368E-02
RA-226						
1	12	186.00	185.98	.02	3.323E+00	3.575E-01

						3.575E-01

```
GAMPD 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:46: 8
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2745
Spectrum file name:  AA04764
Sample identifier :  AA04764
Sample size       :   4.180E+02 g
Measured by       :  KAS

Start of irradiation              :   3-Sep-1991 at   8:10: 0
End of irradiation                :   3-Sep-1991 at   8:10: 0
Collect started on                :   3-Sep-1991 at   8:10: 0
Collect ended on                  :   3-Sep-1991 at   9:50: 0

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                         Created  :   1-Jan-   1     0: 0: 0
                         Modified :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                         Created  :  26-Aug-1991   16:34:14
                         Modified :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                         Created  :  26-Aug-1991   16:43:35
                         Modified :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel    4086
Last fitting discrimination level:    4.00
Last fit        FROM channel       1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********* R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9988	3.686E+00 +- 12.94%	3.686E+00	0.000E+00
2	AC-228	.9919	8.801E-01 +- 7.34%	8.801E-01	0.000E+00
			4.566E+00	4.566E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	11	338.40	338.57	-.17	8.709E-01	2.997E-01
2	18	911.07	911.22	-.15	8.466E-01	1.109E-01
3	19	968.90	968.93	-.03	9.632E-01	1.865E-01

						1.109E-01
RA-226						
1	6	186.00	186.09	-.09	3.685E+00	1.060E+00

						1.060E+00

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:48:27
*************************************************************************
*                                                                       *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T      *
*                                                                       *
*************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2746
Spectrum file name:  AA04765
Sample identifier :  AA04765
Sample size       :   4.250E+02 g
Measured by       :  KAS

Start of irradiation              :   3-Sep-1991 at  12: 8: 0
End of irradiation                :   3-Sep-1991 at  12: 8: 0
Collect started on                :   3-Sep-1991 at  12: 8: 0
Collect ended on                  :   3-Sep-1991 at  13:48: 0

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :     1.00
Minimum intensity conv. factor   :     1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:       1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9989	2.177E+00 +- 15.53%	2.177E+00	0.000E+00
2	AC-228	.9875	6.088E-01 +- 8.45%	6.088E-01	0.000E+00
			2.786E+00	2.786E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.53	-.13	5.710E-01	2.705E-01
2	17	911.07	911.32	-.25	5.709E-01	1.087E-01
3	18	968.90	968.94	-.04	7.419E-01	2.014E-01
						1.087E-01
RA-226						
1	6	186.00	185.92	.08	2.178E+00	9.446E-01
						9.446E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    17:52: 1
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2747
Spectrum file name:  AA04766
Sample identifier :  AA04766
Sample size       :   4.990E+02 g
Measured by       :  KAS

Start of irradiation              :   4-Sep-1991 at   8:13:36
End of irradiation                :   4-Sep-1991 at   8:13:36
Collect started on                :   4-Sep-1991 at   8:13:36
Collect ended on                  :   4-Sep-1991 at   9:53:36

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:   .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1    0: 0: 0
                        Modified  :   1-Jan-   1    0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel    4086
Last fitting discrimination level:    4.00
Last fit        FROM channel       1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:           1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9998	2.369E+00 +- 13.07%	2.369E+00	0.000E+00
			2.369E+00	2.369E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.71	-.31	2.850E-01	2.347E-01
2	15	911.07	1120.65	-209.58	0.000E+00	2.047E-01
3	15	968.90	1120.65	-151.75	0.000E+00	3.199E-01

						2.047E-01
RA-226						
1	5	186.00	185.96	.04	2.369E+00	7.517E-01

						7.517E-01

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:15:52
*********************************************************************************
*                                                                               *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T              *
*                                                                               *
*********************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2748
Spectrum file name:  AA04767u
Sample identifier :  AA04767
Sample size       :   4.180E+02 g
Measured by       :  KAS

Start of irradiation              :   4-Sep-1991 at  10:52: 8
End of irradiation                :   4-Sep-1991 at  10:52: 8
Collect started on                :   4-Sep-1991 at  10:52: 8
Collect ended on                  :   4-Sep-1991 at  12:32: 8

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
With     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:       1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	1.0000	3.225E+00 +- 12.97%	3.225E+00	0.000E+00
2	AC-228	.9762	9.590E-01 +- 7.06%	9.590E-01	0.000E+00
			4.184E+00	4.184E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	10	338.40	338.54	-.14	9.312E-01	3.073E-01
2	16	911.07	911.27	-.20	8.893E-01	1.104E-01
3	17	968.90	969.20	-.30	1.166E+00	2.634E-01
						1.104E-01
RA-226						
1	5	186.00	185.99	.01	3.225E+00	1.033E+00
						1.033E+00

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:21:23
*************************************************************************************
*                                                                                   *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T                   *
*                                                                                   *
*************************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2749
Spectrum file name:  AA04768
Sample identifier :  AA04768
Sample size       :   4.270E+02 g
Measured by       :  KAS

Start of irradiation              :   4-Sep-1991 at  13:16: 0
End of irradiation                :   4-Sep-1991 at  13:16: 0
Collect started on                :   4-Sep-1991 at  13:16: 0
Collect ended on                  :   4-Sep-1991 at  14:56: 0

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9957	4.220E+00 +- 12.37%	4.220E+00	0.000E+00
2	AC-228	.9643	9.188E-01 +- 7.34%	9.188E-01	0.000E+00
			5.139E+00	5.139E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	11	338.40	338.56	-.16	7.095E-01	3.144E-01
2	17	911.07	911.28	-.21	9.801E-01	1.008E-01
3	18	968.90	969.29	-.39	1.064E+00	2.341E-01
						1.008E-01
RA-226						
1	6	186.00	186.16	-.16	4.218E+00	8.870E-01
						8.870E-01

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:25: 9
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2750
Spectrum file name:  AA04769
Sample identifier :  AA04769
Sample size       :   3.940E+02 g
Measured by       :  KAS

Start of irradiation              :   4-Sep-1991 at  15:22:48
End of irradiation                :   4-Sep-1991 at  15:22:48
Collect started on                :   4-Sep-1991 at  15:22:48
Collect ended on                  :   4-Sep-1991 at  17: 2:48

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance   :    1.00
Minimum intensity conv. factor    :    1.00
Gamma reference library           :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:       1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9996	3.415E+00 +- 14.09%	3.415E+00	0.000E+00
2	AC-228	.9888	1.122E+00 +- 6.71%	1.122E+00	0.000E+00
			4.537E+00	4.537E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	11	338.40	338.56	-.16	1.057E+00	3.132E-01
2	18	911.07	911.21	-.14	1.251E+00	1.070E-01
3	19	968.90	969.05	-.15	1.003E+00	1.201E-01
						1.070E-01
RA-226						
1	5	186.00	185.95	.05	3.416E+00	1.086E+00
						1.086E+00

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:29: 9
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2751
Spectrum file name:  AA04770
Sample identifier :  AA04770
Sample size       :   4.320E+02 g
Measured by       :  KAS

Start of irradiation              :   4-Sep-1991 at  17:48:12
End of irradiation                :   4-Sep-1991 at  17:48:12
Collect started on                :   4-Sep-1991 at  17:48:12
Collect ended on                  :   4-Sep-1991 at  19:28:12

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********* R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

umber	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9999	3.301E+00 +- 12.63%	3.301E+00	0.000E+00
2	AC-228	.9921	8.892E-01 +- 7.43%	8.892E-01	0.000E+00
			4.190E+00	4.190E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	11	338.40	338.48	-.08	7.946E-01	3.088E-01
2	17	911.07	911.21	-.14	1.056E+00	1.021E-01
3	18	968.90	969.06	-.16	7.349E-01	2.108E-01

						1.021E-01
RA-226						
1	6	186.00	185.98	.02	3.301E+00	9.596E-01

						9.596E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:35: 1
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2752
Spectrum file name:  AA04771
Sample identifier :  AA04771
Sample size       :   4.310E+02 g
Measured by       :  KAS

Start of irradiation              :   4-Sep-1991 at  19:40: 2
End of irradiation                :   4-Sep-1991 at  19:40: 2
Collect started on                :   4-Sep-1991 at  19:40: 2
Collect ended on                  :   5-Sep-1991 at   8:19:37

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  4.557E+04 s real time:  4.558E+04 s   dead time:    .02 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :     1.00
Minimum intensity conv. factor   :     1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	1.0000	3.098E+00 +-	8.22%	3.098E+00	0.000E+00
2	AC-228	.9814	9.265E-01 +-	3.96%	9.265E-01	0.000E+00
			4.025E+00		4.025E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	19	338.40	338.56	-.16	9.319E-01	1.011E-01
2	33	911.07	911.31	-.24	8.504E-01	4.620E-02
3	36	968.90	969.08	-.18	1.097E+00	5.791E-02

						4.620E-02
RA-226						
1	10	186.00	185.99	.01	3.099E+00	3.561E-01

						3.561E-01

```
*****************************************************************************
*                                                                           *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T          *
*                                                                           *
*****************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2753
Spectrum file name:  AA04772
Sample identifier :  AA04772
Sample size       :   4.430E+02 g
Measured by       :  KAS

Start of irradiation              :   5-Sep-1991 at  14: 6:28
End of irradiation                :   5-Sep-1991 at  14: 6:28
Collect started on                :   5-Sep-1991 at  14: 6:28
Collect ended on                  :   5-Sep-1991 at  15:46:28

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9978	3.214E+00 +- 13.30%	3.214E+00	0.000E+00
2	AC-228	.9959	6.905E-01 +- 8.08%	6.905E-01	0.000E+00
			3.905E+00	3.905E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.50	-.10	7.642E-01	2.993E-01
2	16	911.07	911.17	-.10	5.738E-01	1.139E-01
3	17	968.90	968.82	.08	9.523E-01	1.573E-01

						1.139E-01
RA-226						
1	6	186.00	185.88	.12	3.215E+00	9.725E-01

						9.725E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:47: 6
*****************************************************************************
*                                                                           *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T          *
*                                                                           *
*****************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2754
Spectrum file name:  AA04773
Sample identifier :  AA04773
Sample size       :   4.320E+02 g
Measured by       :  KAS

Start of irradiation              :   5-Sep-1991 at  19:10:14
End of irradiation                :   5-Sep-1991 at  19:10:14
Collect started on                :   5-Sep-1991 at  19:10:14
Collect ended on                  :   6-Sep-1991 at  10:41:43

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  5.588E+04 s real time:  5.589E+04 s   dead time:   .01 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9994	3.315E+00 +- 7.73%	3.315E+00	0.000E+00
2	AC-228	.9761	6.597E-01 +- 4.17%	6.597E-01	0.000E+00
			3.974E+00	3.974E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	20	338.40	338.57	-.17	6.352E-01	9.126E-02
2	34	911.07	911.32	-.25	6.278E-01	4.032E-02
3	37	968.90	969.14	-.24	7.824E-01	5.219E-02

						4.032E-02
RA-226						
1	11	186.00	185.94	.06	3.315E+00	2.966E-01

						2.966E-01

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    13:50:47
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2755
Spectrum file name:  AA04774
Sample identifier :  AA04774
Sample size       :   5.080E+02 g
Measured by       :  KAS

Start of irradiation              :   6-Sep-1991 at  10:43:40
End of irradiation                :   6-Sep-1991 at  10:43:40
Collect started on                :   6-Sep-1991 at  10:43:40
Collect ended on                  :   6-Sep-1991 at  12:23:40

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance   :    1.00
Minimum intensity conv. factor    :    1.00
Gamma reference library           :  ..\LIBRARY\RADIUM.ILF
With     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9998	2.109E+00 +- 16.74%	2.109E+00	0.000E+00
2	AC-228	.9971	3.659E-01 +- 11.90%	3.659E-01	0.000E+00
			2.475E+00	2.475E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.45	-.05	4.974E-01	2.125E-01
2	14	911.07	911.19	-.12	3.151E-01	8.882E-02
3	15	968.90	969.18	-.28	0.000E+00	3.510E-01

						8.882E-02
RA-226						
1	5	186.00	186.04	-.04	2.109E+00	7.705E-01

						7.705E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    21-Sep-1991     9: 4:55
*****************************************************************************
*                                                                           *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T          *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2756
Spectrum file name:  AA04775
Sample identifier :  AA04775
Sample size       :   4.720E+02 g
Measured by       :  KAS

Start of irradiation              :   6-Sep-1991 at  12:28:58
End of irradiation                :   6-Sep-1991 at  12:28:58
Collect started on                :   6-Sep-1991 at  12:28:58
Collect ended on                  :   6-Sep-1991 at  14: 8:58

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:   .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1    0: 0: 0
                        Modified  :   1-Jan-   1    0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991   16:34:14
                        Modified  :  26-Aug-1991   16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991   16:43:35
                        Modified  :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel      10 TO channel    4086
Last fitting discrimination level:    5.00
Last fit        FROM channel       1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9998	3.082E+00 +- 13.40%	3.082E+00	0.000E+00
2	AC-228	.9760	1.081E+00 +- 5.94%	1.081E+00	0.000E+00
			4.164E+00	4.164E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	13	338.40	338.59	-.19	1.031E+00	2.992E-01
2	22	911.07	911.37	-.30	9.051E-01	1.133E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    14:33:34
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2757
Spectrum file name:  AA04776
Sample identifier :  AA04776
Sample size       :   3.590E+02 g
Measured by       :  KAS

Start of irradiation                :   6-Sep-1991 at  14:46:28
End of irradiation                  :   6-Sep-1991 at  14:46:28
Collect started on                  :   6-Sep-1991 at  14:46:28
Collect ended on                    :   6-Sep-1991 at  16:26:28

Irradiation time                    :      0 years   0 days  0 hours  0 minutes
Decay time                          :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:   .00 %

Shape calibration requested         :  GEOM3
Shape calibration used              :  DEFAULT
                         Created    :   1-Jan-   1    0: 0: 0
                         Modified   :   1-Jan-   1    0: 0: 0

Energy calibration requested        :  GEOM3
Energy calibration used             :  GEOM3
                         Created    :  26-Aug-1991   16:34:14
                         Modified   :  26-Aug-1991   16:40:44

Efficiency calibration requested    :  GEOM3
Efficiency calibration used         :  GEOM3
                         Created    :  26-Aug-1991   16:43:35
                         Modified   :  26-Aug-1991   16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel    4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel    4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9961	3.838E+00 +- 12.55%	3.838E+00	0.000E+00
2	AC-228	.9617	1.054E+00 +- 7.55%	1.054E+00	0.000E+00
			4.892E+00	4.892E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	11	338.40	338.60	-.20	9.108E-01	3.476E-01
2	18	911.07	911.41	-.34	1.121E+00	9.859E-02
3	19	968.90	969.20	-.30	1.071E+00	2.832E-01

						9.859E-02
RA-226						
1	6	186.00	186.16	-.16	3.836E+00	1.154E+00

						1.154E+00

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    14:38: 1
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2758
Spectrum file name:  AA04777
Sample identifier :  AA04777
Sample size       :   4.630E+02 g
Measured by       :  KAS

Start of irradiation              :   6-Sep-1991 at  16:55:16
End of irradiation                :   6-Sep-1991 at  16:55:16
Collect started on                :   6-Sep-1991 at  16:55:16
Collect ended on                  :   7-Sep-1991 at  20:42: 9

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  1.000E+05 s real time:  1.000E+05 s   dead time:   .01 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance   :    1.00
Minimum intensity conv. factor    :    1.00
Gamma reference library           :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:       1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	RA-226	.9999	3.272E+00 +-	7.37%	3.272E+00	0.000E+00
2	AC-228	.9796	7.580E-01 +-	3.74%	7.580E-01	0.000E+00
			4.030E+00		4.030E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	23	338.40	338.55	-.15	7.639E-01	6.395E-02
2	37	911.07	911.33	-.26	7.156E-01	2.394E-02
3	40	968.90	969.09	-.19	8.584E-01	3.876E-02

						2.394E-02
RA-226						
1	12	186.00	185.98	.02	3.272E+00	2.167E-01

						2.167E-01

```
SAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    14:41:52
*************************************************************************
*                                                                       *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T       *
*                                                                       *
*************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2759
Spectrum file name:  AA04778
Sample identifier :  AA04778
Sample size       :   5.470E+02 g
Measured by       :  KAS

Start of irradiation              :   9-Sep-1991 at  14: 8: 4
End of irradiation                :   9-Sep-1991 at  14: 8: 4
Collect started on                :   9-Sep-1991 at  14: 8: 4
Collect ended on                  :   9-Sep-1991 at  15:48: 4

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    4.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	1.0000	2.983E+00 +- 12.01%	2.983E+00	0.000E+00
2	AC-228	.9679	4.681E-01 +- 8.98%	4.681E-01	0.000E+00
			3.451E+00	3.451E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	10	338.40	338.51	-.11	3.099E-01	2.345E-01
2	15	911.07	911.11	-.04	5.024E-01	9.664E-02
3	16	968.90	969.34	-.44	5.748E-01	1.691E-01

						9.664E-02
RA-226						
1	6	186.00	186.00	.00	2.983E+00	7.122E-01

						7.122E-01

```
GAMPO 90, 1990 PA,MN,JR.                                    20-Sep-1991    14:45:54
*************************************************************************************
*                                                                                   *
*      G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T                  *
*                                                                                   *
*************************************************************************************
SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2760
Spectrum file name:  AA04779
Sample identifier :  AA04779
Sample size       :   5.770E+02 g
Measured by       :  KAS

Start of irradiation              :   9-Sep-1991 at  16:25:56
End of irradiation                :   9-Sep-1991 at  16:25:56
Collect started on                :   9-Sep-1991 at  16:25:56
Collect ended on                  :   9-Sep-1991 at  18: 5:56

Irradiation time                  :      0 years   0 days  0 hours  0 minutes
Decay time                        :      0 years   0 days  0 hours  0 minutes
Live time:  6.000E+03 s real time:  6.000E+03 s   dead time:    .00 %

Shape calibration requested       :  GEOM3
Shape calibration used            :  DEFAULT
                        Created   :   1-Jan-   1     0: 0: 0
                        Modified  :   1-Jan-   1     0: 0: 0

Energy calibration requested      :  GEOM3
Energy calibration used           :  GEOM3
                        Created   :  26-Aug-1991    16:34:14
                        Modified  :  26-Aug-1991    16:40:44

Efficiency calibration requested  :  GEOM3
Efficiency calibration used       :  GEOM3
                        Created   :  26-Aug-1991    16:43:35
                        Modified  :  26-Aug-1991    16:43:35

Last search  discrimination level:    4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:    5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :    1.00
Minimum intensity conv. factor   :    1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
with     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	RA-226	.9986	2.919E+00 +- 11.34%	2.919E+00	0.000E+00
			2.919E+00	2.919E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

```
SAMPO 90, 1990 PA,MN,JR.                                  20-Sep-1991    14:58:31
*****************************************************************************
*                                                                           *
*     G A M M A   S P E C T R U M   A N A L Y S I S   R E P O R T           *
*                                                                           *
*****************************************************************************
 SCIENTECH, INC.,  2105 LUNA RD., CARROLLTON,TX
Sample description:  1-2761
Spectrum file name:  AA04780
Sample identifier :  AA04780
Sample size       :   4.470E+02 g
Measured by       :  KAS

Start of irradiation                :   9-Sep-1991 at  18:39: 2
End of irradiation                  :   9-Sep-1991 at  18:39: 2
Collect started on                  :   9-Sep-1991 at  18:39: 2
Collect ended on                    :  10-Sep-1991 at   7:49:40

Irradiation time                    :      0 years   0 days  0 hours  0 minutes
Decay time                          :      0 years   0 days  0 hours  0 minutes
Live time:  4.743E+04 s real time:  4.744E+04 s   dead time:   .01 %

Shape calibration requested         :  GEOM3
Shape calibration used              :  DEFAULT
                         Created    :   1-Jan-   1    0: 0: 0
                         Modified   :   1-Jan-   1    0: 0: 0

Energy calibration requested        :  GEOM3
Energy calibration used             :  GEOM3
                         Created    :  26-Aug-1991   16:34:14
                         Modified   :  26-Aug-1991   16:40:44

Efficiency calibration requested    :  GEOM3
Efficiency calibration used         :  GEOM3
                         Created    :  26-Aug-1991   16:43:35
                         Modified   :  26-Aug-1991   16:43:35

Last search  discrimination level:     4.00
Last search     FROM channel       10 TO channel     4086
Last fitting discrimination level:     5.00
Last fit        FROM channel        1 TO channel     4096
Identification energy tolerance  :     1.00
Minimum intensity conv. factor   :     1.00
Gamma reference library          :  ..\LIBRARY\RADIUM.ILF
With     2 isotopes and      4 gamma lines.

MDA library name:  ..\LIBRARY\RADIUM.ILF
MDA energy tolerance:          1.00 keV
MDA decision limit 1-alpha:   95.00 %
MDA detection limit 1-beta:   95.00 %

Peaked backround file:  NONE
Energy tolerance for peaked backround subtraction:      1.00 keV
Threshold factor for peak areas:      1.00
```

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	9	338.40	338.60	-.20	4.748E-01	2.061E-01
2	14	911.07	911.25	-.18	4.315E-01	8.470E-02
3	14	968.90	911.25	57.65	0.000E+00	2.956E-01

						8.470E-02
RA-226						
1	5	186.00	185.91	.09	2.920E+00	7.124E-01

						7.124E-01

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured			decay corrected	saturation
1	RA-226	.9997	2.919E+00	+-	7.92%	2.919E+00	0.000E+00
2	AC-228	.9945	6.707E-01	+-	4.15%	6.707E-01	0.000E+00
			3.589E+00			3.589E+00	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

********** M D A R E P O R T **********

peak #	spectrum #	library energy keV	spectrum energy keV	energy diff. keV	full photopeak activity pCi/g	detection limit pCi/g
AC-228						
1	19	338.40	338.53	-.13	6.687E-01	9.782E-02
2	31	911.07	911.20	-.13	6.203E-01	4.578E-02
3	34	968.90	968.88	.02	7.783E-01	5.746E-02

						4.578E-02
RA-226						
1	10	186.00	185.96	.04	2.919E+00	3.341E-01

						3.341E-01

U. S. Army Corps of Engineers
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235

Chain-of-Custody Form

Location: Carwell Weapon Storage Area Date: 15 Aug 91

Type and Number of Containers in Shipment:

Vials: _____ Jars: (1) ½ liter per sample Glass bottles: _____

Field Number	Time Sampled	Parameter(s)	SWD LAB #
8A-1 A 1.5-2.0'		Total Radium (M9315)	1-2729
8A-1 B 3.5-4.0'		"	1-2730
8A-1 C 5.5-6.0'		"	1-2731
8A-1 D 7.5-8.0'		"	1-2732
8A-1 E 9.5-10'		"	1-2733
8A-1 F 11.5-12'		"	1-2734

Remarks: _____

Custody Record
Signature and Title

Relinquished by	Received by	Date	Time
R McCoy	JK [illegible]	8-16-91	1:00 PM

U. S. Army Corps of Engineers
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235

Chain-of-Custody Form

Location: Chaffee, Weapons Storage Date: 15 Aug 91

Type and Number of Containers in Shipment:

Vials: _____ Jars: 1 1/2 liter per sample Glass bottles: _____

Field Number	Time Sampled	Parameter(s)	
SA-2 A 1.5-2.0'		Total Radium (m4315)	1-2735
SA-2 B 3.5-4.0'		"	1-2736
SA-2 C 5.5-6.0'		"	1-2737
SA-2 D 7.5-8.0'		"	1-2738
SA-2 E 9.5-10'		"	1-2739
SA-2 F 11.5-12'		"	1-2740
SA-2 G 13.5-14.0'		"	1-2741
SA-2 H 15.5-16.0'		"	1-2742
SA-2 I 17.5-18'		"	1-2743

Remarks: _____

Custody Record
Signature and Title

Relinquished by	Received by	Date	Time
R McCully	JR Austin	8-16-91	1:00 PM

U. S. Army Corps of Engineers
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235

Chain-of-Custody Form

Location: Carswell, Weapons Storage Area Date: 16 Aug 91

Type and Number of Containers in Shipment:

Vials: _____ Jars: (1) Kilite-per-sample Glass bottles: _____

Field Number	Time Sampled	Parameter(s)	
4HA3 1-1.5'		Total Radium (m9315)	1-2744
4HA-4 0.5-1.5'		"	1-2745
4HA-5 0.5-1.5'		"	1-2746
4HA-6 0.5-1.5'		"	1-2747
4HA-7 0.5-1.5'		"	1-2748
4HA-8 0.5-1.5'		"	1-2749
4HA-9 0.5-1.5'		"	1-2750
4HA-10 0.5-1.5'		"	1-2751
4HA-11 0.5-1.5		"	1-2752
4HA-12 0.5-1.5'		"	1-2753

Remarks: _____

Custody Record
Signature and Title

Relinquished by	Received by	Date	Time
R McVey	JR Acosta	8-16-91	1:00 pm

U. S. Army Corps of Engineers
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235

Chain-of-Custody Form

Location: Caswell, Weapons Storage Area Date: 16 Aug 91

Type and Number of Containers in Shipment:

Vials: _____ Jars: 1 Liter per sample Glass bottles: _____

Field Number	Time Sampled	Parameter(s)	
4HA-13 0-1.0'		Total Radium (935)	1-2754
4HA-14 0.0-0.6'		"	1-2755
4HA-15 0.5-1.5'		"	1-2756
4HA-16 0.5-1.5'		"	1-2757
4HA-17 0.5-1.5'		"	1-2758
8A-1 G 13.5'-14'		"	1-2759
8A-1 H 15.5-16'		"	1-2760
8A-1 I 17.5-18.0'		"	1-2761

Remarks: _____

Custody Record
Signature and Title

Relinquished by	Received by	Date	Time
R McVey	J R Acosta	8-16-91	1:00 PM

SOUTHWESTERN DIVISION LABORATORY, CORPS OF ENGINEERS
CASS STREET
DALLAS, TEXAS

REQUEST FOR ANALYSES

NOTIFY: [illegible]

PROJECT: Fort Worth District, Carswell AFB

DATE RESULTS REQUIRED: 20 September 1991

DATE SAMPLES SENT: 2[illegible] August 1991

TEST THE FOLLOWING SAMPLES AS INDICATED BELOW:

FIELD ID	SWD NO.	DATE SAMPLED
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
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SOUTHWESTERN DIVISION LABORATORY, CORPS OF ENGINEERS
1815 CASS STREET
DALLAS, TEXAS 75235-8011
(214) 905-9130

REQUEST FOR ANALYSES

LABORATORY: Scientech, Inc.

PROJECT: Fort Worth District, Carswell AFB

DATE RESULTS REQUIRED: 20 September 1991

DATE SAMPLES SENT: 20 August 1991

TEST THE FOLLOWING SAMPLES AS INDICATED BELOW:

FIELD ID	SWD NO.	DATE SAMPLED

ANALYZE THIRTY-THREE SOIL SAMPLES FOR TOTAL RADIUM -- METHOD 900

RELINQUISHED BY	RECEIVED BY	DATE	TIME

FINAL PAGE

ADMINISTRATIVE RECORD

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