GaiaTech

200 North LaSalle Street • Suite 2600 • Chicago, IL 60601

July 29, 2009

Ms. Verneta Simon
United States Environmental Protection Agency, Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Results of Surface Radiation Survey and Focused Screening around Boring B-35
GHB 630, LLC
630 North McClurg Court
Chicago, Illinois

Dear Ms. Simon:

GaiaTech has recently completed the surface walk-over radiation screening and 18-inch excavation investigation of boring B-35 area, in accordance with the Work Plan dated May 18, 2009. This report includes survey protocol, techniques and results of the investigation.

Background

The site consists of an area bounded by McClurg Court to the east, Ontario Street to the south and Erie Street to the north, with a parking structure to the west (Figure 1). Site dimensions are 305 x 218 feet. All structures and aboveground utilities (underground structures to remain in place) were removed prior to the initiation of the investigation.

The site was developed in 1924, with the former Chicago Riding Club. The site remained the Chicago Riding Club until approximately 1950 when it was remodeled into the Chicago Arena Corporation as an ice skating rink. Chicago Arena Corporation was located at the site until 1954 when the site was redeveloped into CBS-WBBM Studios. The site is currently owned by GHB-630, LLC, which purchased the property from CBS in 2005.

GaiaTech conducted a limited radiological survey on the property in 2005 when it was occupied and operated by CBS. GaiaTech conducted a surface walk through screening on the existing concrete surface and no radiation impacts were reported. GaiaTech subsequently completed a subsurface investigation utilizing over 40 soil borings where PVC survey casings were installed in each borehole. Each location was downhole surveyed with a survey meter at 1-foot increments. Samples were collected in each borehole at the highest count rates and analyzed for thorium contamination. Laboratory samples were collected at the highest survey levels within the soil column at each location. The results of the laboratory analysis did not confirm any impact at the site; one location (B-35) on the property yielded one elevated concentration (6.6 Pico curies), slightly below the US EPA action level (7.1 Pico curies).

The current completed scope of work included:

- Surface walk over radiation survey, after the existing concrete slab was peeled away, and
- Focused 18-inch lift excavation and screening for potential thorium impacts at boring B-35.

GaiaTech notified the USEPA of the proposed screening, survey schedule and sampling activities. The USEPA did not send any on-site representative during the survey work and sampling activities.

Surface Walk-Over Survey

The site building demolition was completed prior to the start of the survey scope of work. Following the removal of the slab on grade by Heneghan Wrecking, GaiaTech set up a one-meter square survey grid for the entire property. The grid was marked utilizing a 100 meter survey tape, flags, paint and marked stakes. The grid lines were labeled as 1, 2, 3, etc. from East to West across the property, while grid lines were labeled as A, B, C, etc. from North to South across the property. GaiaTech and its subcontractor (RSSI) conducted the surface walk over survey during May 4-5 and June 1-2, 2009. About 60% of the site was completed with walk over survey, where the slab had been pulled, in May 2009. The remainder of the survey was conducted, after the remainder of the slab was pulled and the underground storage tanks were removed from the sidewalk area near the northeast corner of the site, in June 2009.

The survey was performed along the survey grid lines, moving the detector along the survey line approximately three inches above the ground. The meter was held stationary and at the ground surface at each 1-meter grid node point for recording of the reading. After recording the reading, the surveyor moved along the line to the next survey node point noting all readings along the survey line between node points. Any elevated readings were marked on the surface with a flag for potential sampling. All readings at each node point (every meter along survey line) were recorded in a notebook for future reference and/or mapping (Table 1). All areas between the node points were also surveyed.

The survey was performed utilizing a Ludlum Model 193 with a Ludlum Model 44-10 (2 x 2) thallium doped sodium iodide (NaI (Tl)) detector. The Model 193 meter was adjusted to detect gamma radiation from the thorium series while discriminating against background radiation. The Ludlum Model 193 is a general purpose portable survey instrument with a fixed alarm point and deviation alarm based on background radiation levels. The deviation alarm enables detection of subtle changes in radiation levels. The Model 193 was used with a Ludlum Model 44-10 gamma scintillation detector. The Model 44-10 detector was side shielded to minimize the response to background radiation.

As needed, calibration of the Ludlum instrument was also conducted for the probe utilizing both a long and short cord. Cord length can influence the response of the instrument and the corresponding threshold limit on the instrument. Threshold limits were provided for comparison for each cord length (as needed). The gamma detector was calibrated using calibration blocks from the Tronox facility in West Chicago. The calibration was performed with the detector centered and on contact with the calibration blocks and 3-inch above the center of the blocks, the 3-inch calibration providing similar measurement geometry to the anticipated field survey. Instruments were calibrated separately using all cord lengths. Calibration for the Ludlum Model 2220 with a (2 x 2) sodium iodide probe with calibrations for shielded and unshielded probes (Appendix A). The instrument with a short cord was used for the surface walk over survey, while a long cord instrument was used for the B-35 excavation survey.

Two meters were utilized during the survey, the first meter (serial #149080) had an established background level of 2,000 counts with a calibrated rate of 620 cpm/pCi/g (4,402 counts is the threshold limit), while the second meter had an established background level of approximately 2,000 counts (serial #149073) with a calibrated rate of 600 cpm/pCi/g (4,260 counts is threshold limit). The field threshold limit was based on the approximate calibration rate plus the background level. Thus 6,000 and 6,400 counts were used for the threshold limits for each meter respectively (Appendix A).

During the survey approximately 4,500 nodal point meter readings were recorded across the site (Table 1). Although most meter readings were below the respective meter threshold limits (6,000-6,400 counts), several locations (63 out of 4,500) were over the threshold limits of the field meters; as a result, soil samples were collected from those locations in order to reliably evaluate potential thorium contamination.

At each location with elevated meter readings, soil sampling was accomplished by field screening with a gamma survey meter identifying the highest gamma levels in the potentially contaminated location. If an area with several elevated readings were found in close proximity, the location with the highest meter reading in the group was chosen for sample analysis.

At each sample location, a shallow excavation was dug manually for additional screening with depth. If the readings increased, the shallow hole was extended until the highest reading was found. Soils exhibiting the highest gamma levels were collected with a stainless steel scoop and then sifted through a ½-inch mesh screen/sieve prior to placement into laboratory supplied sampler container. Large debris collected in the sieve were also gamma surveyed; if the debris did not appear to be elevated above the action level, it was discarded, otherwise the debris was placed in a container. All samples, upon placement into laboratory supplied sample containers, were labeled, taped and sealed to ensure no spillage of materials during transport. The samples were transported under chain of custody procedures and analyzed at RSSI Laboratories in Morton Grove, Illinois for analysis.

A total of 25 soil samples were collected at the suspect surface locations. The gamma spectroscopy results indicated that the equivalent thorium gamma readings were between 1.5 and 5.3 Pico curies (pCi/g), below the Action level 7.1 pCi/g. The results of the soil samples are summarized Table 2. Laboratory reports were included in Appendix B.

Focused 18-inch Lift Screening around Boring B-35

After the slab on grade was removed, GaiaTech flagged the location of the prior boring B-35. The exact location was found by the same geologist who installed the boring in the previous investigation, since the bentonite-filled boring was easily distinguishable from the surrounding soils. Around B-35, a 20 feet x 20-feet area was staked and excavated using an excavator/backhoe operated by Heneghan Wreaking Company on June 3, 2009.

The survey was performed utilizing a Ludlum Model 2220 with a Ludlum Model 44-10 (2 X 2) thallium doped sodium iodide (NaI (Tl)) detector. The Model 2220 meter was adjusted to detect gamma radiation from the thorium series. The Model 2220 was used with a Ludlum Model 44-10 gamma scintillation detector. The Model 44-10 detector was unshielded during the survey.

Calibration of the Ludlum instrument was conducted for the probe utilizing the long cord, since it would be needed to survey the deep excavation. The gamma detector was calibrated using calibration blocks from the

Tronox facility in West Chicago, as previously explained in the previous sections. Calibration was completed for the Ludlum Model 2220 utilizing a (2 x 2) sodium iodide probe with both shielded and unshielded probes.

Prior to the commencement of subsurface work onsite, a field technician under the direction of a certified health physicist was present on site for the purpose of surveying soils for radiological contamination. All soils within this area were subsequently screened in 18-inch lifts to the top of the water table. Existing foundation structures were encountered within the excavation area and were removed (4-inch subgrade concrete slab); then the screening activities continued. A concrete pile and cap at the boundary of the excavation was also encountered, but left in place and the screening activities were conducted around as needed.

During removal of the slab and other subgrade structures over the excavation area, the site grade was cut approximately one foot. The excavation was thus begun at -1 foot below surface grade. Soils consisted of 1 to 1.5 feet of brown over-compacted clayey silt with cinders, which was underlain by a 4-inch concrete slab. The slab was removed and soils directly under the slab consisted of light brown sand with concrete pieces to 4 feet bgs. Underlying this material at a depth of 4-5 feet was a black to dark brown sandy fill with cinders, slag, ash, bricks, glass, ceramic tile, wood and other debris to a depth of approximately 12-14 feet. Underlying this material were fill materials consisting almost wholly of broken clay tiles, pipes and bricks mixed with black sand. Native soils were encountered at approximately 16-17 feet and consisted of dark gray-brown sandy silt or silty sand. The groundwater table was located between 12 and 13 feet bgs (13-14 feet below old surface grade).

As the excavation continued beyond 5 feet in depth, the survey probe with the long cord was attached to a rope and was lowered to the base of the excavation and moved to cover the entire 18-inch bench (Appendix C). Upon reaching the water table at approximately 12-13 feet bgs, the excavation area was divided into four quadrants for surveying. Several scoops (excavator buckets) of less than 1 cubic yard were removed from each quadrant and brought to the surface for surveying. Several scoops were taken from each quadrant to extend the excavation to the top of the native soils. Once native soils were observed in the bucket, the quadrant excavation was terminated and excavation proceeded on the next quadrant until the area was fully surveyed. Once surveying was completed, all soils were returned to the excavation as no apparent thorium impacts were found.

Surveying in the excavation was completed with a Ludlum 2220 meter (serial number 69279) and unshielded 2 x 2 NaI probe. The background concentration for this meter was approximately 3,500 counts with an approximate calibrated level of 1,931 cpm/pCi/g which equates to 13,710 counts to achieve the action level. This level is added to the background level of 3,500 counts to achieve an approximate equivalent value of 17,000 counts. During the survey of the excavation, none of the readings exceeded the threshold limit value and generally ranged from 8,000 to 17,000 counts.

During the exploratory work at this location, RSSI collected four soil samples as previously described and at the levels exhibiting the highest meter readings. Three samples were collected above the water table and one below the water-table. All samples were analyzed by gamma spectroscopy. The results indicated that gamma levels under the thorium series were found to range from 0.7 to 1.4 pCi/g, well below the US EPA threshold limit value (Table 3).

Conclusions

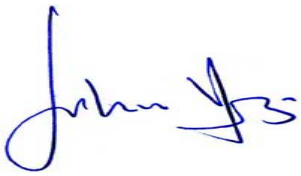
GaiaTech has completed a comprehensive surface walk over survey and 18-inch lift excavation investigation of boring B-35. No thorium contamination was found on the subject property during the investigation.

In accordance to the Chicago code, the ground surface of the property has been re-graded to sidewalk levels. A fence is being installed around the perimeter of the property.

If we can provide any additional information or clarification, please do not hesitate to contact me at 312.541.4200 ext. 230.

Sincerely,

GaiaTech Incorporated



John H. Yang, CPG
VP, Site Investigation & Remediation

Figures

Figure 1 Site Location Map
Figure 2 Survey Grid with Sample Locations

Tables

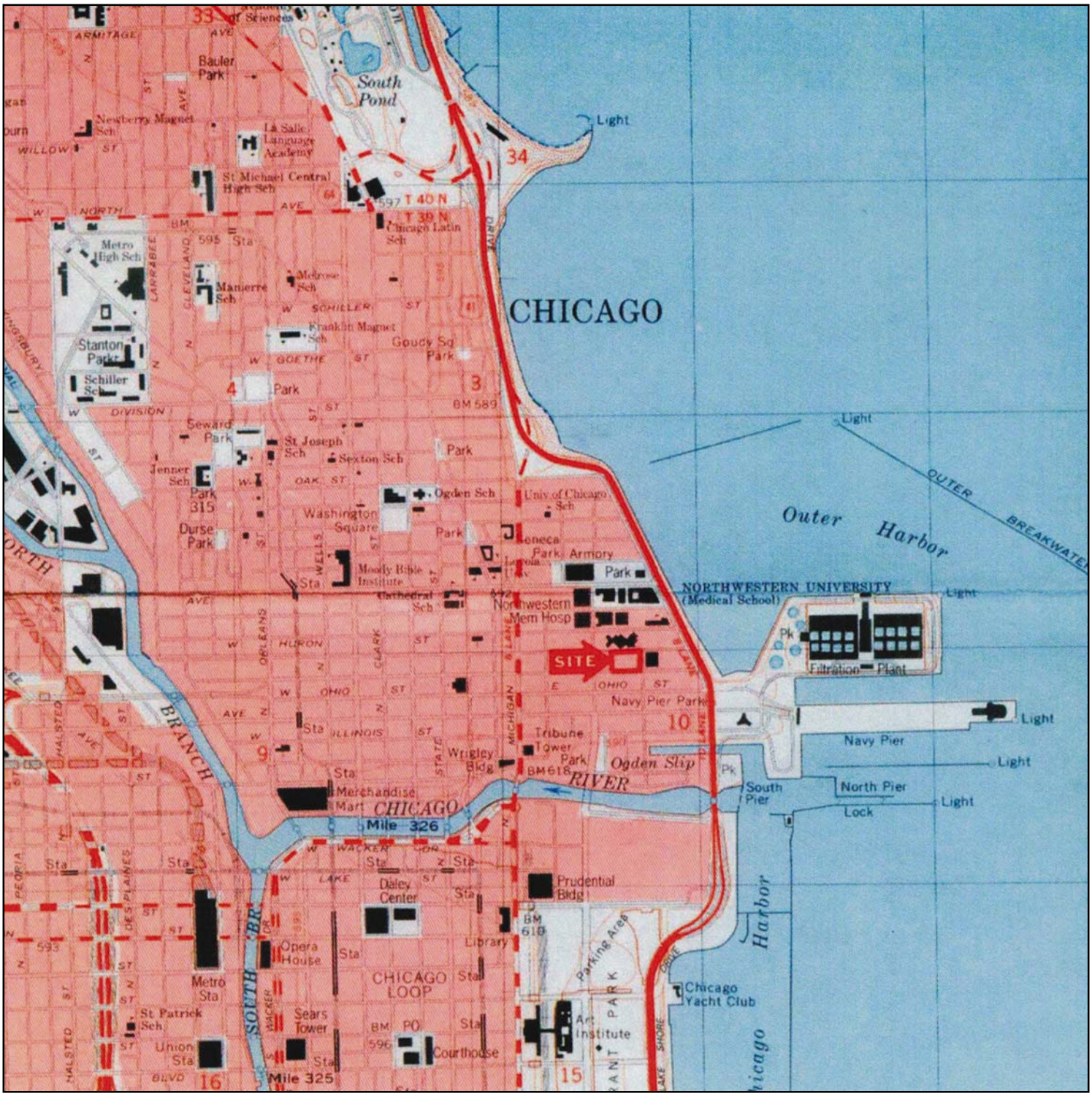
Table 1 Surface Survey Results
Table 2 Gamma Spectroscopy Results – Surface/Near Surface Soil Samples
Table 3 Gamma Spectroscopy Results – B-35 Soil Samples

Appendices

Appendix – A Survey Meter Calibration
Appendix – B Gamma Spectroscopy Results
Appendix – C Visual Summary

Cc:	Brian Lorenc,	Golub & Company LLC
	Bruce Armstrong,	Golub & Company LLC
	Daniel Swartzman,	DiVincenzo Schoenfield Swartzman

Figures



Scale 1: 24 000
Contour Interval 10 Feet

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

Quadrangle Location

UNITED STATES GEOLOGICAL SURVEY
CHICAGO LOOP QUADRANGLE
ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC)

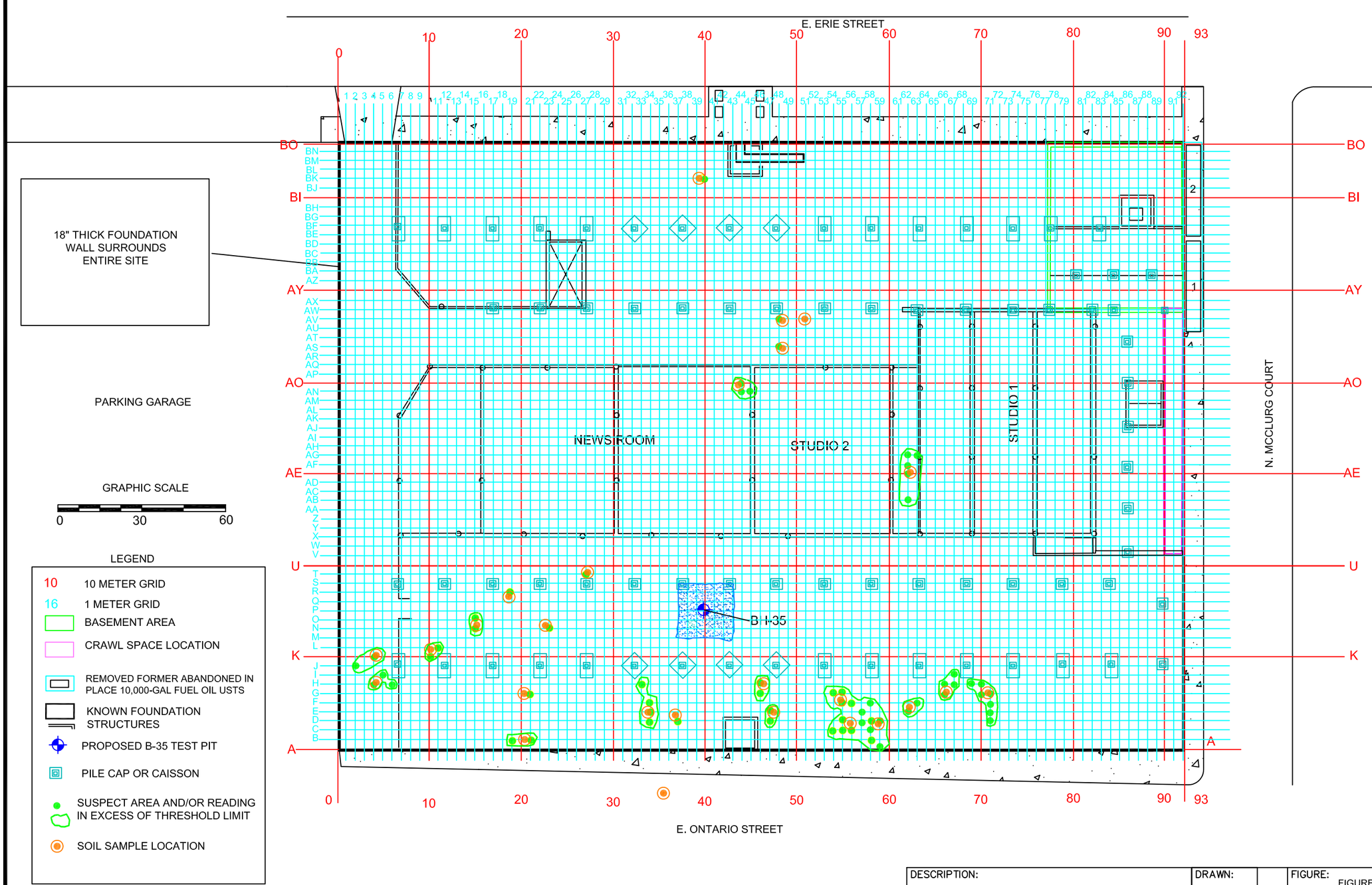
1993

Former CBS Property/GHB630, LLC
Chicago, Illinois
Project No. A1854-460-0

Figure 1

Site Location Map

GaiaTech



DESCRIPTION:	DRAWN:	FILE:	FIGURE:
FORMER CBS - WBBM/GHB 630, LLC 630 NORTH McCLURG COURT CHICAGO, IL	RJ	A1854-460-0	FIGURE 2 - SURVEY GRID with EXCEEDANCES AND SAMPLING LOCATIONS
	CHECK: LB		
CLIENT:	SCALE: 1:30	DATE: 7/8/09	GaiaTech

Tables

A1854-460-0

TABLE 1
SURFACE SURVEY RESULTS
(Model 193 meter counts)

Former CBS Property
GHB 630, LLC
630 North McClurg Court
Chicago, Illinois

RADIATION SURVEYING DATA - 630 NORTH McCLURG COURT, CHICAGO (CPM - Counts per Minute)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	4200	4600	4800	4400	4800	5000	4800	5000	5800	5600	5600	4800	6000	5200	5800	4800	5600	5200	4200
B	4800	5600	5000	4400	4800	4400	5000	5800	5800	5600	5800	5600	6000	5800	6000	5800	5800	5600	5800
C	5600	5600	4400	4400	4200	4200	4400	5600	5000	5800	6000	5800	5800	5000	6000	6000	6000	6000	5600
D	5400	5600	4200	4400	4200	4200	4400	5600	5000	5200	5800	5800	6000	6000	5800	6000	6000	5800	5600
E	5800	5800	4200	4200	5400	4200	5000	5800	5800	5800	5800	5600	5600	6000	6000	5600	5800	5600	5800
F	5200	5000	5600	4200	4000	4000	4400	5200	5600	5800	5000	5600	5400	5600	5800	4800	5000	5600	6000
G	5600	6000	4400	4800	5000	5200	5800	5600	5600	5600	6000	5400	6000	5800	5000	5800	5600	5000	5000
H	5000	5800	5000	5600	5000	6400	5200	6200	5800	5200	5800	6000	6000	5000	6000	5800	6000	5800	5200
I	5800	5000	5200	5600	5800	4400	6200	6000	5800	5800	5600	5800	5800	5600	6000	5800	5000	5800	5000
J	5000	5600	5800	6200	4400	4000	5600	5400	5800	5800	5600	5200	6000	5800	6000	5600	4000	5000	4800
K	5800	6000	5600	5400	5400	6400	4600	5600	5000	6000	6600	5800	6000	4600	5000	5800	5000	5200	5400
L	5200	5600	5200	5000	6000	5200	4400	6000	5200	5000	6000	6600	4800	5600	4600	5000	5800	5400	5800
M	4200	4000	4200	4600	5200	4400	4200	5400	5600	5600	6000	5800	6000	6000	5200	5800	5800	5600	4000
N	4400	5000	4400	3800	4200	4000	4000	4400	4600	5800	5600	5800	6000	5800	5800	6400	6000	5200	6000
O	4000	4400	4200	4000	3800	4200	3800	3600	5200	4800	5800	5200	5800	5800	5800	6400	5800	5200	5600
P	3800	4200	4000	3800	3800	3600	3800	5600	5200	4400	5200	4400	5800	5000	4800	5600	5000	5800	4800
Q	3600	3800	4000	3400	3200	3600	4000	4200	5000	4800	5600	4800	5000	4400	4200	4800	5000	52000	5800
R	3600	3800	3400	3600	3200	4400	5800	5800	5600	4800	5400	5000	4200	5400	5400	4000	5400	5800	5800
S	2800	3000	3200	3800	3800	3000	3000	4200	4400	5200	5000	4000	4000	4000	4000	4400	4400	5800	5800
T	2800	2800	3200	3200	3200	3800	3000	4400	5200	5200	6000	5000	4800	4800	4200	4200	5200	4200	5800
U	- -	2800	3000	3800	3000	2800	2800	5000	4600	4800	4400	4600	5400	4400	4800	4400	4800	5200	5200
V	- -	2800	3600	3400	3600	2800	3000	5000	4400	4200	4600	4000	4400	4200	4800	3800	5000	5200	5400
W	- -	2800	3200	3600	2800	4000	4800	4200	4600	4800	4400	4400	4800	4400	4400	5600	4000	5000	5200
X	- -	- -	2800	3200	3400	2800	2800	4200	3600	4800	5400	4000	3800	5200	5000	4000	4000	4600	4400
Y	- -	- -	4000	3600	3600	3600	3200	4000	3600	3800	4000	4200	4800	4200	5000	4400	4000	4000	5000
Z	- -	- -	4000	3800	3600	3800	3600	5600	3800	4000	5000	5600	5600	5400	4400	4800	4200	4400	5600
AA	3200	3400	3600	3600	3200	3600	4200	5600	4000	4400	5600	5200	5800	5800	5000	4400	4200	5000	5600
AB	3400	3200	3800	3800	4000	3800	4800	5000	5600	5800	5800	4200	4200	4400	4400	4200	4200	4000	5800
AC	3600	3200	3800	3800	3600	4000	4000	5000	5200	6000	6000	5000	5000	5200	4200	4200	4400	5800	5800
AD	3600	3000	3400	4000	3600	3800	4400	6000	5200	6000	5800	5400	5600	4400	4400	4000	4400	4800	5600
AE	3400	3600	3600	3600	3800	3800	4000	5800	5800	5800	5600	5800	5200	5000	5200	4200	4400	4400	5000
AF	3800	3200	3400	3600	3600	3800	3800	5000	6000	5600	6000	5800	5200	5600	5800	4200	4400	4600	4800
AG	3600	3600	3600	3800	4000	5000	6000	4800	5800	5800	5200	4800	4800	5800	5200	4800	5400	4200	4200
AH	3400	3200	3800	3600	3200	3200	4200	5600	5200	4600	4000	4400	5000	4800	5400	4400	5200	4200	4400
AI	3800	3800	3800	3600	3400	3800	4000	5800	5600	5800	5800	5800	4200	4000	4800	5600	5000	4800	4400

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
A	5800	6000	6000	5800	5400	5600	4800	5000	5000	5200	4800	3800	4800	5000	4400	5000	4000	5000	4200
B	6400	5200	6600	5800	6000	5800	5600	5800	5200	5800	5800	5200	5600	5600	5800	6000	5000	5600	5000
C	5600	5600	6000	6000	5600	5800	5800	5600	5800	5000	5800	6000	5800	5800	4000	5800	5600	5800	6000
D	5600	5200	5000	5600	6000	5400	5000	5800	5800	5600	5200	5600	6000	5800	5200	6400	5000	5600	6200
E	5800	5600	5000	5600	5800	5200	4800	6000	5800	5600	5600	6000	6000	5800	5600	6800	6000	4800	4800
F	5800	5800	6000	6000	5600	5800	5800	5800	5600	5800	5000	5800	6000	6000	5800	6600	5800	5600	4800
G	5000	6000	6400	6000	5200	5600	5800	5800	5800	5600	6000	5600	6000	6200	6000	5800	4400	5200	5000
H	6000	5800	6000	6000	5800	5600	5800	5800	5800	5800	4800	5800	6000	5200	6400	5200	5200	440	5800
I	4600	5000	5200	5600	5800	5800	6000	6000	5000	5800	5800	5600	5800	6000	6000	4800	4800	4200	4800
J	5000	4800	5200	5000	5800	5800	5200	5600	5800	5400	6000	5600	4800	5000	4000	3600	4000	4800	4200
K	5000	4800	4600	5600	5800	6000	6000	6000	5800	5800	5600	6000	6000	4800	5200	4400	4400	5000	5600
L	5800	4400	5000	5200	5600	5000	6000	5800	5800	5600	5800	5200	5600	5000	5600	5800	5200	5000	5600
M	5800	5200	5000	5800	5600	5600	6000	5800	6000	5800	6000	5800	6000	5600	5400	5800	6000	5800	5600
N	5200	5400	5800	5800	6200	5800	5800	5800	5600	5300	5800	5600	5800	5800	5800	5300	5800	5600	5800
O	5800	5600	5600	5800	5000	4400	5800	5600	4400	5200	5800	5800	6000	5200	5800	5600	5800	5000	6000
P	5200	6000	5600	5800	4200	5600	5000	4400	4000	5800	5000	5000	5800	5600	5600	5800	5400	6000	5800
Q	6000	5800	5600	5200	5800	4600	4400	4200	4400	6000	5600	6000	6000	6000	6000	6000	5800	4600	4800
R	6200	5800	5000	5200	5800	6000	5800	4400	4000	4400	4400	5800	5600	5800	6000	4800	4200	5000	5000
S	5200	5600	5200	5600	5400	5800	5000	5400	4800	5000	5000	4600	5000	5800	6000	5600	5600	4200	5000
T	5800	5600	5400	6000	5200	6000	5000	5000	6200	6000	5400	3200	4800	5600	5800	5600	5400	5000	5800
U	5000	5600	5200	4600	5200	4600	4400	4500	4800	4400	4400	4600	5600	4800	5400	5600	5800	5200	4800
V	4800	4400	5000	5000	4400	3800	3200	5000	4400	4800	4800	4400	4400	5400	4800	4400	4200	4200	4800
W	4600	4800	4200	3200	3600	4200	4600	4800	4400	5400	4800	5000	5200	5000	5600	5000	5200	5000	4000
X	3600	4000	3200	3200	3000	2800	3000	3800	4000	4600	4200	4800	4200	5200	5800	4400	4800	4400	5000
Y	4200	5000	4400	4200	5000	4200	3800	4000	4200	4400	4000	3000	2600	4000	4800	3800	4200	5800	4000
Z	5600	5800	5600	5200	5200	5800	4600	4800	5200	5000	4800	3600	3800	4200	4600	4200	4800	4200	5200
AA	5600	5400	5400	5000	4800	5800	5800	5600	4400	4400	4600	4200	3800	4800	5000	4800	4400	5200	5000
AB	4800	5000	5000	5200	5800	5400	5000	5000	5200	5600	4800	4400	4000	5000	5600	5200	4800	5400	5400
AC	5600	5600	5200	5000	5800	5000	5800	5800	5200	5600	4800	4800	4200	4800	5800	5600	4000	6000	4800
AD	5800	5200	5800	5200	5000	5800	5000	5400	5600	5200	5800	5000	4800	5000	5200	5800	5400	5000	4800
AE	4800	5000	4800	5600	4800	5200	5800	5800	5600	5600	5800	4800	4800	5000	4800	5000	5200	5800	5200
AF	5000	4400	4400	4400	4800	5600	5800	5000	5400	5000	4600	4000	4200	5200	5600	5800	5000	5800	4000
AG	4400	4800	5000	5400	4400	5200	5200	5800	5600	5600	4000	4200	4000	5800	5000	4800	5600	5600	5000
AH	5000	6000	5200	5000	4800	3800	4400	4800	4200	4000	3800	4000	4000	4200	5800	4800	5200	5000	5800
AI	4400	5600	4800	5000	4800	5800	5200	4400	3200	4000	4400	4800	3800	4200	5600	5000	5200	4400	5000

A1854-460-0

TABLE 1
SURFACE SURVEY RESULTS
(Model 193 meter counts)

Former CBS Property
GHB 630, LLC
630 North McClurg Court
Chicago, Illinois

RADIATION SURVEYING DATA - 630 NORTH McCLURG COURT, CHICAGO (CPM - Counts per Minute)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
AJ	3800	3800	3800	3600	3800	3800	4800	5000	**6000**	5400	5400	5000	5600	5600	5000	4400	4200	4800	5200
AK	3600	3300	3400	3600	3800	3000	4000	5200	5800	5600	4400	5000	5800	5200	4800	4200	4400	4200	4400
AL	3800	3600	3200	3600	5600	3200	4400	5200	5800	5800	4400	5600	6000	5400	5600	4800	4400	4200	4800
AM	3800	3600	3800	3800	3800	3600	4200	6000	5000	5000	4000	4400	4600	4200	4200	4600	4000	4000	4400
AN	3800	3000	3800	3800	4000	3400	4400	5800	3800	3800	4400	4800	4200	3600	4200	4200	4400	4200	4400
AO	3600	3800	4600	4000	4000	3600	3800	5000	**6000**	**6000**	4800	4400	4200	4400	4200	4000	4000	4000	5000
AP	3400	3800	4200	4200	3800	3200	3800	3400	3200	3200	3200	3400	4000	3200	4400	4200	4400	4200	4400
AQ	3600	3800	3800	3800	4000	3600	3800	3200	3600	4200	4000	4000	3800	3800	4000	3200	4000	3400	3200
AR	3800	3400	3800	3800	3800	3600	3600	3800	3800	4000	3400	3800	4000	4000	3800	4000	4200	4000	4000
AS	3000	3200	3800	3800	3800	3000	4000	3800	4000	3800	3600	4000	4000	4000	4000	4000	4400	4000	4200
AT	3000	3800	3000	4000	4000	3800	3600	3800	3000	3000	3800	4200	4200	4200	4200	4200	4200	4400	4800
AU	3000	4000	3000	3800	3800	3800	3800	3800	3600	3600	3800	4400	4000	4200	4200	4200	4400	4000	4400
AV	4000	4200	4200	4000	4000	4800	4000	4400	4000	4800	4600	4800	4800	4400	4600	4800	4800	4400	4800
AW	2800	2800	3200	3800	3800	3800	4400	4600	4600	3800	4400	4800	4800	5200	5000	4400	4800	4800	5200
AX	2800	2800	3400	3800	4000	4600	4800	4400	4800	5200	5200	5200	5200	5200	4800	5400	5200	5000	5000
AY	2800	3200	2800	5000	5000	4000	4400	4200	5800	5800	5600	5200	5200	5200	5000	4400	4800	4800	4800
AZ	3200	4000	4000	4400	4000	4400	5400	5400	5200	5400	5600	5200	5400	5400	5200	4000	5200	4800	5200
BA	3200	3400	3400	4400	4800	5200	5200	5200	5400	5400	5800	5600	5200	5400	5400	4400	4800	5200	5200
BB	3200	3600	4000	5000	4800	4800	4400	4600	4800	5800	5800	5800	5200	5200	5200	4200	5000	5200	5200
BC	4000	4400	4200	4600	5000	5200	5000	5400	5000	5600	5400	5200	5200	4800	5200	5000	5200	4800	4600
BD	4400	4600	4800	4800	5000	5600	5400	5400	5600	5800	5800	5200	5200	5800	5200	4800	5200	5000	4400
BE	4400	4400	5000	4800	5000	5200	4000	5600	5800	5600	5400	48000	4400	4800	5000	4400	4000	4400	4600
BF	4400	4800	5000	3400	5400	3600	3200	4000	5000	5400	5600	4600	4400	4600	4800	4200	3200	4000	4000
BG	4200	4200	4400	5000	5200	4200	4200	5200	4800	5400	5400	5600	5600	5400	5200	4000	4000	4000	4400
BH	4200	4200	4000	5000	4800	4800	4200	5200	4800	5000	5200	4600	4400	2600	3600	4400	4400	4000	3800
BI	4400	4000	5000	5200	5800	4000	4200	4800	2800	5400	5000	4800	5200	4800	5000	2600	4600	4200	4600
BJ	4000	4400	4400	4400	5000	4800	4800	5400	5400	5200	5200	5000	5000	5400	4400	4400	4200	4200	4200
BK	4000	4400	4800	4800	5200	4800	4000	4600	5000	5000	5200	5400	5200	4800	4200	4800	4800	4000	4400
BL	3600	4800	4400	4400	4800	5000	4000	4400	4600	4400	4800	4800	5200	4600	4400	4400	3400	4400	4440
BM	4000	4600	4000	4400	4400	4400	3800	4800	4200	4600	5200	2800	5000	5200	4400	4200	4000	4000	3800
BN	4200	42000	5000	4400	4000	4600	4400	4800	4800	4400	4800	4800	5000	2800	4400	4400	4000	4000	3600
BO	2800	3600	3800	4000	4000	4000	4200	4400	3800	3600	4000	4000	4200	3800	3600	3600	4000	3200	3200

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
AJ	4800	4000	5800	5200	5500	5600	5800	4200	4000	3800	3200	4000	3800	5000	5200	5200	5600	5400	5800
AK	4400	4800	5200	5600	5800	5800	4600	4200	5000	5400	4200	4600	3800	5200	5000	4800	5800	5600	5800
AL	4800	5000	5200	5800	6000	5800	5400	4200	5600	5200	4200	5000	4200	5600	5600	5000	5400	5200	5800
AM	5600	4800	4600	5800	5200	4800	5000	5200	4400	4200	4200	4200	4000	5800	5200	5600	6000	5800	5600
AN	3400	4800	5000	5600	5000	5800	5600	4800	4600	4800	5000	3800	4000	5200	5200	5000	5600	6800	5800
AO	4000	3800	5200	5600	5600	5800	4600	5000	4800	5600	5000	4800	3800	4200	3400	5200	5400	5800	5800
AP	4600	4200	4400	4800	5000	4800	4600	5200	4600	5800	5200	4400	3600	4000	4400	4600	5000	4800	5200
AQ	4200	4400	4400	4800	4600	5000	4800	4400	4400	5400	4600	4400	4000	4400	4400	**6000**	4999	4200	4200
AR	4000	4400	5000	5600	4200	5000	5000	4600	4800	5000	44000	4600	5600	4200	4000	4400	4000	4000	3800
AS	4200	4000	4000	42000	4800	5600	5000	4800	4400	5000	5000	4200	4600	5000	4800	4200	4200	5800	4200
AT	5000	4400	4800	4200	4200	5000	5200	4200	4200	4800	4400	4800	5200	4400	4600	5600	4400	4200	4000
AU	4400	4400	4400	4200	4400	4200	4600	4400	4200	4000	4200	3400	4000	4200	4000	4000	4000	4200	3800
AV	5000	4800	4400	4400	4600	4800	4800	4000	4000	4200	4000	4000	4000	4000	4000	4800	4600	4600	4600
AW	5400	5000	5200	5000	5400	4000	4400	4000	4200	4400	3800	4200	4400	4200	4400	5000	5800	5600	3800
AX	5200	4800	5200	5600	4800					4800	5400	5200	4800	4800	5400	5600	4600	4200	4600
AY	5400	5600	5200	5200	5000					4400	4400	4800	4400	5200	5200	5200	2600	4800	4800
AZ	5400	5200	5200	5600	4200					4400	5200	4800	4200	4800	4800	4800	3800	3800	3600
BA	5400	5600	5600	5200	4800					4200	4800	4200	3200	4400	4400	4000	36000	4000	4400
BB	5000	5200	5000	5000	5000					5000	4800	3800	4000	3600	4200	4200	4800	4600	4400
BC	4600	5000	48000	4800	5000					4400	4800	3600	3600	3600	4400	4600	4800	4800	4000
BD	4800	4800	4800	5000	5400					4800	4800	2400	3800	3000	3800	4200	3800	4600	4000
BE	4600	4600	4400	4400	5200	5000	5200	38000	4200	4400	4800	4800	3600	4400	4200	4600	4400	3800	4000
BF	4400	4400	3800	3600	2600	4000	4000	4000	4000	4000	36000	3600	3600	4000	4400	4400	4000	4400	3800
BG	4000	4400	4000	4000	4000	4600	3800	3600	3200	3600	4800	4000	4600	4400	2800	4000	4000	4200	4600
BH	3800	3800	3800	3200	3600	3400	3600	4000	4600	4400	4800	4800	5200	4600	4600	4800	4600	3600	4800
BI	4200	4200	4600	4400	4200	4200	4600	5000	5200	4400	4800	5400	4800	4400	4400	4800	3800	4000	4000
BJ	4400	3600	4400	5600	5800	6000	5600	5600	5200	4800	5400	5000	4800	5000	5400	5200	4000	4600	5600
BK	4000	3600	4600	5200	4800	6000	5600	5400	5800	5200	4800	5400	4800	4800	5400	5200	5800	4400	4800
BL	3800	4000	5600	5600	5600	5200	5200	5200	5200	4800	4800	5600	5600	4800	5200	4800	6000	5200	5400
BM	3800	3800	5000	4800	4800	4800	5200	5200	5600	5200	5000	5600	5600	5000	4800	4400	6000	5600	6200
BN	4000	4400	5200	5000	5200	5200	5600	5600	5600	5600	5200	4800	4800	4400	3800	4000	4800	4800	5000
BO	3200	3600	4600	4000	4600	5000	5000	4800	4400	4800	4400	4200	4200	3600	3600	3800	4200	5600	5000

*** Rows - AV to BO, U to X and rows A72 to A93 through U72 through U93 surveyed by meter #1 (serial #149080) with a threshold limit of approximately 6,400 counts. Background level was 2,000 counts**
**** Rows - AU to Y and A to T surveyed by meter # 2 (serial #149073) with a threshold limit of approximately 6,000 counts. Background level was 2,000 counts**
Blank areas on the table represent deep subgrade structures filled during demolition to depths beyond the range of the survey instrument. These structures include the elevator pits, pipe tunnel, basement area or large concrete foundations or structures.

A1854-460-0

TABLE 1
SURFACE SURVEY RESULTS
(Model 193 meter counts)

Former CBS Property
GHB 630, LLC
630 North McClurg Court
Chicago, Illinois

CPM

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
A	5000	4800	4000	4200	4000	4000	4200	4000	3800	5200	5000	4200	4400	2400	2600	3000	4200	5200	5600
B	5800	5400	3000	4800	4000	4000	4800	4000	4000	5800	5800	4200	4800	5800	2800	3000	3800	5600	6000
C	5600	5200	4600	5000	4400	4000	4200	5200	4200	5200	5000	5000	4800	3600	3000	4200	**6200**	**6200**	**6400**
D	5200	4800	4000	4600	4000	4200	4800	5000	5000	**6400**	5600	4000	4600	4800	3200	5200	4800	**6200**	5800
E	5600	5000	4400	4200	4400	4200	4800	5200	5000	**7000**	5800	4600	4400	3600	5300	4000	5800	6000	5600
F	5600	5200	4400	4600	4600	4800	**6000**	4800	5200	5000	4200	4400	4400	4200	3800	3800	5600	**6400**	**6200**
G	5600	5000	4000	5000	4400	4800	4200	4400	**6200**	5000	5200	4800	4200	3800	3600	4600	**6200**	**6200**	**6000**
H	**6000**	5800	5600	5600	5200	4200	4000	4800	**7000**	5600	5400	4600	4800	4200	3600	3800	5800	**6000**	5800
I	4800	5000	5000	4200	**6000**	5600	5200	5400	5200	4800	5000	5600	4400	3800	5000	4600	4400	**6000**	5800
J	3400	4200	4400	3600	4200	4200	4400	4800	3800	4200	4200	4600	4800	3400	4800	4800	4400	5200	4600
K	5000	4600	4800	4200	4400	4200	4800	4400	4800	5200	4800	4800	5200	4400	4800	4000	4200	4400	4600
L	5800	5600	5800	**6000**	5000	5400	5200	5200	5000	4800	5200	5000	4000	5000	4600	4200	5000	4600	3800
M	5600	5800	5600	5200	5600	5800	5800	4600	4400	5000	5200	5000	3600	4600	5200	4400	4400	4800	4200
N	**6000**	5800	5600	5200	5200	5800	4600	5000	4800	4800	5600	5600	5200	4000	5200	5000	4800	5600	5000
O	5600	5600	5200	4400	4600	4800	4600	4400	4000	4600	5000	5600	4800	5600	5000	5600	5200	4800	4400
P	5600	5600	5800	5600	4800	5000	4600	4800	4400	4600	5800	5900	5000	5000	5800	5600	5200	4800	5600
Q	5000	5400	5600	5800	5800	5000	4400	4600	4800	5400	5600	5400	5200	5800	5400	5800	5600	4800	5600
R	5400	5800	4200	5600	5400	500	4800	5400	4800	4600	4400	4200	4800	4400	5000	4800	5200	4400	5000
S	5400	5600	5600	4800	4400	5600	5200	4200	5000	4400	4200	4400	4600	4000	4200	4200	5400	5200	4600
T	5800	5600	4800	4400	4800	4200	5000	5600	5200	5000	4400	5400	4800	5000	5600	4800	5000	4800	5800
U	5600	5200	4200	4800	4200	5000	5400	4800	4800	4800	5000	4800	4600	4800	4200	4400	4800	4400	5000
V	5200	4400	4200	4400	4400	4600	4800	4000	4400	4200	4200	4600	4000	4000	3800	4000	4000	4800	5400
W	4200	4000	5000	5200	5600	5800	**6000**	3800	5000	5600	5400	4000	4400	4600	4800	5600	5600	5000	5600
X	**6000**	5200	5200	4400	4200	4600	5000	5000	5800	5000	4200	5200	5400	4200	4400	5000	4400	5000	4800
Y	4200	4200	4000	3800	3800	4000	3600	3800	3600	4200	4200	4000	3800	4200	3800	4000	5400	5400	4200
Z	5000	5600	4600	5400	5000	4400	4200	3800	4200	5800	5600	5200	4800	5000	4800	4800	5200	5800	5200
AA	5600	5800	5000	5200	5600	4800	4200	4400	4000	5800	5600	5200	5600	5800	4800	5600	5600	5600	5600
AB	5600	5200	4800	500	500	5000	3800	4200	4400	5800	4600	6000	5400	5400	5600	5800	5600	5800	5200
AC	5800	5600	4400	5600	5200	5600	5800	5600	5800	5800	5600	5600	5200	5600	5200	5600	**6000**	**6000**	5600
AD	4800	5200	4200	5800	5600	5600	5800	5600	5800	4000	5600	4800	5000	5000	5200	5800	**6000**	**6000**	5200
AE	4800	5200	5400	5600	5600	5800	5800	5000	48000	5400	5000	5600	4800	5200	5600	5800	5800	5800	5000
AF	4800	5000	5800	5400	5000	5800	5200	5600	4400	4000	4600	4800	5000	5200	5000	4800	5600	**6000**	5800
AG	4800	5600	5400	5600	5200	5400	5200	5200	5600	4000	5000	5800	5800	5400	5000	5600	5800	5600	5800
AH	5600	4400	5400	5400	5400	5200	5200	5400	5200	5000	58000	5600	5800	5600	5600	5600	5000	5200	5000
AI	5600	5000	5200	5600	5800	5800	5600	4800	4000	4000	5000	4800	4600	5600	5400	5600	5200	5600	5600

	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
A	5200	5800	**6200**	**6000**	5600	5000	4800	5200	5200	5000	5000	4200	4400	4800	4800	3800	4200	4400	4400
B	5600	**6200**	5600	5600	5800	5000	5200	5600	4600	4800	**6000**	4000	4800	5000	5200	5600	4000	4800	4200
C	**6000**	**6200**	5800	5000	5200	5800	4800	5200	5000	**6000**	5800	5600	4800	5000	5800	5800	4400	5000	4200
D	**6200**	**6200**	**6800**	5200	5000	4800	4500	5200	5800	5000	5800	4400	5000	**6000**	**6400**	5600	5000	5200	5400
E	**6200**	**6000**	5000	5800	5200	**7000**	**6000**	5600	5000	**6000**	4800	5200	4400	5600	**6200**	5800	5800	**6000**	**6000**
F	5800	**6400**	5000	5600	5600	5200	**6200**	5600	5400	5600	5800	5200	5800	5800	**6200**	5800	**6400**	5600	**6400**
G	5800	5800	5600	5800	**6000**	**6000**	**6000**	5200	5800	**6800**	**6000**	5600	5800	**6200**	**6600**	**6000**	**6000**	5800	5600
H	5200	**6000**	5600	5400	4800	5000	5000	5800	5800	**6200**	**6400**	**6000**	**6800**	**6400**	5800	5000	**5400**	4800	5000
I	5000	4800	4600	5600	4000	5200	5000	5600	5800	5600	**6200**	5800	4400	5800	5000	4600	5400	3600	4000
J	3400	4800	3800	4000	4000	3800	3600	5200	5600	5800	5600	5000	4400	5600	5000	4600	3400	4000	3600
K	3800	4500	4400	5000	3800	3800	4800	4400	5200	5400	5600	5000	5000	5000	5800	5400	4800	4600	4000
L	4000	4500	4000	4000	3800	4000	6200	5000	5800	5000	**6000**	**6000**	**6000**	5600	**6000**	5200	5800	5600	5600
M	4400	4600	4800	4800	4200	5000	5600	4400	5000	5200	4800	5600	5000	5800	5200	5000	5600	5600	5000
N	4800	5600	5800	5000	4400	5000	5000	4800	4200	4200	4800	5000	4800	5800	5800	4200	5600	5800	5400
O	4200	5200	4800	4000	4200	4800	5000	4000	4800	4000	4000	5400	5400	5000	5600	4000	5400	4800	5000
P	5400	4400	5600	4200	4200	4400	4800	5200	5000	4400	4200	4800	4200	4400	4800	4000	5800	4000	4400
Q	5400	4800	5000	4800	4800	5600	4800	4400	4200	4600	4400	4400	4200	4400	4800	5200	5800	4200	4000
R	3800	4400	4800	5600	5000	4400	4800	4600	4000	4600	4800	4400	5000	5000	4200	**6000**	5800	3600	3600
S	4800	4800	5000	5800	5600	5200	5600	4800	4200	4400	4200	4800	4000	4400	5800	5200	5800	3600	3800
T	5800	6000	5600	5200	**6000**	5800	5800	5600	600	5800	5800	5600	**6000**	5000	5800	5800	5800	5000	5800
U	5000	5800	**6000**	4200	**6000**	5800	5600	5000	5600	5800	5600	5600	5800	4800	5200	5200	5000	4800	5200
V	5000	5200	5600	5400	5600	4800	4400	4800	4600	5000	4800	4400	4400	5600	4200	4200	5000	4800	5200
W	5800	5800	**6000**	**6000**	5600	5600	5200	5600	5800	5600	5000	5400	5600	5000	4000	4200	4200	4000	4200
X	5800	5800	**6000**	5800	5800	5800	5800	5600	5800	5800	5600	5000	4800	4000	4800	4200	4200	3400	3200
Y	4000	3600	4200	400	3800	4800	5000	3000	3800	3400	2400	3000	2400	3800	3400	3600	3600	3400	3600
Z	3600	5400	4800	5000	4200	5800	5600	3800	3600	3000	3600	3600	3000	3800	3600	3800	3600	3600	3400
AA	5600	5800	5200	5000	5600	**6000**	5800	3600	3600	3800	3800	3200	4000	3800	4000	3400	3800	3800	3600
AB	5000	5600	5600	4400	5800	6200	5800	3200	3600	3800	3200	4000	3600	3600	3400	3400	3600	4000	3800
AC	5600	5600	5200	4800	4400	**6000**	**6000**	3800	3400	3800	4000	3600	3600	3600	3200	3400	3800	3800	3600
AD	5800	5600	5600	4800	5600	5800	5600	3600	3800	3800	4000	3800	3600	3800	3600	3600	3800	3600	3800
AE	5600	5200	4800	5600	5600	6200	5800	3600	3200	3600	3600	3800	3800	4000	3600	3600	4000	3800	3800
AF	**6000**	5200	5800	5000	5800	6200	**6000**	4000	3400	4000	3800	3400	3800	3600	3800	3800	3800	3800	4000
AG	5600	5800	5800	4200	**6000**	6200	6200	4000	4000	3800	3600	3800	3800	3800	3800	3600	3800	3600	3800
AH	4200	5000	5600	5600	3600	3800	3800	3600	3800	3200	3800	3400	3600	3600	3800	3800	3600	3400	4000
AI	4600	4800	5000	4600	4400	5800	5400	5000	3800	3800	3600	3800	4000	3600	3800	3800	4000	3800	3400

A1854-460-0

TABLE 1
SURFACE SURVEY RESULTS
(Model 193 meter counts)

Former CBS Property
GHB 630, LLC
630 North McClurg Court
Chicago, Illinois

CPM

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
AJ	5200	5800	5600	5600	5800	5600	5600	5600	4000	5800	5600	5800	5600	5600	5800	5200	5000	5600	5800
AK	5000	5600	5000	5200	5200	5600	5200	5600	4200	5000	5800	5800	5600	4800	5800	58000	5000	5200	5600
AL	5600	5400	5800	5800	5800	**6000**	5400	5000	5600	5800	5600	5400	5200	5600	5800	5600	5000	5800	5400
AM	5600	5600	5400	5000	5400	5800	5600	5600	4200	5800	5600	5600	5800	5800	5400	5800	58000	5200	5200
AN	5600	5800	5600	5400	5800	**6000**	6200	6200	4200	5600	5800	5200	5000	5600	5600	4800	5800	5000	5000
AO	5000	5800	5800	5600	5400	5200	6400	**6000**	4200	5800	5600	5000	5800	5600	5000	4000	3000	5800	5800
AP	4800	4400	5800	4800	5000	5600	**6000**	5400	5000	5800	5600	**6000**	5000	5800	5200	5800	5200	5000	5600
AQ	4600	4600	4800	4000	3800	4000	4200	4200	4400	5000	4800	4800	4800	5000	4600	5000	4600	4400	4000
AR	4000	42000	3800	3800	4000	4200	4200	4400	4400	500	**6000**	5800	5800	**6000**	4200	4400	4000	3800	3800
AS	4200	4000	3800	4000	3800	4000	4000	4400	4000	5800	6400	**6000**	5800	**6000**	4200	4000	4200	4400	4200
AT	3200	4000	4000	4000	3800	3800	4000	4000	4000	5800	5800	5900	5200	5000	4200	5800	6000	6000	5200
AU	4000	4000	3400	3800	3800	3800	3800	4200	4400	4800	5800	5800	5800	5800	4000	4800	600	4400	4000
AV	4800	4800	4400	4400	4000	4600	4800	4400	4400	**6400**	6600	5600	6000	6000	4800	5000	6000	4400	4600
AW	4200	3800	2000	4000	4200	4400	4200	4000	4800	4400	4800	5000	5600	5400	4200	6000	5000	4800	4000
AX	5000	4600	4600	4400	5600	5600	4400	4000	4400	4000	4600	4800	4600	4400	4000	4200	3800	3800	3200
AY	4600	5000	4000	4400	5200	4600	4600	4600	4800	5600	4800	5000	4800	4800	4600	4000	4600	4200	2800
AZ	3800	4400	2600	4000	5200	5400	400	4800	4800	5200	5200	4600	4400	4200	3200	3200	2800	2400	2400
BA	3600	4200	3600	4000	5400	5200	5400	5400	5400	5400	5600	4400	4400	3200	4000	2800	2800	2600	2400
BB	4600	4000	4000	4000	4800	4800	5600	5400	5000	5600	5000	4000	4600	3600	2800	3000	3000	3600	2600
BC	3800	4000	3600	4600	4400	52000	3600	4800	5400	4400	5200	4400	5000	4200	3600	3200	2800	2800	2400
BD	4000	4800	4000	4000	4000	4800	5200	4600	5600	5800	5400	5200	4800	3000	2800	2400	2400	2600	2400
BE	3600	4200	3600	4000	4800	5000	5000	5000	5800	5000	4000	4200	4200	2400	2400	2800	2800	2600	2400
BF	3600	3000	4600	4800	4000	4400	4000	4000	4400	4000	4000	4000	4000	2600	2600	2800	2800	2800	2800
BG	3200	4000	4600	4000	5600	5000	4800	5600	5000	4800	4600	4000	2800	3200	2600	2600	2400	2800	2800
BH	3800	3800	4000	4000	4800	2800	5200	5200	2600	2400	4400	3400	2400	2400	2800	2800	2600	2400	2400
BI	4800	4000	3800	4800	4000	4000	4800	5000	4000	4000	4000	4200	4400	3200	2800	2600	2600	2400	2000
BJ	5200	3600	4400	5400	5400	4800	5200	4800	4600	4200	4200	4200	4200	3000	2800	2800	2400	2400	2400
BK	4800	5200	6600	5200	4000	4200	4400	3400	4600	4600	3800	3600	3600	3400	2400	2800	2800	2600	2400
BL	6000	5600	6000	4800	3200	3200	3400	3600	3600	3600	3600	3600	4400	3800	2400	2600	2400	2400	2400
BM	6000	5200	5200	5000	3600								3600	3200	3000	2800	3600	3200	3000
BN	5200	5000	4400	3600	3200								3200	4000	3000	2800	2600	2400	2400
BO	5800	5400	4000	3600	4200			4000	4200	3600	3600	3200	3600	3200	2500	2500	2400	2500	2400

	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
AJ	4800	5200	5400	4200	4400	4200	4200	3800	3600	3600	3600	3800	4200	4000	3600	3400	3800	3800	3800
AK	5800	5800	4600	4800	5400	4800	5600	3600	3800	3800	3800	3600	3800	3800	3800	3400	4000	3600	3800
AL	5600	5800	4800	5800	4800	4400	4400	3000	3800	3800	4000	4000	3800	3800	3600	3800	3800	3800	3600
AM	5600	5800	5800	5800	5000	5200	5800	3000	3000	3800	3800	3800	3800	3800	4000	3800	3600	3800	3800
AN	5000	5000	5400	5600	4800	5600	4600	3000	3600	3600	3600	3400	3800	3600	3800	3800	3600	3800	3800
AO	4800	5600	4000	5000	4800	5000	4800	3800	3800	3600	3000	3600	3800	3400	3800	3800	3800	3800	3800
AP	4600	44000	5200	5000	5800	5000	4800	3000	3600	3600	3800	3800	3600	3800	4000	3800	3800	3600	5800
AQ	4000	3800	3600	5000	4800	4000	4200	4400	3500	3600	4000	3200	3600	3800	32000	3800	3800	3800	3800
AR	4000	3800	4800	4800	4000	4400	5800	3000	3800	3800	3000	3800	3800	3600	3400	3800	3800	3800	3800
AS	4200	4200	4400	5000	4000	4200	4000	3000	4000	3800	3800	3800	3600	3600	3600	3800	3600	4000	4000
AT	4400	4400	5800	3200	3200	4400	5000	3800	3800	3600	3500	3800	3600	3600	3800	3800	3600	3800	3800
AU	4000	42000	4000	4400	3800	4000	4000	3000	3800	3800	3800	3400	3400	3800	3000	3800	3800	3800	3600
AV	4400	4000	4600	4000	4400	4400	3800	4000	4400	4400	4400	4000	4400	4600	3600	3600	3600	3600	3600
AW	4200	44000	4000	4600	4000	4400	4400	3600	3800	3600	3000	3000	4200	3000	4400	4200	4000	4000	3000
AX	3200	4000	4000	4000	4000	5000	3200	2800	2400	2600	2400	4000	3400	3000	3000	3800	3400	2800	2800
AY	3000	2800	4400	3600	3400	4000	3800	4000	3200	3000	2800	3000	4000	3600	3400	2600	4200	3600	3800
AZ	2400	2000	2800	3200	2400	3400	3600	4400	3600	2800	2600	3400	3200	3600	4000	3800	2200	2200	2400
BA	2600	2400	2400	2400	2600	3600	4000	4000	3200	2600	3200	4600	3600	3800	3600	3600	4000	4400	4400
BB	2400	2600	2400	2400	2400	3000	3000	3600	2800	3000	3200	4600	3200	3200	2800	3800	3600	4000	3600
BC	2800	2400	2400	2000	2000	2800	2800	2400	2600	2400	2800	3200	2400	3000	2400	4000	4000	3800	4200
BD	2400	2400	2000	2000	2600	2600	2400	2400	3000	2400	2800	3200	3000	3200	3800	3600	4000	3200	4400
BE	2400	2400	2400	2600	2400	2000	2400	2400	2600	2800	2600	2600	2400	28000	3200	3800	3000	3200	4400
BF	2600	2800	2800	2800	2400	2800	2400	2800	2800	3200	4000	2600	3200	3200	2800	3200	2800	2800	2400
BG	2600	2000	2600	3000	2600	2400	2400	2400	2600	3200	3400	2600	3200	3200	2200	3400	2800	2400	2800
BH	2600	3200	3200	2800	2400	2400	2800	4600	3600	3600	3600	3200	2400	2600	2400	3400	3200	3000	3200
BI	2000	2200	2400	2400	2600	3000	4200	4200	4200	4600	3600	3600	3200	3200	3000	4200	4200	2800	4000
BJ	2400	2200	2000	2400	2800	2800	3600	3200	3200	3200	3600	3200	2800	4200	2800	2600	2400	2800	2800
BK	2400	2400	2400	2000	2600	3000	2800	2800	4400	4600	3200	2800	3200	2400	2400	2600	2400	2400	2600
BL	2800	2800	2800	3200	2800	2800	3000	3200	3600	3600	4000	3200	2400	2400	3200	2400	2400	2400	2400
BM	3800	2400	2000	2600	2800	2400	3200	3000	3600	3600	3200	2800	2600	2600	2600	2600	2800	2400	2600
BN	2800	2400	2400	2400	2400	2400	2600	2800	3600	3000	2400	2000	2400	2400	2800	2400	2400	2600	2800
BO	2800	2800	2400	2400	2800	2400	2600	2600	3000	3000	3200	2800	2400	2800	2400	2400	2400	2200	2400

TABLE 1
SURFACE SURVEY RESULTS
(Model 193 meter counts)

	CPM																	
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
A	4600	5200	4400	5400	3000	4000	3600	3600	3600	3600	4000	4800	3800	3600	4800	3000	3000	2800
B	4400	4600	5400	**6000**	4000	4600	4200	4200	4400	3600	3600	4000	5000	5000	4000	3600	3200	3200
C	4600	4600	4800	5200	4400	5000	4400	4400	3600	3200	3600	4200	5000	5000	5200	4400	3600	3200
D	5000	**6000**	**6000**	5600	5200	5200	4400	4000	3800	3800	4000	3800	4400	4400	4200	4400	4400	3200
E	5600	**6000**	**6000**	5200	5600	4400	4800	4600	4400	3800	5000	4600	3200	3200	4600	5000	4800	3000
F	5400	5600	5400	5600	5800	5400	5200	5200	4800	4200	4200	4000	4800	4800	5200	4800	4000	4000
G	**6200**	**6000**	4400	4800	5800	5600	5600	5200	3800	4800	4600	4400	4600	4600	5000	4800	4600	3600
H	5600	5600	4000	4800	5200	5800	5400	4800	3600	3600	4000	4800	4800	4800	4600	4400	4800	3600
I	5800	5600	3600	4000	5000	5200	3800	4400	3800	3000	3200	4400	4000	4000	4000	5200	480	4000
J	5600	5600	3600	4000	3200	3200	3800	4000	5000	4000	3000	4800	4400	4400	4200	4000	5600	4400
K	5800	4600	4400	4000	3200	3600	5000	4200	5200	5000	3600	4000	4800	4800	4200	4600	5000	4400
L	4800	4400	5000	4400	5000	4400	5200	5000	5000	5000	4400	4000	4400	4000	4000	5000	5600	4400
M	5200	4000	5000	4200	5000	5200	5800	4200	4200	5400	4000	4000	3600	4000	4000	5000	5200	4800
N	5400	4600	4800	4400	3200	3200	3000	4400	3400	4200	4400	4000	4600	4000	4800	5200	5000	4400
O	4200	4600	3400	4000	4600	4000	4200	3600	3200	4200	4000	4400	3800	4000	4000	4600	5600	4400
P	4200	5000	5000	4200	4200	4400	4000	3200	4200	3200	4000	4400	4800	4400	4800	5200	5200	4800
Q	4800	5000	4800	4800	3600	3600	3600	3600	4000	3800	4200	4000	4600	4400	5200	4200	5000	4800
R	4600	3600	3400	3200	3000	3200	3000	3200	2800	3600	3200	2800	3200	4000	3600	4000	5200	4400
S	4600	3600	3400	4200	2600	2800	3000	2600	2800	2800	2800	2800	3000	2800	3800	3200	3000	3600
T	4800	4000	3600	4000	2600	3200	4000	3400	2200	4000	3600	2800	3000	3000	3200	3200		
U	5200	3600	2800	2800	2600	2800	3400	3000	4000	4800	3800	3000	3000	3600	3200	3200		
V	4000	4000	2800	2800	3800	3200	2600	2800	3400	4400	3800	3200	3200	3200	3200	3600		
W	4000	3200	2800	3200	3200	3500	2800	2800	3600	3600	3600	3200	3200	3200	3400	3400		
X	3800	3400	2800	3000	3600	2800	2800	2800	2800	4200	3600	3200	3200	3200	3000	3200		
Y	2800	2800	3000	3600	3600	3200	3000	2800	3200	4600	3400	3200	3200	3000	3000	3400		
Z	3000	3000	3000	3600	3000	4200	3000	3000	3200	2600	3000	3000	3000	3800	3400	3000		
AA	3600	3600	3200	3200	3200	3200	3200	3000	4200	3800	2800	3000	3000	3200	3000	3000		
AB	3200	3800	3200	3200	3400	2800	3200	3000	4000	4000	3200	3000	3000	3000	3200	3000		
AC	3800	3400	2800	3400	3200	3200	3000	3200	4600	3600	3200	3200	3000	3000	3000	3200		
AD	3400	3600	2800	3200	3200	3200	3000	2800	4000	4000	3000	3200	3200	3000	3200	3000		
AE	3200	3600	3200	3600	2600	3500	3400	2800	3600	3600	3000	3000	3200	3200	3200	3600		
AF	3200	3600	3200	3600	3200	3600	2800	2800	3200	3400	3200	3000	3600	3000	3000	2600		
AG	3600	3400	3000	3600	3200	3600	3000	3000	3600	4200	3000	3200	3200	3000	2800	3000		
AH	3800	3000	3000	3600	3200	3000	3200	3200	3400	4000	3200	3400	3200	3000	3000	3000		
AI	3800	3200	3400	3200	3800	3600	3000	2800	3200	3800	3000	3200	3200	2800	3000	4800		

TABLE 1
SURFACE SURVEY RESULTS
(Model 193 meter counts)

	CPM																	
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	92	92	93
AJ	3800	3000	3400	3600	3000	3200	3600	2800	3600	3600	3000	3200	3200	3000	2800	3600		
AK	4000	3600	3400	3400	3400	3600	2800	3600	3200	3200	3000	3200	3000	2800	3000	3800		
AL	3600	3200	3000	3600	3400	3600	2800	2800	3600	3200	3200	3200	3000	2800	3000	4000		
AM	3600	3600	3000	3600	4000	3200	2800	4400	5000	3800	3200	3200	3800	3000	2800	3800		
AN	3800	3800	3400	3400	3600	3000	2800	4000	4200	3800	3200	3200	3000	2800	2800	3800		
AO	3800	3800	2600	3600	3200	3600	2800	3600	4000	3600	3200	3400	3800	3000	2800	3000		
AP	3600	3800	3800	3000	2800	3000	2800	3600	4400	3600	3200	3000	3000	3000	3400	3000		
AQ	4000	3800	3800	3200	3200	3200	3000	2800	4400	3800	3600	3200	3800	3200	3000	3000		
AR	4000	3600	3600	3200	3000	3000	2600	2800	2600	3400	3600	3600	3400	300	2800	2800		
AS	3800	3000	3000	2800	3000	2800	2800	2800	4000	3400	3600	3200	3200	3400	3200	2800		
AT	3800	3000	3600	2800	3000	2600	2600	2600	2800	3200	4000	3600	3600	3200	3600	3000		
AU	3600	3800	3600	3200	2800	2600	3000	3000	3000	2600	3000	3000	3000	3400	2800	2600		
AV	3600	3600	2800	4000	3600	2800	2800	2600	3600	2800	3000	3200	2800	3000	2800	3200		
AW	4600	4000	2800	3400	3200	2800	2800	2800	2800	3000	3000	3000	2800	2800	2800	3000		
AX	3200	3600	3800	3600	3000													
AY	4000	3400	3200	3600	3200													
AZ	2800	3000	3000	4400	4400													
BA	4600	3400	4000	4200	3600													
BB	3800	3200	4000	4000	3200													
BC	4000	4000	4400	5200	3200													
BD	4400	4600	4000	3200	4000													
BE	4600	4200	4000	3800	3600													
BF	3400	4000	4000	3600	3200													
BG	3200	3600	3000	3000	3200													
BH	3200	3600	3200	2400	3000													
BI	4000	4200	2000	2800	3200													
BJ	2400	3200	3200	2800	2800													
BK	2699	3200	2800	3200	4200													
BL	2800	2800	2800	3600	3000													
BM	2400	2800	2600	2800	2800													
BN	2400	2800	2400	2400	2800													
BO	2600	2200	2400	2800	2400													

TABLE 2
SURFACE SURVEY
GAMMA SPECTROSCOPY RESULTS
May 2009

Sample No./ Grid Loc.	Sample Depth	Grid Location	RSSI Sample No.	Pb-214 (pCi/g)*	Ac-228 (pCi/g)**	Total (pCi/g)
1- AV-48	6"	AV-48	G090132	3.6881	1.2917	5.0
2- AE-62	18"	AE-62	G090138	3.2885	1.3443	4.6
3- AO-44	24"	AO-44	G090139	0.99216	0.53216	1.5
4- BK-40	15"	BK-40	G090140	4.0101	1.2579	5.3
5- AV-51	12"	AV-51	G090141	3.4697	1.3542	4.8
6- AS-48	6"	AS-48	G090142	2.7013	1.1567	3.9
7-N-15	8"	N-15	G090145	3.454	1.3382	4.8
8-H-5	12"	H-5	G090146	3.4994	1.5134	5.0
9-K-5	2-3"	K-5	G090147	2.8611	1.19	4.1
10-L-10.5	12"	L-10.5	G090148	2.8252	1.1361	4.0
11-R-19	16"	N-19	G090149	3.3579	1.2012	4.6
12-B-21	12"	B-21	G090150	3.0739	1.0932	4.2
13-G21	6"	G-21	GO90151	2.4056	1.4587	3.9
14-N-23	18"	N-23	G090152	1.0254	1.0563	2.1
15-T-27	16"	T-27	G090153	2.8521	1.2932	4.1
16-E-34	8"	E-34	G090154	3.4199	1.1811	4.6
17-C-37	8"	C-37	G090159	2.8062	1.0718	3.9
18-H-46	12"	H-46	G090160	3.3116	1.1251	4.4
19-E-47	16"	E-47	G090161	3.7899	1.1381	4.9
20-F-55	6"	F-55	G090162	3.2296	1.2797	4.5
21-C-56	16"	C-56	G090163	3.6544	1.0939	4.7
22-D-59	12"	D-59	G090164	3.6923	1.2547	4.9
23-E-62	12"	E-62	G090165	3.718	1.434	5.2
24-G-66	12"	G-66	G090166	3.3911	1.1181	4.5
25-G-71	12"	G-71	G090167	3.5975	1.2051	4.8

Notes:

* Pb-214 is used as a surrogate for Ra-226
** Ac-228 is used as a surrogate for Ra-228
7.1 pCi/g is USEPA threshold limit value

Project No. A1854-460-0

Former CBS Property/GHB630, LLC
630 North McClurg Court
Chicago, Illinois

TABLE 3
BH-35 TEST PIT
GAMMA SPECTROSCOPY RESULTS
June 2009

Test Pit	Quadrant	Sample Depth	RSSI Sample No.	Pb-214 (pCi/g)*	Ac-228 (pCi/g)**	Total (pCi/g)
BH-35	Center	4.5'	G090155	1.1462	0.76608	1.9
BH-35	SE	7.5'	G090156	0.62222	0.57141	1.2
BH-35	SE	10.5'	G090157	0.91963	0.79039	1.7
BH-35	NE	14-15'	G090158	0.37277	0.34549	0.7

Notes:

* Pb-214 is used as a surrogate for Ra-226
** Ac-228 is used as a surrogate for Ra-228
7.1 pCi/g is USEPA threshold limit value

Appendix A

Survey Meter Calibration

CERTIFICATE OF CALIBRATION

RSSI

6312 West Oakton Street
Morton Grove, IL 60053-2723
Telephone: 847-965-1999
Fax: 847-965-1991
www.rssi.us

Certificate No. 044611

RSSI
Attention: Eli A. Port, Rso
6312 West Oakton Street
Morton Grove, IL 60053-2723

Manufacturer: LUDLUM
Model: 193
Serial No.: 149080
Probe(s): EBERLINE SPA-3

CALIBRATION DATA

SOURCE*	SCALE	FIELD (cpm)	READING (cpm)	FIELD (cpm)	READING (cpm)
5	x1	200	200	800	800
5	x10	2 K	2 K	8 K	8 K
5	x100	20 K	20 K	80 K	80 K
5	x1000	200 K	200 K	800 K	800 K

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: Not Applicable

Temperature: 25 °C **Relative Humidity:** 50 % **Barometric Pressure:** 992 mbar

Calibrated by: Timothy Hall **Date:** 9/12/08

Calibration Frequency: Annual **Recalibrate by:** 9/12/09

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham		
Model	CCs-D-20E	64-764	AMC 13446	100		
Serial Number		722	7510 LA	FTC-CF-001		
Activity	11.5 Ci	100 mCi	100 mCi	1801 µg		
Date	1/1994	5/2/78	6/3/84	10/8/85		

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.
Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

PREVENTIVE MAINTENANCE PERFORMED

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	790 VOLTS
SENSITIVITY MEASURED	✓	12 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

Lab Reference: 11

CERTIFICATE OF CALIBRATION

RSSI

6312 West Oakton Street
Morton Grove, IL 60053-2723
Telephone: 847-965-1999
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Certificate No. 044389

RSSI
Attention: Eli A. Port, Rso
6312 West Oakton Street
Morton Grove, IL 60053-2723

Manufacturer: LUDLUM
Model: 193
Serial No.: 149073
Probe(s): LUDLUM 44-10, Sn: PR159705

CALIBRATION DATA

SOURCE*	SCALE	FIELD (cpm)	READING (cpm)	FIELD (cpm)	READING (cpm)
5	x1	200	200	800	800
5	x10	2 K	2 K	8 K	8 K
5	x100	20 K	20 K	80 K	80 K
5	x1000	200 K	200 K	800 K	800 K

If the accuracy of a scale is not within +/-10% but is within +/-20% a correction factor is supplied.

Check Source: BA-133 **Reading:** 730 kcpm

Temperature: 26 °C **Relative Humidity**: 42 % **Barometric Pressure**: 990 mbar

Calibrated by: Timothy Hall **Date**: 6/16/08

Calibration Frequency: Annual **Recalibrate by**: 6/16/09

*SOURCE	1. Cs-137	2. Cs-137	3. Am-241	4. Cf-252	5. Electronic	6. Other
Manufacturer	U.S. Nuclear	Eon Corp.	Amersham	Amersham		
Model	CCs-D-20E	64-764	AMC 13446	100		
Serial Number		722	7510 LA	FTC-CF-001		
Activity	11.5 Ci	100 mCi	100 mCi	1801 µg		
Date	1/1994	5/2/78	6/3/84	10/8/85		

Calibration authorized by Illinois Department of Nuclear Safety License No. IL-01429-01 and meets the requirements of ANSI 323-1978 and MIL-STD-45662A.
Exposure rate traceable to NIST with MDH model 1015 SN 109 transfer instrument. Radcal Cert. of Conf. 20300.

PREVENTIVE MAINTENANCE PERFORMED

BATTERIES/CONTACTS CHECKED	✓	
HIGH VOLTAGE MEASURED	✓	881 VOLTS
SENSITIVITY MEASURED	✓	10 mVOLTS
METER ZERO CHECKED	✓	
INSTRUMENT CLEANED	✓	

Lab Reference: 54

#1

LUDLUM 193
SN: 149080

Calibrated on10/16/08

	Action limit (pCi/g)	EPA limit (pCi/g)
	5	**7.1**

SURFACE with PR155592 #2

With shield

Bkgd (cpm)	Slab (pCi/g)	Gross cpm	Net cpm	cpm/pCi/g	Action(cpm)	Limit (cpm)
2400	10	8600	6200	620	3100	4402

cpm/pCi/g	**620**
Action	**3100**
Limit:	**4402**

Without shield

Bkgd (cpm)	Slab (pCi/g)	Gross cpm	Net cpm	cpm/pCi/g	Action(cpm)	Limit (cpm)
9200	10	25000	15800	1580	7900	11218

cpm/pCi/g	**1580**
Action	**7900**
Limit:	**11218**

Calibrated against Th slab SN: 2012-54-2TA and 2012-54-4TA

#2

LUDLUM 193 Calibrated on10/16/08
SN: 149073

	Action limit (pCi/g)	EPA limit (pCi/g)
	5	**7.1**

SURFACE with PR159705 #1

With shield

Bkgd (cpm)	Slab (pCi/g)	Gross cpm	Net cpm	cpm/pCi/g	Action(cpm)	Limit (cpm)
3000	10	9000	6000	600	3000	4260

cpm/pCi/g	**600**
Action	**3000**
Limit:	**4260**

Without shield

Bkgd (cpm)	Slab (pCi/g)	Gross cpm	Net cpm	cpm/pCi/g	Action(cpm)	Limit (cpm)
7000	10	26000	19000	1900	9500	13490

cpm/pCi/g	**1900**
Action	**9500**
Limit:	**13490**

Calibrated against Th slab SN: 2012-54-2TA and 2012-54-4TA

LUDLUM 2200 Calibrated on 10/16/08
SN: 69279

	Set off	Actual
Window		
Threshold	100	10 mV
HV	390	1010

Action limit (pCi/g)	EPA limit (pCi/g)
5	**7.1**

DOWNHOLE

Background 5315
PVC

	pCi/g	gross cpm	net cpm	cpm/pCi/g	Action(cpm)	Limit (cpm)
CD-1	1.7	15292	9977	5869	29344	41669
CD-8	12.9	47826	42511	3295	16477	23398
CD-7	23.4	81235	75920	3244	16222	23036

cpm/pCi/g	**3270**
Action	**16350**
Limit:	**23217**

SURFACE

Without shield

Bkgd (cpm)	Slab (pCi/g)	Gross cpm	Net cpm	cpm/pCi/g	Action(cpm)	Limit (cpm)
5886	10	25192	19306	1930.6	9653	13707

cpm/pCi/g	**1931**
Action	**9653**
Limit:	**13707**

Calibrated against Th slab SN: 2012-54-2TA and 2012-54-4TA

Appendix B

Gamma Spectroscopy Results

1

RSSI Spectrum name: G090132A.Anl

Sample description
G090132 GAIATECH AV-48 866g

Spectrum Filename: H:\GammaVision\User\Spectra\G090132A.Anl

Acquisition information

Start time:	27-May-2009 13:32:51
Live time:	3606
Real time:	3615
Dead time:	0.26 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_05_27.Clb

09_05_27

Energy Calibration

Created:	27-May-2009 13:29:35
Zero offset:	6.949 keV
Gain:	0.231 keV/channel
Quadratic:	3.420E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.05keV)
Stop channel:	8144 (1894.25keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	8.6600E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 8.6600E+02) = 1.1547E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 41 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2686

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
116.39	33.89	669.	579.	0.161	9.00	1.454	-	sM
262.61	67.87	1650.	94.	0.026	61.94	1.381	-	sc
273.69	70.44	1012.	97.	0.027	47.43	1.383	-	D
291.21	74.36	2508.	115.	0.032	62.32	1.387	-	c
343.85	86.81	1448.	505.	0.140	11.56	1.397	-	D
356.89	89.82	2139.	356.	0.099	19.14	1.399	-	D
395.55	98.51	1606.	116.	0.032	59.30	0.512	-	sM
522.35	127.86	1524.	271.	0.075	33.61	0.738	-	sM
591.53	143.88	1640.	200.	0.056	46.82	0.433	-	sM
616.80	149.73	1386.	153.	0.042	39.31	0.805	-	sM
675.98	163.11	1727.	115.	0.032	51.78	1.459	-	D
706.46	170.49	1466.	210.	0.058	37.88	0.714	-	sM
772.02	185.66	2430.	1364.	0.378	7.81	1.380	-	M
854.80	204.83	1012.	274.	0.076	23.47	0.929	-	s
872.53	208.93	1170.	291.	0.081	25.16	1.522	-	
1366.65	323.34	452.	88.	0.025	43.82	0.265	-	s
1752.61	412.72	210.	93.	0.026	30.94	0.279	-	s
1786.04	420.46	86.	15.	0.004	88.19	0.220	-	sc
1878.71	441.92	92.	22.	0.006	68.17	0.425	-	sc
1966.82	462.53	333.	147.	0.041	19.47	1.681	-	D
2357.10	552.78	187.	31.	0.009	64.28	1.742	-	c
2369.49	555.66	239.	32.	0.009	69.80	1.744	-	c
2627.73	615.40	120.	44.	0.012	50.00	0.579	-	sM
2841.87	665.01	165.	207.	0.057	17.13	1.202	-	s
2921.93	683.56	159.	73.	0.020	42.52	0.252	-	s
3018.41	705.91	51.	22.	0.006	55.58	0.734	-	s
3052.98	713.92	125.	74.	0.021	34.46	0.415	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
3965.68	925.39	25.	17.	0.005	52.23	0.380	-	s
4730.80	1102.71	60.	44.	0.012	40.56	0.270	-	s
4892.43	1140.18	99.	79.	0.022	35.35	0.507	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
TH-234	N	6.1278E-06						
			63.29	5.678E-06	(	1.159E-06	2.70E+01	G
			92.80	6.556E-06	(	4.040E-07	6.89E+00	G
			2 of 3 peaks found					
PB-214	N	3.6881E-06						
			351.92	3.643E-06	(	3.146E-08	2.03E+00	G
			295.21	3.696E-06	(	5.364E-08	2.82E+00	G
								Energy duplication
			77.11	3.688E-06	}	2.134E-07	5.15E+00	XA
			241.98	3.892E-06	(	1.468E-07	4.66E+00	G
								Energy duplication
			74.81	3.688E-06	}	6.193E-07	1.27E+01	XA
			5 of 5 peaks found					
BI-214	N	3.5177E-06						
			609.31	3.530E-06	(	2.994E-08	2.57E+00	G
			1764.49	4.162E-06	+	2.527E-07	4.49E+00	G
			1120.29	3.905E-06	+	2.198E-07	4.86E+00	G
			1238.11	3.421E-06	(	2.618E-07	9.92E+00	G
			768.36	4.533E-06	+	4.022E-07	9.97E+00	G
			5 of 5 peaks found					
AC-228	N	1.2917E-06						
			911.07	1.278E-06	(	3.795E-08	6.44E+00	G
			969.11	1.225E-06	(	8.024E-08	8.73E+00	G
			338.32	1.425E-06	(	9.804E-08	2.00E+01	G
			964.77	1.689E-06	+	3.624E-07	1.89E+01	GA
			4 of 4 peaks found					
PB-212	N	1.1492E-06						
			238.63	1.149E-06	(	2.614E-08	3.08E+00	G
								Energy duplication
			77.11	1.149E-06	}	1.728E-07	5.68E+00	XA
								Energy duplication
			74.81	1.149E-06	}	3.050E-07	2.37E+01	XA
			300.09	1.369E-06	+	3.153E-07	3.10E+01	G
			4 of 4 peaks found					

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N 2.2376E-06						
		727.17	2.165E-06	@(	2.128E-07	2.10E+01	G
		1620.50	2.564E-06	?(	3.844E-07	2.69E+01	G
		785.46	8.733E-06	+	1.605E-06	2.93E+01	G
		893.43	2.303E-07	-	1.319E-07	5.64E+01	G
		4 of 5 peaks found					
TL-208	N 4.0819E-07						
		583.14	4.082E-07	(	1.452E-08	8.19E+00	G
		510.84	8.627E-07	+	8.272E-08	1.41E+01	G
		860.37	7.706E-07	+	1.271E-07	2.07E+01	G
		277.36	5.405E-07	+	1.457E-07	3.16E+01	GA
		4 of 5 peaks found					
K-40	N 1.5384E-05						
		1461.00	1.538E-05	(	1.042E-07	2.75E+00	G
		1 of 1 peaks found					

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

Analyzed by: Krista L. Ambrose
Digitally signed by Krista Ambrose
DN: cn=Krista Ambrose, c=US, o=RSSI, email=kambrose@rssi.us
Date: 2009.05.27 14:44:44 -05'00'
Krista Ambrose

Laboratory: RSSI

2

RSSI Spectrum name: G090138.An1

Sample description
G090138 GAIATECH AE-62 715g

Spectrum Filename: H:\GammaVision\User\Spectra\G090138.An1

Acquisition information

Start time:	26-May-2009 09:43:24
Live time:	3600
Real time:	3607
Dead time:	0.20 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_05_26.Clb

09_05_26

Energy Calibration

Created:	26-May-2009 09:42:11
Zero offset:	7.036 keV
Gain:	0.231 keV/channel
Quadratic:	3.768E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.600
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.13keV)
Stop channel:	8144 (1893.98keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	7.1500E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 7.1500E+02) = 1.3986E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

RSSI Spectrum name: G090138.Anl

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 36 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2220

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
114.16	33.45	323.	138.	0.038	21.08	0.935	-	s
141.09	39.68	347.	29.	0.008	89.06	0.429	-	sc
207.59	55.07	1063.	89.	0.025	78.07	0.456	-	s
345.00	87.05	1203.	532.	0.148	10.19	1.450	-	D
357.02	89.83	1624.	317.	0.088	18.82	1.452	-	D
409.96	101.90	511.	108.	0.030	34.53	0.644	-	s
589.57	143.47	1288.	178.	0.049	37.16	0.503	-	sM
772.06	185.70	1899.	1341.	0.372	9.31	1.613	-	sM
966.49	230.71	661.	181.	0.050	29.97	1.134	-	s
1082.52	257.56	924.	225.	0.062	35.08	0.301	-	s
1172.38	278.36	695.	75.	0.021	51.20	1.596	-	D
1555.77	367.26	334.	47.	0.013	56.42	1.661	-	D
1567.31	369.93	276.	72.	0.020	34.71	1.663	-	D
1635.30	385.53	273.	50.	0.014	62.29	0.347	-	s
1866.08	438.96	221.	92.	0.026	33.39	0.776	-	s
1885.32	443.41	153.	51.	0.014	49.51	0.688	-	s
2112.08	495.92	139.	60.	0.017	42.41	0.678	-	s
2811.96	657.80	77.	18.	0.005	70.85	1.868	-	sc
2821.18	659.94	92.	22.	0.006	65.25	1.870	-	sc
2841.38	664.81	94.	160.	0.045	16.25	0.724	-	s
3080.10	720.10	90.	62.	0.017	34.29	0.661	-	sM
3999.11	932.99	105.	169.	0.047	17.93	0.915	-	s
4095.31	955.28	16.	13.	0.004	54.73	0.523	-	s
4826.05	1124.93	109.	33.	0.009	47.85	2.174	-	D
4907.66	1143.53	63.	95.	0.026	24.98	0.326	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
TH-234	N	7.7183E-06						
			63.29	9.214E-06	(	1.473E-06	2.50E+01	G
			92.80	6.147E-06	(	4.268E-07	7.77E+00	G
			112.81	1.015E-05	?(	4.308E-06	4.80E+01	G
			3 of 3 peaks found					
PB-214	N	3.2885E-06						
			351.92	3.210E-06	(	3.678E-08	2.62E+00	G
			295.21	3.440E-06	(	5.513E-08	3.85E+00	G
								Energy duplication
			77.11	3.288E-06	}	2.322E-07	7.80E+00	XA
			241.98	3.753E-06	+	2.183E-07	4.84E+00	G
								Energy duplication
			74.81	3.288E-06	}	6.561E-07	1.54E+01	XA
			5 of 5 peaks found					
BI-214	N	3.0685E-06						
			609.31	3.068E-06	(	2.567E-08	2.50E+00	G
			1764.49	3.595E-06	+	2.562E-07	4.95E+00	G
			1120.29	3.941E-06	+	2.396E-07	4.41E+00	G
			1238.11	5.245E-06	+	4.954E-07	1.06E+01	G
			768.36	5.007E-06	+	4.827E-07	1.39E+01	G
			5 of 5 peaks found					
AC-228	N	1.3443E-06						
			911.07	1.412E-06	(	4.408E-08	7.14E+00	G
			969.11	1.232E-06	(	8.571E-08	9.40E+00	G
			338.32	9.722E-07	-	1.202E-07	1.39E+01	G
			964.77	1.512E-06		3.913E-07	2.30E+01	GA
			4 of 4 peaks found					
PB-212	N	1.2326E-06						
			238.63	1.233E-06	(	2.480E-08	2.99E+00	G
								Energy duplication
			77.11	1.233E-06	}	1.890E-07	5.63E+00	XA
								Energy duplication
			74.81	1.233E-06	}	3.152E-07	2.37E+01	XA
			300.09	1.698E-06	+	3.693E-07	3.14E+01	G
			4 of 4 peaks found					

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA	Comments	
BI-212	N	2.0065E-06						
			727.17	2.007E-06	(	1.987E-07	2.06E+01	G
			1620.50	5.083E-06	+	9.887E-07	1.31E+01	G
			893.43	1.388E-06	-	2.596E-07	2.33E+01	G
			3 of 5 peaks found					
TL-208	N	4.3926E-07						
			583.14	4.393E-07	(	1.146E-08	5.86E+00	G
			510.84	1.023E-06	+	9.290E-08	1.00E+01	G
			860.37	1.073E-06	+	1.572E-07	2.11E+01	G
			277.36	4.538E-07		1.834E-07	3.86E+01	GA
			4 of 5 peaks found					
K-40	N	1.4026E-05						
			1461.00	1.403E-05	(	7.460E-08	2.99E+00	G
			1 of 1 peaks found					

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
) - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

Analyzed by: Krista L. Ambrose (signature)
Ejhjubmmtjhof e!cztLgtub!Bn cspt f
EO;!do>Lgt ub!Bn cspt f -!d>VT-!p>STTJ
f n bjml bn cspt f A stt j/vt
Ebuf ;!311: /16/38!24;21;18!.16(11(

Krista Ambrose

Laboratory: RSSI

3

RSSI Spectrum name: G090139.An1

Sample description
G090139 GAIATECH AO-44 999.4g

Spectrum Filename: H:\GammaVision\User\Spectra\G090139.An1

Acquisition information
Start time: 26-May-2009 10:45:19
Live time: 3600
Real time: 3611
Dead time: 0.30 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_05_26.Clb
09_05_26

Energy Calibration
Created: 26-May-2009 09:42:11
Zero offset: 7.036 keV
Gain: 0.231 keV/channel
Quadratic: 3.768E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001.Lib
Library Match Width: 0.600
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.13keV)
Stop channel: 8144 (1893.98keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 9.9940E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 9.9940E+02) =
1.0006E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 37 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1454

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
118.38	34.43	1242.	848.	0.236	10.33	1.683	-	s
239.94	62.56	1302.	241.	0.067	28.08	0.705	-	s
300.76	76.63	4002.	1268.	0.352	7.60	1.442	-	D
329.14	83.20	2359.	326.	0.091	21.77	1.447	-	D
345.04	86.87	2056.	681.	0.189	10.17	1.450	-	D
357.08	89.66	2703.	355.	0.099	21.38	1.452	-	D
368.08	92.21	2406.	1031.	0.286	7.41	1.454	-	D
770.02	185.07	1961.	1555.	0.432	4.76	1.526	-	D
785.21	188.58	2017.	187.	0.052	34.79	1.528	-	D
890.66	213.16	1423.	95.	0.026	74.72	0.299	-	s
984.09	234.78	2097.	190.	0.053	34.84	1.563	-	D
995.06	237.32	1948.	2129.	0.591	3.65	1.565	-	D
1043.49	248.53	1100.	124.	0.034	52.57	0.528	-	s
1238.26	293.52	1353.	2551.	0.709	2.84	1.607	-	D
1299.96	307.90	369.	120.	0.033	35.05	0.766	-	s
1423.30	336.68	772.	415.	0.115	10.68	1.639	-	D
1441.67	340.93	519.	35.	0.010	94.95	1.642	-	c
1481.80	349.87	1529.	4276.	1.188	2.00	1.649	-	D
1631.64	384.68	222.	35.	0.010	70.84	0.721	-	s
2008.70	471.98	316.	96.	0.027	42.64	0.375	-	s
2475.69	580.39	386.	551.	0.153	6.60	1.814	-	D
2486.58	582.91	571.	242.	0.067	15.38	1.816	-	D
2587.20	605.92	372.	2853.	0.793	2.10	1.832	-	D
3056.23	714.57	164.	88.	0.024	34.24	0.384	-	s
3270.29	764.24	259.	262.	0.073	10.67	1.941	-	D
3301.08	771.38	252.	26.	0.007	87.37	1.945	-	c
3645.75	851.13	87.	43.	0.012	47.23	0.414	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
3891.33	908.02	491.	169.	0.047	20.06	2.036	-	D
3900.00	910.03	176.	190.	0.053	12.27	2.034	-	D
4132.63	963.93	330.	253.	0.070	11.93	2.072	-	D
4238.90	988.55	116.	73.	0.020	37.51	0.531	-	s
4781.93	1114.39	129.	611.	0.170	6.14	1.647	-	sD
4975.82	1159.33	40.	28.	0.008	43.45	0.403	-	s
5294.15	1233.11	233.	175.	0.048	14.51	2.240	-	D
5303.00	1235.16	135.	87.	0.024	21.65	2.238	-	D
6244.64	1453.45	77.	1058.	0.294	3.92	2.034	-	M
6418.85	1493.85	19.	32.	0.009	32.95	0.468	-	s
6972.95	1622.34	10.	73.	0.020	15.80	0.318	-	s
7549.10	1755.97	13.	470.	0.131	4.94	1.849	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	9.9216E-07						
			351.92	9.638E-07	(	6.578E-08	7.31E+00	G
			295.21	1.047E-06	(	9.074E-08	9.25E+00	G
								Energy duplication
			77.11	9.922E-07	}	2.521E-07	7.59E+00	XA
			74.81	7.329E-06	+	5.953E-07	7.55E+00	XA
			4 of 5 peaks found					
BI-214	N	1.1406E-06						
			609.31	1.141E-06	(	4.641E-08	4.94E+00	G
			1764.49	1.729E-06	+	1.534E-07	6.63E+00	G
			1120.29	1.356E-06	+	1.442E-07	1.33E+01	G
			1238.11	1.746E-06	+	2.976E-07	1.43E+01	G
			768.36	1.419E-06	+	2.937E-07	1.84E+01	G
			5 of 5 peaks found					
AC-228	N	5.3216E-07						
			911.07	5.608E-07	(	3.607E-08	8.80E+00	G
			969.11	4.844E-07	(	5.270E-08	1.73E+01	G
			338.32	2.997E-07	-	1.118E-07	3.59E+01	G
			3 of 4 peaks found					

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

Ra-224   N   7.6236E-06
                         240.98 7.624E-06  (  3.099E-07 4.77E+00 G
                            1 of   1 peaks found

PB-212   N   3.1272E-07
                         238.63 3.127E-07  (  3.911E-08 1.30E+01 G
                                                        Energy duplication
                          77.11 3.127E-07 }   1.772E-07 1.38E+01 XA
                            2 of   4 peaks found

BI-212   N   6.5428E-07
                         727.17 4.245E-07 ?(  1.133E-07 3.24E+01 G
                         893.43 9.128E-07 &(  1.858E-07 3.81E+01 G
                         288.07 8.124E-06 &   3.263E-06 6.19E+01 GA
                            3 of   5 peaks found

K-40     N   4.5720E-06
                        1461.00 4.572E-06  (  1.020E-07 6.40E+00 G
                            1 of   1 peaks found
```

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - - - - - - Krista L. Ambrose Digitally signed by Krista Ambrose DN: cn=Krista Ambrose, c=US, o=RSSI, email=kambrose@rssi.us Date: 2009.05.27 13:05:16 -05'00' - - - - - - - -

Analyzed by: _____
Krista Ambrose

Laboratory: RSSI

4

ORTEC g v - i (1079) Env32 G53W4.22 27-MAY-2009 12:43:43 Page 1
RSSI Spectrum name: G090140.Anl

Sample description
G090140 GAIATECH BK-40 978.3g

Spectrum Filename: H:\GammaVision\User\Spectra\G090140.Anl

Acquisition information
Start time: 26-May-2009 11:48:02
Live time: 3600
Real time: 3611
Dead time: 0.30 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_05_26.Clb
09_05_26

Energy Calibration
Created: 26-May-2009 09:42:11
Zero offset: 7.036 keV
Gain: 0.231 keV/channel
Quadratic: 3.768E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.13keV)
Stop channel: 8144 (1893.98keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 9.7830E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 9.7830E+02) =
1.0222E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 42 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1109

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
115.92	33.86	551.	221.	0.061	18.82	0.745	-	s
290.80	74.33	3052.	219.	0.061	36.38	1.440	-	D
333.72	84.23	2040.	349.	0.097	19.06	1.448	-	D
345.31	86.92	2312.	650.	0.181	11.17	1.450	-	D
356.86	89.59	2510.	441.	0.122	16.78	1.452	-	D
523.88	128.27	2319.	177.	0.049	39.16	1.482	-	D
634.52	153.87	2316.	183.	0.051	46.14	0.680	-	sM
773.77	186.10	2441.	1718.	0.477	7.26	1.218	-	M
890.08	213.02	670.	55.	0.015	78.03	0.299	-	c
947.28	226.26	981.	74.	0.021	67.92	0.368	-	s
976.86	233.11	610.	96.	0.027	43.23	0.657	-	sM
1041.49	248.07	410.	56.	0.016	53.88	0.305	-	sM
1089.67	259.22	1038.	250.	0.069	26.15	1.023	-	s
1137.67	270.33	847.	605.	0.168	11.16	1.546	-	s
1368.72	323.82	330.	89.	0.025	36.91	0.769	-	s
1572.98	371.10	569.	112.	0.031	61.17	0.478	-	s
1907.14	448.47	328.	103.	0.029	36.04	0.465	-	s
2039.66	479.15	317.	154.	0.043	28.75	0.732	-	s
2272.71	533.11	124.	44.	0.012	46.90	0.296	-	s
2393.00	560.97	160.	20.	0.005	94.53	1.801	-	sc
2412.99	565.60	41.	13.	0.004	71.26	0.230	-	sc
2473.47	579.57	305.	110.	0.031	24.28	1.814	-	D
2699.35	631.91	65.	57.	0.016	28.44	0.341	-	s
3075.89	719.12	210.	132.	0.037	29.56	0.423	-	s
3163.77	739.48	105.	56.	0.016	38.96	0.529	-	sM
3424.37	799.84	269.	34.	0.010	69.73	1.965	-	sc
3613.90	843.75	81.	49.	0.014	39.41	0.476	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
4112.12	959.18	54.	54.	0.015	29.80	0.364	-	sM
4195.73	978.55	108.	80.	0.022	34.01	0.505	-	s
4259.27	993.27	88.	80.	0.022	31.11	0.382	-	sM
4317.85	1006.85	117.	55.	0.015	48.05	0.297	-	sM
4922.53	1146.97	128.	154.	0.043	24.07	0.414	-	sM
5063.41	1179.63	17.	7.	0.002	83.94	0.296	-	sc
5155.53	1200.98	19.	15.	0.004	48.53	0.449	-	sM
5660.62	1318.06	8.	12.	0.003	45.92	0.283	-	sM
7141.97	1661.54	13.	76.	0.021	17.33	0.550	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity uCi/g	Peak Energy keV	Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
TH-234	N	6.0265E-06						
			63.29	6.414E-06	(	1.070E-06	2.45E+01	G
			92.80	5.658E-06	(	4.020E-07	7.76E+00	G
			2 of 3 peaks found					
PA-234M	N	1.0944E-05						
			1001.03	1.178E-05	(	1.664E-06	2.46E+01	G
								Energy duplication
			94.67	8.618E-06	}	1.420E-05	1.06E+02	XA
			766.41	8.546E-06	(	8.279E-06	9.69E+01	G
			3 of 5 peaks found					
Pa-234	N	8.0988E-08						
								Energy duplication
			94.67	7.783E-08	}	1.064E-07	8.97E+01	XA
								Energy duplication
			98.44	1.127E-07	?	5.008E-08	4.81E+01	XA
			111.00	1.040E-07		9.391E-08	8.86E+01	XA
			883.24	4.798E-08	?(	4.401E-08	9.55E+01	G
			131.20	1.008E-07	(	5.534E-08	5.53E+01	G
			5 of 5 peaks found					
PB-214	N	4.0101E-06						
			351.92	4.057E-06	(	2.862E-08	2.06E+00	G
			295.21	3.919E-06	(	5.231E-08	2.61E+00	G
								Energy duplication
			77.11	4.010E-06	}	2.325E-07	6.03E+00	XA
			241.98	4.491E-06	+	2.088E-07	3.92E+00	G
								Energy duplication
			74.81	4.010E-06	}	5.760E-07	1.12E+01	XA
			5 of 5 peaks found					

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA		Comments
BI-214	N	3.7079E-06						
			609.31	3.708E-06	(	2.360E-08	1.87E+00	G
			1764.49	4.620E-06	+	2.481E-07	3.83E+00	G
			1120.29	4.250E-06	+	2.152E-07	4.64E+00	G
			1238.11	4.271E-06	+	3.938E-07	7.18E+00	G
			768.36	4.044E-06	+	3.713E-07	7.46E+00	G
			5 of 5 peaks found					
Th-232	N	1.2561E-04						
			59.00	1.256E-04	(	3.189E-05	3.83E+01	G
			1 of 2 peaks found					
AC-228	N	1.2579E-06						
			911.07	1.230E-06	(	3.036E-08	5.54E+00	G
			969.11	1.305E-06	(	6.096E-08	7.08E+00	G
			338.32	1.454E-06	+	1.257E-07	1.07E+01	G
			964.77	2.432E-06	+	3.223E-07	1.08E+01	GA
			4 of 4 peaks found					
PB-212	N	1.1732E-06						
			238.63	1.173E-06	(	2.363E-08	2.79E+00	G
								Energy duplication
			77.11	1.173E-06	}	1.758E-07	5.53E+00	XA
								Energy duplication
			74.81	1.173E-06	}	2.754E-07	2.23E+01	XA
			300.09	1.648E-06	+	3.161E-07	2.20E+01	G
			4 of 4 peaks found					
BI-212	N	1.7386E-06						
			727.17	1.739E-06	(	1.473E-07	1.52E+01	G
			1620.50	2.743E-06	+	7.460E-07	2.72E+01	G
			785.46	9.330E-06	+	1.367E-06	2.00E+01	G
			893.43	2.612E-07	-	1.399E-07	5.68E+01	G
			4 of 5 peaks found					
TL-208	N	4.5495E-07						
			583.14	4.550E-07	(	1.043E-08	4.01E+00	G
			510.84	8.512E-07	+	7.564E-08	1.06E+01	G
			860.37	7.302E-07	+	1.160E-07	1.89E+01	G
			277.36	8.802E-07	&	1.422E-07	2.26E+01	GA
			4 of 5 peaks found					
K-40	N	1.2813E-05						
			1461.00	1.281E-05	(	8.096E-08	2.78E+00	G
			1 of 1 peaks found					

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

Analyzed by: Krista L. Ambrose Digitally signed by Krista Ambrose DN: cn=Krista Ambrose, c=US, o=RSSI, email=kambrose@rssi.us Date: 2009.05.27 13:12:24 -05'00'
Krista Ambrose

Laboratory: RSSI

5

RSSI Spectrum name: G090141.An1

Sample description
G090141 GAIATECH AV-51 761.0g

Spectrum Filename: H:\GammaVision\User\Spectra\G090141.An1

Acquisition information

Start time:	26-May-2009 12:54:56
Live time:	3600
Real time:	3608
Dead time:	0.22 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_05_26.Clb

09_05_26

Energy Calibration

Created:	26-May-2009 09:42:11
Zero offset:	7.036 keV
Gain:	0.231 keV/channel
Quadratic:	3.768E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.13keV)
Stop channel:	8144 (1893.98keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	7.6100E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 7.6100E+02) = 1.3141E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

RSSI Spectrum name: G090141.Anl

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1659

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
116.47	33.99	620.	511.	0.142	10.41	1.347	-	s
242.13	63.07	1220.	230.	0.064	26.30	0.990	-	s
270.43	69.61	1289.	68.	0.019	87.08	0.284	-	sc
318.21	80.69	1078.	64.	0.018	73.44	1.445	-	sc
333.10	84.14	1587.	227.	0.063	25.65	1.448	-	D
344.82	86.85	1309.	471.	0.131	11.81	1.450	-	D
370.22	92.71	1606.	736.	0.204	11.17	1.671	-	sM
395.31	98.51	1270.	233.	0.065	32.51	0.878	-	sM
772.09	185.71	1911.	1142.	0.317	8.95	1.341	-	M
792.50	190.44	896.	106.	0.029	48.86	0.513	-	sM
831.89	199.55	987.	121.	0.034	52.72	0.236	-	s
932.36	222.81	1170.	233.	0.065	35.05	0.418	-	s
979.27	233.67	248.	58.	0.016	47.34	0.666	-	sD
1215.81	288.42	517.	139.	0.039	32.36	0.342	-	sM
1352.97	319.99	305.	83.	0.023	31.90	1.627	-	D
1363.55	322.44	489.	35.	0.010	90.78	1.629	-	c
1519.95	358.82	217.	70.	0.020	37.34	0.673	-	s
1655.97	390.31	223.	23.	0.006	93.47	1.678	-	sc
1664.25	392.22	220.	50.	0.014	44.46	1.680	-	D
1719.32	404.98	269.	80.	0.022	39.77	0.341	-	s
1737.88	409.28	192.	82.	0.023	30.50	0.567	-	s
2341.04	548.94	65.	18.	0.005	76.85	0.380	-	sc
3077.51	719.50	116.	49.	0.014	54.98	0.312	-	s
4004.32	934.20	108.	220.	0.061	15.09	0.953	-	s
4105.20	957.57	48.	16.	0.005	79.19	0.230	-	sM
5520.94	1285.68	21.	25.	0.007	38.99	0.601	-	s
5918.15	1377.76	33.	230.	0.064	9.59	1.679	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Peak Code	MDA Value uCi/g		COMMENTS
PB-214	N	3.4697E-06						
			351.92	3.482E-06	(	3.610E-08	2.37E+00	G
			295.21	3.446E-06	(	5.304E-08	3.24E+00	G
								Energy duplication
			77.11	2.508E-06	}	2.445E-07	1.05E+01	XA
			241.98	3.993E-06	+	2.167E-07	4.51E+00	G
								Energy duplication
			74.81	3.470E-06	}	6.519E-07	1.36E+01	XA
			5 of 5 peaks found					
BI-214	N	3.1147E-06						
			609.31	3.115E-06	(	2.597E-08	2.48E+00	G
			1764.49	3.974E-06	+	2.607E-07	4.56E+00	G
			1120.29	3.648E-06	+	2.287E-07	6.03E+00	G
			1238.11	4.203E-06	+	4.200E-07	8.86E+00	G
			768.36	4.303E-06	+	4.158E-07	1.06E+01	G
			5 of 5 peaks found					
AC-228	N	1.3542E-06						
			911.07	1.291E-06	(	3.566E-08	6.52E+00	G
			969.11	1.459E-06	(	6.897E-08	7.40E+00	G
			338.32	1.109E-06	-	1.397E-07	1.84E+01	G
			964.77	1.792E-06	+	3.422E-07	1.61E+01	GA
			4 of 4 peaks found					
Ra-224	N	5.7311E-07						
			240.98	5.731E-07	(	4.953E-07	8.65E+01	G
			1 of 1 peaks found					
PB-212	N	1.2207E-06						
			238.63	1.221E-06	(	2.314E-08	2.87E+00	G
								Energy duplication
			77.11	1.221E-06	}	1.789E-07	5.57E+00	XA
								Energy duplication
			74.81	1.221E-06	}	3.213E-07	2.24E+01	XA
			300.09	1.757E-06	+	3.305E-07	1.71E+01	G
			4 of 4 peaks found					
BI-212	N	2.1464E-06						
			727.17	2.148E-06	?(	1.766E-07	1.64E+01	G
			1620.50	2.141E-06	?(	5.369E-07	4.74E+01	G
			785.46	7.756E-06	+	1.551E-06	2.98E+01	G
			3 of 5 peaks found					

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N 4.5333E-07						
		583.14	4.533E-07	(	1.394E-08	6.71E+00	G
		510.84	7.556E-07 +		8.201E-08	1.31E+01	G
		860.37	6.178E-07 +		1.244E-07	2.36E+01	G
		277.36	5.106E-07		1.538E-07	3.53E+01	GA
		4 of 5 peaks found					
K-40	N 1.5327E-05						
		1461.00	1.533E-05	(	1.061E-07	2.96E+00	G
		1 of 1 peaks found					

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

Analyzed by: Krista L. Ambrose
Digitally signed by Krista Ambrose
DN: cn=Krista Ambrose, c=US, o=RSSI, email=kambrose@rssi.us
Date: 2009.05.27 12:50:57 -05'00'
Krista Ambrose

Laboratory: RSSI

6

RSSI Spectrum name: G090142.An1

Sample description
G090142 GAIATECH AS-48 728.7g

Spectrum Filename: H:\GammaVision\User\Spectra\G090142.An1

Acquisition information

Start time:	26-May-2009 14:24:50
Live time:	3600
Real time:	3607
Dead time:	0.19 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_05_26.Clb

09_05_26

Energy Calibration

Created:	26-May-2009 09:42:11
Zero offset:	7.036 keV
Gain:	0.231 keV/channel
Quadratic:	3.768E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.600
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.13keV)
Stop channel:	8144 (1893.98keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	7.2870E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 7.2870E+02) = 1.3723E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2196

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
117.03	34.12	498.	504.	0.140	9.80	1.288	-	s
239.75	62.51	944.	265.	0.074	22.20	0.917	-	sM
257.98	66.73	963.	213.	0.059	30.56	0.860	-	s
286.90	73.42	1978.	220.	0.061	29.40	1.440	-	D
344.91	86.85	1128.	402.	0.112	15.31	1.112	-	sD
367.34	92.04	2130.	646.	0.180	14.98	1.237	-	sM
729.82	175.93	883.	105.	0.029	41.26	1.518	-	D
738.15	177.86	1035.	113.	0.031	41.54	1.520	-	D
755.09	181.78	624.	99.	0.027	46.01	0.500	-	sM
771.56	185.59	1154.	989.	0.275	7.47	1.527	-	M
855.64	205.05	754.	80.	0.022	61.88	0.565	-	s
1402.51	331.64	152.	39.	0.011	55.83	0.385	-	s
1469.00	347.03	120.	31.	0.009	56.89	0.238	-	sM
1738.37	409.39	240.	107.	0.030	33.79	0.675	-	s
1965.42	461.96	304.	82.	0.023	62.49	0.561	-	s
2103.03	493.82	153.	69.	0.019	41.44	0.305	-	s
2526.17	591.81	52.	43.	0.012	32.81	0.463	-	s
2636.89	617.45	38.	27.	0.007	42.57	0.698	-	s
3191.16	745.82	63.	42.	0.012	42.67	0.369	-	sM
3359.70	784.86	163.	133.	0.037	30.43	0.750	-	sM
3463.35	808.87	54.	35.	0.010	45.81	0.208	-	s
3592.06	838.69	152.	111.	0.031	34.65	0.334	-	s
4628.74	1078.89	48.	102.	0.028	21.37	0.456	-	s
7948.00	1848.51	0.	100.	0.028	10.00	0.828	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	Peak MDA Value uCi/g	COMMENTS
PB-214	N	2.7013E-06					
			351.92	2.761E-06	(	3.433E-08	3.01E+00 G
			295.21	2.587E-06	(	5.272E-08	3.65E+00 G
							Energy duplication
			77.11	2.701E-06	}	2.489E-07	7.52E+00 XA
			241.98	3.364E-06	+	2.099E-07	5.25E+00 G
							Energy duplication
			74.81	2.701E-06	}	6.218E-07	1.62E+01 XA
			5 of 5 peaks found				
BI-214	N	2.6357E-06					
			609.31	2.636E-06	?(	2.296E-08	2.69E+00 G
			1764.49	3.149E-06	+	2.402E-07	5.72E+00 G
			1120.29	3.246E-06	+	2.252E-07	7.18E+00 G
			1238.11	4.304E-06	+	4.643E-07	1.35E+01 G
			768.36	3.477E-06	+	3.813E-07	1.18E+01 G
			5 of 5 peaks found				
AC-228	N	1.1567E-06					
			911.07	1.110E-06	(	3.682E-08	7.27E+00 G
			969.11	1.235E-06	(	6.051E-08	8.00E+00 G
			338.32	1.633E-06	+	1.500E-07	1.42E+01 G
			964.77	1.792E-06	+	3.483E-07	1.63E+01 GA
			4 of 4 peaks found				
PB-212	N	1.0994E-06					
			238.63	1.099E-06	(	2.373E-08	3.16E+00 G
							Energy duplication
			77.11	7.335E-07	}	1.786E-07	1.69E+01 XA
							Energy duplication
			74.81	1.099E-06	}	3.078E-07	2.29E+01 XA
			300.09	1.924E-06	+	3.575E-07	2.19E+01 G
			4 of 4 peaks found				
BI-212	N	1.6441E-06					
			727.17	1.644E-06	?(	1.917E-07	2.33E+01 G
			1620.50	7.166E-07	-	6.019E-07	9.38E+01 G
			893.43	9.035E-07	-	2.341E-07	3.39E+01 G
			3 of 5 peaks found				

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N 3.8949E-07						
		583.14	3.895E-07	(	1.184E-08	6.54E+00	G
		510.84	8.930E-07	+	7.955E-08	1.03E+01	G
		860.37	6.126E-07	+	1.113E-07	1.89E+01	G
		277.36	5.601E-07	+	1.559E-07	3.40E+01	GA
		4 of 5 peaks found					
K-40	N 1.2299E-05						
		1461.00	1.230E-05	(	6.751E-08	3.13E+00	G
		1 of 1 peaks found					

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Analyzed by: Krista L. Ambrose
Digitally signed by Krista Ambrose
DN: cn=Krista Ambrose, c=US, o=RSSI, email=kambrose@rssi.us
Date: 2009.05.27 13:11:32 -05'00'
Krista Ambrose

Laboratory: RSSI

7

RSSI Spectrum name: G090145.An1

Sample description
G090145 GAIATECH N15 597.6g

Spectrum Filename: H:\GammaVision\User\Spectra\G090145.An1

Acquisition information

Start time:	05-Jun-2009 10:05:51
Live time:	3600
Real time:	3607
Dead time:	0.18 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_05.Clb

09_06_05

Energy Calibration

Created:	05-Jun-2009 10:02:38
Zero offset:	6.727 keV
Gain:	0.231 keV/channel
Quadratic:	3.231E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (14.83keV)
Stop channel:	8144 (1893.94keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	5.9760E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 5.9760E+02) = 1.6734E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 36 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2497

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
118.46	34.15	506.	398.	0.111	12.04	0.653	-	sM
170.06	46.09	682.	78.	0.022	53.82	0.403	-	sM
233.94	60.88	436.	40.	0.011	76.82	0.408	-	sc
333.37	83.87	1149.	204.	0.057	24.48	1.414	-	D
347.24	87.08	1288.	492.	0.137	11.25	1.416	-	D
358.09	89.60	1429.	266.	0.074	21.00	1.418	-	D
370.15	92.39	1250.	632.	0.176	8.85	1.420	-	D
562.26	136.88	800.	68.	0.019	63.76	0.420	-	sM
701.87	169.20	682.	162.	0.045	36.12	0.454	-	sM
742.07	178.51	803.	251.	0.070	28.41	0.441	-	sM
758.81	182.37	744.	145.	0.040	27.91	1.477	-	D
772.87	185.63	879.	1008.	0.280	5.22	1.479	-	D
785.17	188.48	849.	64.	0.018	65.18	1.481	-	c
875.09	209.31	573.	261.	0.072	17.07	1.209	-	
972.17	231.78	228.	22.	0.006	97.27	0.544	-	c
1320.66	312.47	108.	22.	0.006	71.33	0.285	-	c
1531.45	361.28	88.	24.	0.007	59.72	0.414	-	s
1576.08	371.62	76.	18.	0.005	74.36	0.418	-	sc
2071.59	486.37	114.	58.	0.016	39.09	0.701	-	s
2119.57	497.48	38.	18.	0.005	57.40	0.478	-	s
2464.19	577.30	34.	16.	0.004	58.51	0.293	-	sD
2842.83	665.01	65.	117.	0.032	16.39	0.618	-	s
2876.54	672.82	76.	51.	0.014	37.60	0.489	-	s
3020.46	706.16	21.	13.	0.004	58.83	0.605	-	s
3401.87	794.52	63.	75.	0.021	25.02	0.347	-	s
3600.81	840.62	27.	19.	0.005	48.95	0.427	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
4573.69	1066.06	69.	25.	0.007	75.74	0.198	-	s
4628.24	1078.71	16.	18.	0.005	43.66	0.340	-	s
4856.25	1131.55	44.	56.	0.016	28.87	0.364	-	s
4970.99	1158.15	13.	15.	0.004	43.22	0.636	-	s
6048.39	1407.91	13.	91.	0.025	13.91	0.632	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	3.4540E-06						
			351.92	3.415E-06	(P	4.375E-08	3.28E+00	G
			295.21	3.529E-06	(P	5.952E-08	3.74E+00	G
								Energy duplication
			77.11	3.440E-06	} P	3.103E-07	9.02E+00	XA
			241.98	3.806E-06	+ P	2.543E-07	5.60E+00	G
								Energy duplication
			74.81	3.454E-06	}	7.341E-07	1.66E+01	XA
			5 of 5 peaks found					
BI-214	N	3.0717E-06						
			609.31	3.072E-06	(P	3.553E-08	2.99E+00	G
			1764.49	3.996E-06	+	2.956E-07	5.14E+00	G
			1120.29	3.609E-06	+ P	2.671E-07	7.30E+00	G
			1238.11	3.937E-06	+ P	5.287E-07	1.70E+01	G
			768.36	3.910E-06	& P	4.529E-07	1.22E+01	G
			5 of 5 peaks found					
AC-228	N	1.3382E-06						
			911.07	1.314E-06	(P	5.714E-08	7.79E+00	G
			969.11	1.047E-06	- P	1.559E-07	1.11E+01	G
			338.32	1.399E-06	(P	1.354E-07	1.42E+01	G
			964.77	1.206E-06	P	4.102E-07	2.65E+01	GA
			4 of 4 peaks found					
Ra-224	N	1.0928E-06						
			240.98	1.093E-06	(	5.330E-07	4.92E+01	G
			1 of 1 peaks found					
PB-212	N	1.2485E-06						
			238.63	1.249E-06	(P	3.086E-08	3.31E+00	G
								Energy duplication
			77.11	1.200E-06	} P	2.256E-07	1.52E+01	XA
								Energy duplication
			74.81	1.249E-06	}	3.543E-07	2.66E+01	XA

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         300.09 2.643E-06 +   4.209E-07 2.11E+01 G
                            4 of   4 peaks found

BI-212   N   1.4583E-06
                         727.17 1.526E-06 ?(P 1.732E-07 1.63E+01 G
                        1620.50 1.195E-06 ?(P 6.238E-07 7.72E+01 G
                         288.07 1.654E-06 ?   1.331E-06 7.30E+01 GA
                            3 of   5 peaks found

TL-208   N   4.5223E-07
                         583.14 4.522E-07  (P 1.665E-08 6.69E+00 G
                         510.84 7.162E-07 + P 1.014E-07 1.20E+01 G
                         860.37 6.357E-07 + P 1.444E-07 2.38E+01 G
                         277.36 4.578E-07     1.865E-07 5.11E+01 GA
                         763.13 1.451E-06 &   6.774E-07 4.66E+01 GA
                            5 of   5 peaks found

K-40     N   1.3288E-05
                        1460.80 1.329E-05  (P 3.071E-07 3.51E+00 G
                            1 of   1 peaks found
```

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

8

RSSI Spectrum name: G090146.An1

Sample description
G090146 GAIATECH H5 581.3g

Spectrum Filename: H:\GammaVision\User\Spectra\G090146.An1

Acquisition information
Start time: 05-Jun-2009 12:56:16
Live time: 3600
Real time: 3607
Dead time: 0.19 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: G090146.An1
09_06_05

Energy Calibration
Created: 17-Jun-2009 14:06:13
Zero offset: 7.325 keV
Gain: 0.232 keV/channel
Quadratic: 1.498E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.43keV)
Stop channel: 8144 (1894.58keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 5.8130E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 5.8130E+02) =
1.7203E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 40 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0462

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
113.95	33.72	306.	154.	0.043	18.95	0.969	-	sM
182.94	49.70	565.	79.	0.022	55.83	0.528	-	sM
241.71	63.31	1042.	194.	0.054	34.68	0.533	-	sM
283.05	72.91	1131.	146.	0.041	33.63	1.160	-	D
290.71	74.66	1415.	93.	0.026	58.38	1.161	-	D
311.42	79.48	878.	74.	0.021	57.72	1.163	-	D
330.96	83.98	782.	209.	0.058	24.82	0.977	-	sM
345.14	87.25	1058.	332.	0.092	14.92	1.167	-	D
356.37	89.86	1018.	208.	0.058	22.82	1.168	-	D
369.10	92.82	1293.	619.	0.172	12.75	1.152	-	sM
539.24	132.22	455.	62.	0.017	53.77	0.514	-	sM
771.46	186.01	1133.	1094.	0.304	8.82	1.494	-	sM
871.89	209.28	512.	141.	0.039	27.37	0.553	-	s
1100.89	262.32	299.	109.	0.030	34.87	0.577	-	s
1285.25	305.03	253.	57.	0.016	49.13	0.299	-	sM
1531.22	362.01	180.	58.	0.016	45.22	0.388	-	s
1617.06	381.91	138.	29.	0.008	59.59	1.310	-	D
1627.68	384.37	184.	27.	0.008	72.50	1.312	-	c
1647.83	389.02	290.	101.	0.028	32.79	1.093	-	s
2006.18	472.04	55.	22.	0.006	54.82	0.693	-	s
2270.92	533.38	69.	34.	0.009	47.27	0.680	-	s
2498.89	586.15	202.	22.	0.006	94.20	1.418	-	sc
3074.53	719.57	55.	29.	0.008	46.88	0.688	-	s
3345.00	782.24	45.	14.	0.004	82.68	0.000	-	sc
3660.52	855.35	21.	13.	0.004	58.83	0.538	-	sM
3999.66	934.03	77.	111.	0.031	14.65	1.617	-	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
4009.82	936.38	116.	22.	0.006	71.13	1.619	-	c
4224.18	985.97	74.	60.	0.017	38.92	0.329	-	s
4786.40	1116.20	44.	17.	0.005	61.38	1.729	-	D
5849.64	1362.69	13.	23.	0.006	37.39	0.644	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity uCi/g	Peak Energy keV	Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	3.4994E-06						
			351.92	3.516E-06	(P	3.682E-08	2.37E+00	G
			295.21	3.389E-06	(P	7.173E-08	3.74E+00	G
								Energy duplication
			77.11	3.499E-06 }	P	2.906E-07	5.35E+00	XA
			241.98	3.701E-06	(P	1.699E-07	5.63E+00	G
								Energy duplication
			74.81	3.499E-06 }		6.595E-07	5.71E+00	XA
			5 of 5 peaks found					
BI-214	N	3.3059E-06						
			609.31	3.263E-06	(P	3.188E-08	2.53E+00	G
			1764.49	4.064E-06 +		3.023E-07	5.16E+00	G
			1120.29	3.437E-06	(P	1.061E-07	5.33E+00	G
			1238.11	3.857E-06 +	P	5.097E-07	1.41E+01	G
			768.36	3.841E-06 +	P	4.514E-07	1.14E+01	G
			5 of 5 peaks found					
AC-228	N	1.5134E-06						
			911.07	1.406E-06	(P	5.370E-08	6.72E+00	G
			969.11	1.636E-06	(P	9.234E-08	9.79E+00	G
			338.32	1.598E-06	(P	9.263E-08	8.27E+00	G
			964.77	1.655E-06	P	3.961E-07	2.45E+01	GA
			4 of 4 peaks found					
Ra-224	N	7.1215E-07						
			240.98	7.122E-07	(	5.477E-07	7.71E+01	G
			1 of 1 peaks found					
PB-212	N	1.2273E-06						
			238.63	1.227E-06	(P	2.806E-08	3.21E+00	G
								Energy duplication
			77.11	1.227E-06 }	P	2.225E-07	5.81E+00	XA
								Energy duplication
			74.81	1.227E-06 }		3.040E-07	6.15E+00	XA
			300.09	1.780E-06 +		4.020E-07	2.47E+01	G
			4 of 4 peaks found					

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-212   N   1.2827E-06
                          727.17 1.283E-06  (P 1.810E-07 1.94E+01 G
                         1620.50 2.284E-06 + P 7.256E-07 2.42E+01 G
                            2 of   5 peaks found

TL-208   N   4.1131E-07
                          583.14 4.113E-07  (P 1.692E-08 5.63E+00 G
                          510.84 6.332E-07 + P 9.730E-08 1.13E+01 G
                          860.37 5.086E-07 + P 1.489E-07 3.26E+01 G
                          277.36 5.270E-07 +   1.621E-07 3.58E+01 GA
                            4 of   5 peaks found

K-40     N   1.5717E-05
                         1460.80 1.572E-05  (P 3.023E-07 2.97E+00 G
                            1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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Laboratory:  RSSI
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9

ORTEC g v - i (1207) Env32 G53W4.22 17-JUN-2009 15:41:14 Page 1
RSSI Spectrum name: G090147.An1

Sample description
G090147 GAIATECH K5 2-3" 745.6g

Spectrum Filename: H:\GammaVision\User\Spectra\G090147.An1

Acquisition information
Start time: 08-Jun-2009 12:40:13
Live time: 3600
Real time: 3607
Dead time: 0.21 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: G090147.Spc
09_06_08

Energy Calibration
Created: 17-Jun-2009 14:12:36
Zero offset: 7.392 keV
Gain: 0.232 keV/channel
Quadratic: 2.037E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.49keV)
Stop channel: 8144 (1894.14keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 7.4560E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 7.4560E+02) =
1.3412E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

RSSI Spectrum name: G090147.An1

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0681

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
114.97	34.01	568.	352.	0.098	12.71	0.793	-	s
241.17	63.23	833.	199.	0.055	27.41	0.868	-	
269.09	69.69	798.	51.	0.014	79.48	1.037	-	c
279.62	72.13	1006.	93.	0.026	49.52	1.039	-	D
331.19	84.07	572.	118.	0.033	32.30	0.411	-	sM
345.01	87.27	1038.	442.	0.123	11.36	1.053	-	D
356.18	89.85	972.	258.	0.072	18.18	1.055	-	D
368.63	92.73	1045.	762.	0.212	8.89	1.288	-	sM
772.21	186.18	1212.	1198.	0.333	10.87	1.368	-	sM
855.09	205.37	718.	100.	0.028	51.35	0.511	-	s
1270.11	301.46	588.	57.	0.016	61.17	1.235	-	D
1310.96	310.92	134.	56.	0.016	39.19	0.557	-	s
1384.32	327.86	332.	133.	0.037	21.19	1.257	-	D
1393.15	329.91	335.	67.	0.019	40.38	1.258	-	D
1649.90	389.41	261.	63.	0.018	47.92	0.315	-	s
1736.55	409.48	323.	40.	0.011	97.64	0.357	-	sc
2401.39	563.45	51.	15.	0.004	79.58	0.564	-	sc
2915.81	682.60	56.	31.	0.009	45.51	0.666	-	s
3086.00	722.02	42.	38.	0.011	33.15	0.615	-	sM
3142.84	735.18	40.	18.	0.005	62.03	0.358	-	s
3732.06	871.67	66.	43.	0.012	43.57	0.526	-	s
3874.49	904.67	57.	41.	0.011	40.98	0.317	-	sM
4002.41	934.30	75.	142.	0.040	16.71	0.823	-	s
4404.92	1027.56	18.	25.	0.007	35.55	0.814	-	s
5915.85	1377.67	50.	196.	0.054	12.57	0.748	-	s
6504.74	1514.15	4.	40.	0.011	19.36	0.371	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Peak Code	Peak MDA Value uCi/g	COMMENTS
PB-214	N	2.8611E-06					
			351.92	2.878E-06	(P	2.928E-08 2.35E+00	G
			295.21	2.828E-06	(P	5.910E-08 3.71E+00	G
							Energy duplication
			77.11	2.861E-06	} P	2.164E-07 5.27E+00	XA
			241.98	2.477E-06	- P	2.139E-07 9.10E+00	G
			4 of 4 peaks found				
BI-214	N	2.7369E-06					
			609.31	2.737E-06	(P	2.448E-08 2.40E+00	G
			1764.49	3.431E-06	+	2.450E-07 4.96E+00	G
			1120.29	3.132E-06	+ P	2.197E-07 6.23E+00	G
			768.36	3.099E-06	+ P	3.646E-07 1.24E+01	G
			4 of 4 peaks found				
AC-228	N	1.1900E-06					
			911.07	1.111E-06	(P	5.566E-08 9.33E+00	G
			969.11	1.220E-06	(P	7.831E-08 1.05E+01	G
			338.32	1.339E-06	(P	1.016E-07 1.19E+01	G
			3 of 3 peaks found				
PB-212	N	9.5464E-07					
			238.63	9.546E-07	(P	2.528E-08 3.82E+00	G
							Energy duplication
			77.11	9.546E-07	} P	1.644E-07 6.20E+00	XA
			74.82	2.833E-06	+	2.651E-07 8.35E+00	XA
			300.09	1.191E-06	+	2.927E-07 2.88E+01	G
			4 of 4 peaks found				
BI-212	N	2.2028E-06					
			727.17	2.072E-06	(P	1.842E-07 1.61E+01	G
			1620.60	2.796E-06	(P	4.683E-07 2.96E+01	G
			785.46	6.536E-06	+	1.330E-06 2.46E+01	G
			3 of 4 peaks found				
TL-208	N	4.0930E-07					
			583.14	4.093E-07	(P	1.321E-08 5.95E+00	G
			510.84	6.992E-07	+ P	8.422E-08 1.02E+01	G
			277.35	2.900E-07	&	1.386E-07 6.05E+01	GA
			3 of 3 peaks found				

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N 1.4525E-05						
		1460.80	1.453E-05	(P	2.338E-07	2.75E+00	G

1 of 1 peaks found

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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Laboratory: RSSI

10

RSSI Spectrum name: G090148.Anl

Sample description
G090148 GAIATECH L10.5 12" 944.3g

Spectrum Filename: H:\GammaVision\User\Spectra\G090148.Anl

Acquisition information

Start time:	08-Jun-2009 14:04:27
Live time:	3600
Real time:	3609
Dead time:	0.25 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_08.Clb

09_06_08

Energy Calibration

Created:	08-Jun-2009 10:14:38
Zero offset:	7.146 keV
Gain:	0.232 keV/channel
Quadratic:	3.506E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.25keV)
Stop channel:	8144 (1894.84keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	9.4430E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 9.4430E+02) = 1.0590E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 38 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1668

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
116.78	34.18	760.	711.	0.198	8.61	1.628	-	sM
148.83	41.60	678.	120.	0.033	45.72	0.528	-	sM
344.69	86.82	1724.	544.	0.151	11.62	1.419	-	D
356.57	89.57	2046.	274.	0.076	24.08	1.421	-	D
368.46	92.32	1839.	799.	0.222	8.38	1.424	-	D
395.86	98.79	1126.	135.	0.037	42.13	0.427	-	sM
487.75	120.07	1685.	148.	0.041	53.41	0.308	-	sM
509.00	124.99	1519.	104.	0.029	68.40	0.000	-	sM
589.06	143.53	1256.	196.	0.054	30.79	0.928	-	sM
665.28	161.18	754.	140.	0.039	38.76	0.315	-	sM
771.53	185.78	1265.	1263.	0.351	4.88	1.496	-	D
786.31	189.20	1550.	90.	0.025	62.60	1.499	-	c
851.69	204.34	1054.	120.	0.033	45.38	0.301	-	s
873.70	209.44	1238.	276.	0.077	25.04	0.457	-	s
921.00	220.39	819.	166.	0.046	34.60	0.469	-	s
1100.07	261.86	590.	57.	0.016	70.49	0.382	-	sc
1726.76	407.00	133.	24.	0.007	77.31	0.303	-	sc
1817.84	428.10	160.	75.	0.021	32.32	0.467	-	s
1963.95	461.95	240.	246.	0.068	15.67	0.544	-	s
2328.33	546.36	104.	76.	0.021	29.94	0.738	-	s
2518.88	590.50	62.	41.	0.011	36.75	0.482	-	s
3087.23	722.19	46.	41.	0.011	31.77	0.462	-	sM
3246.20	759.03	79.	21.	0.006	81.70	0.243	-	sc
3277.39	766.25	321.	34.	0.009	76.92	1.948	-	sc
3720.43	868.93	60.	40.	0.011	42.79	0.484	-	sM
3786.27	884.19	108.	49.	0.014	50.68	0.590	-	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM		Suspected
3933.66	918.35	85.	62.	0.017	38.58	0.298	-	sM
4097.79	956.39	15.	13.	0.004	52.67	0.583	-	sM
4376.69	1020.81	82.	19.	0.005	70.09	2.145	-	sc
4388.76	1023.61	86.	39.	0.011	36.80	2.147	-	D
4452.10	1038.52	80.	25.	0.007	54.66	2.158	-	D
4464.81	1041.47	113.	50.	0.014	33.01	2.161	-	D
4632.86	1080.43	77.	70.	0.019	32.76	0.522	-	s
7586.63	1765.50	0.	565.	0.157	4.21	1.834	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	2.8252E-06						
			351.92	2.874E-06	(P	2.992E-08	2.29E+00	G
			295.21	2.732E-06	(P	4.928E-08	3.23E+00	G
								Energy duplication
			77.11	2.326E-06 }	P	2.308E-07	1.04E+01	XA
			241.98	3.142E-06 +	P	1.842E-07	4.94E+00	G
								Energy duplication
			74.81	2.197E-06 }		5.251E-07	1.80E+01	XA
			5 of 5 peaks found					
BI-214	N	2.6963E-06						
			609.31	2.696E-06	(P	2.355E-08	2.34E+00	G
			1120.29	2.990E-06 +	P	1.993E-07	7.05E+00	G
			1238.11	3.638E-06 +	P	3.854E-07	1.23E+01	G
			768.36	3.070E-06 +	P	3.243E-07	8.32E+00	G
			4 of 5 peaks found					
AC-228	N	1.1361E-06						
			911.07	1.110E-06	(P	4.068E-08	6.83E+00	G
			969.11	1.134E-06	(P	6.403E-08	7.54E+00	G
			338.32	1.202E-06	(P	8.174E-08	9.50E+00	G
			964.77	1.646E-06 +	P	3.037E-07	1.46E+01	GA
			4 of 4 peaks found					
PB-212	N	1.0830E-06						
			238.63	1.083E-06	(P	2.143E-08	2.77E+00	G
								Energy duplication
			77.11	1.083E-06 }	P	1.635E-07	5.55E+00	XA
								Energy duplication
			74.81	1.081E-06 }		2.665E-07	2.09E+01	XA
			300.09	1.393E-06 +		2.898E-07	2.55E+01	G
			4 of 4 peaks found					

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Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-212   N   1.5976E-06
                        727.17 1.598E-06 ?(P 1.554E-07 1.80E+01 G
                           1 of   5 peaks found

TL-208   N   4.0079E-07
                        583.14 4.008E-07  (P 1.181E-08 5.70E+00 G
                        510.84 5.378E-07 + P 7.086E-08 1.08E+01 G
                        860.37 7.307E-07 + P 1.200E-07 2.08E+01 G
                        277.36 4.251E-07 ?   1.081E-07 2.79E+01 GA
                           4 of   5 peaks found

K-40     N   1.2371E-05
                       1460.80 1.237E-05  (P 1.888E-07 2.72E+00 G
                           1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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Laboratory:  RSSI
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11

ORTEC g v - i (1207) Env32 G53W4.22 17-JUN-2009 15:39:15 Page 1
RSSI Spectrum name: G090149.An1

Sample description
G090149 GAIATECH R19 1012.9g

Spectrum Filename: H:\GammaVision\User\Spectra\G090149.An1

Acquisition information
Start time: 09-Jun-2009 09:40:35
Live time: 3600
Real time: 3610
Dead time: 0.27 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_09.Clb
09_06_09

Energy Calibration
Created: 09-Jun-2009 09:38:49
Zero offset: 7.259 keV
Gain: 0.231 keV/channel
Quadratic: 3.605E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.36keV)
Stop channel: 8144 (1894.04keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 1.0129E+03
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0129E+03) =
9.8726E-04
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 34 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1127

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
114.31	33.71	438.	261.	0.073	14.37	0.782	-	sM
164.99	45.44	407.	73.	0.020	47.41	0.654	-	sM
276.08	71.14	757.	108.	0.030	45.31	0.625	-	sD
320.68	81.46	1018.	88.	0.024	55.64	0.727	-	sD
345.16	87.13	1588.	624.	0.173	12.59	1.199	-	
368.99	92.97	1843.	810.	0.225	8.28	1.469	-	D
422.94	105.13	1642.	174.	0.048	39.61	0.727	-	sM
455.04	112.55	1003.	71.	0.020	74.16	0.300	-	sc
503.39	123.75	1597.	126.	0.035	51.83	0.324	-	s
526.67	129.19	2013.	209.	0.058	31.07	1.501	-	D
584.56	142.49	1368.	170.	0.047	31.65	1.513	-	D
591.52	144.10	1688.	282.	0.078	21.43	1.514	-	D
771.56	185.81	2298.	1367.	0.380	7.91	1.355	-	M
875.35	209.83	1242.	321.	0.089	23.53	1.051	-	s
902.54	216.12	790.	220.	0.061	28.65	0.740	-	s
1154.90	274.61	564.	59.	0.016	58.65	1.625	-	D
1670.47	393.88	315.	64.	0.018	56.85	0.551	-	s
1813.35	426.96	184.	43.	0.012	56.73	0.622	-	s
1845.91	434.50	209.	38.	0.011	60.46	0.274	-	s
1969.66	463.15	364.	95.	0.026	53.28	1.071	-	s
2522.61	591.18	57.	30.	0.008	41.56	0.537	-	s
2677.74	627.10	62.	36.	0.010	39.00	0.655	-	s
3043.35	711.78	125.	79.	0.022	32.41	0.331	-	s
3683.50	860.05	192.	180.	0.050	21.69	0.710	-	sM
3986.70	930.18	129.	25.	0.007	68.20	2.137	-	sc
4002.44	933.83	113.	232.	0.064	9.23	2.139	-	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
5917.55	1377.75	62.	248.	0.069	10.58	1.637	-	s
6484.38	1509.16	22.	111.	0.031	13.53	0.958	-	s
7944.41	1847.74	6.	82.	0.023	12.56	0.554	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g	COMMENTS
PB-214	N	3.3579E-06					
			351.92	3.417E-06	(P	3.097E-08	2.26E+00 G
			295.21	3.244E-06	(P	4.807E-08	2.94E+00 G
							Energy duplication
			77.11	2.955E-06	} P	2.295E-07	7.92E+00 XA
			241.98	3.772E-06	+ P	2.002E-07	4.53E+00 G
			4 of 4 peaks found				
BI-214	N	3.0756E-06					
			609.31	3.076E-06	(P	2.593E-08	2.17E+00 G
			1764.49	3.858E-06	+	2.248E-07	4.39E+00 G
			1120.29	3.402E-06	+ P	2.005E-07	6.00E+00 G
			768.36	3.708E-06	+ P	3.451E-07	1.05E+01 G
			4 of 4 peaks found				
AC-228	N	1.2012E-06					
			911.07	1.217E-06	(P	4.097E-08	6.81E+00 G
			969.11	1.042E-06	- P	1.113E-07	1.08E+01 G
			338.32	1.162E-06	?(P	8.652E-08	1.11E+01 G
			3 of 3 peaks found				
PB-212	N	1.0780E-06					
			238.63	1.078E-06	(P	2.286E-08	2.83E+00 G
							Energy duplication
			77.11	1.078E-06	} P	1.648E-07	5.58E+00 XA
			74.82	3.484E-06	+	2.972E-07	7.88E+00 XA
			300.09	1.731E-06	+	2.485E-07	1.82E+01 G
			4 of 4 peaks found				
BI-212	N	1.9160E-06					
			727.17	1.916E-06	(P	1.732E-07	1.61E+01 G
			785.46	6.677E-06	+	1.155E-06	2.05E+01 G
			2 of 4 peaks found				

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208   N   3.7146E-07
                          583.14 3.715E-07  (P 1.335E-08 6.43E+00 G
                          510.84 4.936E-07 + P 7.047E-08 1.18E+01 G
                             2 of   3 peaks found

K-40     N   1.3431E-05
                         1460.80 1.343E-05  (P 1.746E-07 2.48E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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Laboratory:  RSSI
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12

RSSI Spectrum name: G090150.An1

Sample description
G090150 GAIATECH B21 716.7g

Spectrum Filename: H:\GammaVision\User\Spectra\G090150.An1

Acquisition information
Start time: 09-Jun-2009 10:59:12
Live time: 3600
Real time: 3607
Dead time: 0.20 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: G090150.An1
09_06_09

Energy Calibration
Created: 17-Jun-2009 14:49:06
Zero offset: 7.398 keV
Gain: 0.231 keV/channel
Quadratic: 2.099E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.50keV)
Stop channel: 8144 (1893.70keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 7.1670E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 7.1670E+02) =
1.3953E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0605

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
113.04	33.56	253.	139.	0.039	19.57	0.864	-	s
179.03	48.83	486.	74.	0.021	51.35	0.439	-	s
331.23	84.06	1062.	210.	0.058	29.78	0.636	-	s
344.62	87.18	1036.	367.	0.102	13.46	1.096	-	D
356.08	89.83	905.	231.	0.064	19.59	1.098	-	D
368.88	92.67	1043.	609.	0.169	8.53	1.100	-	D
386.80	96.81	1013.	62.	0.017	73.59	1.104	-	c
588.11	143.52	1030.	182.	0.051	33.81	0.369	-	sM
649.30	157.69	359.	46.	0.013	60.09	0.320	-	sM
700.65	169.57	283.	31.	0.009	76.48	0.202	-	sc
771.86	186.06	1044.	1032.	0.287	6.54	1.255	-	sM
1133.83	269.85	628.	235.	0.065	21.63	1.268	-	s
1155.05	274.68	349.	62.	0.017	44.12	1.235	-	D
1385.64	328.14	424.	104.	0.029	36.29	0.460	-	s
1621.31	382.70	188.	49.	0.014	50.83	0.678	-	s
1719.93	405.53	200.	35.	0.010	70.57	0.520	-	s
2027.13	476.66	68.	22.	0.006	61.46	0.408	-	s
2457.19	576.24	82.	42.	0.012	41.90	0.484	-	s
2472.98	579.83	170.	57.	0.016	34.65	1.437	-	D
2512.12	588.96	37.	16.	0.004	59.29	0.546	-	s
2622.55	614.53	56.	20.	0.006	68.56	0.369	-	sM
2840.57	665.01	91.	114.	0.032	20.07	0.815	-	s
3845.28	897.69	34.	46.	0.013	28.87	0.378	-	sM
4001.05	933.77	72.	140.	0.039	16.89	0.537	-	s
6420.89	1494.36	5.	9.	0.003	47.25	0.268	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Peak Code	Peak MDA Value uCi/g		COMMENTS
PB-214	N	3.0739E-06						
			351.92	3.074E-06	(P	3.118E-08	2.39E+00	G
			295.21	2.837E-06	- P	1.151E-07	4.39E+00	G
								Energy duplication
			77.11	2.261E-06	} P	2.395E-07	1.19E+01	XA
			241.98	2.487E-06	- P	2.019E-07	6.93E+00	G
								Energy duplication
			74.81	3.074E-06	}	5.323E-07	5.71E+00	XA
			5 of 5 peaks found					
BI-214	N	2.8500E-06						
			609.31	2.834E-06	(P	2.577E-08	2.44E+00	G
			1764.49	3.380E-06	+	2.503E-07	5.41E+00	G
			1120.29	2.918E-06	(P	1.030E-07	7.10E+00	G
			1238.11	3.973E-06	+ P	4.437E-07	1.11E+01	G
			768.36	2.795E-06	(P	2.366E-07	1.06E+01	G
			5 of 5 peaks found					
AC-228	N	1.0932E-06						
			911.07	1.134E-06	(P	5.183E-08	8.06E+00	G
			969.11	1.079E-06	(P	8.223E-08	1.27E+01	G
			338.32	1.015E-06	(P	9.825E-08	1.37E+01	G
			964.77	1.114E-06	P	2.813E-07	2.29E+01	GA
			4 of 4 peaks found					
Ra-224	N	7.5077E-07						
			240.98	7.508E-07	(	4.204E-07	5.64E+01	G
			1 of 1 peaks found					
PB-212	N	9.7324E-07						
			238.63	9.732E-07	(P	2.440E-08	3.38E+00	G
								Energy duplication
			77.11	9.732E-07	} P	1.742E-07	5.91E+00	XA
								Energy duplication
			74.81	9.732E-07	}	2.485E-07	6.24E+00	XA
			300.09	1.248E-06	+	3.272E-07	3.33E+01	G
			4 of 4 peaks found					

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-212   N   1.5146E-06
                        727.17 1.515E-06  (P 1.421E-07 1.40E+01 G
                        785.46 7.035E-06 &   1.401E-06 2.53E+01 G
                           2 of   5 peaks found

TL-208   N   3.3850E-07
                        583.14 3.385E-07  (P 1.389E-08 5.61E+00 G
                        510.84 5.181E-07 + P 8.390E-08 1.18E+01 G
                        860.37 6.647E-07 + P 1.314E-07 2.23E+01 G
                        277.36 4.003E-07 +   1.506E-07 3.55E+01 GA
                        763.13 1.051E-06 +   7.527E-07 6.64E+01 GA
                           5 of   5 peaks found

K-40     N   1.4001E-05
                       1460.80 1.400E-05  (P 2.462E-07 2.89E+00 G
                           1 of   1 peaks found
```

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

Laboratory: RSSI

13

RSSI Spectrum name: G090151.An1

Sample description
G090151 GAIATECH G21 652.1g

Spectrum Filename: H:\GammaVision\User\Spectra\G090151.An1

Acquisition information

Start time:	08-Jun-2009 10:16:26
Live time:	3600
Real time:	3606
Dead time:	0.17 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: G090151.An1
09_06_08

Energy Calibration

Created:	17-Jun-2009 14:33:11
Zero offset:	7.186 keV
Gain:	0.232 keV/channel
Quadratic:	1.438E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.29keV)
Stop channel:	8144 (1894.58keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	6.5210E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 6.5210E+02) = 1.5335E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 33 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0758

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
113.48	33.37	195.	224.	0.062	11.06	0.976	-	D
119.33	34.73	559.	120.	0.033	29.33	0.977	-	D
292.02	74.83	1233.	76.	0.021	66.57	1.011	-	c
316.74	80.56	872.	80.	0.022	70.41	0.560	-	sM
331.17	83.90	878.	206.	0.057	27.86	1.015	-	M
345.38	87.19	797.	301.	0.084	17.68	1.008	-	D
357.13	89.91	708.	215.	0.060	22.49	0.468	-	sD
369.15	92.72	836.	441.	0.123	10.42	1.026	-	D
379.00	95.00	781.	90.	0.025	45.38	1.028	-	D
385.32	96.47	524.	51.	0.014	65.65	1.030	-	c
573.36	140.00	596.	79.	0.022	53.10	0.329	-	sM
675.31	163.62	768.	90.	0.025	58.23	0.649	-	sM
690.34	167.22	781.	55.	0.015	73.32	1.088	-	sc
695.70	168.46	569.	42.	0.012	82.44	1.089	-	sc
771.73	185.96	981.	801.	0.223	7.73	1.232	-	sM
831.45	199.79	537.	79.	0.022	53.63	0.772	-	s
874.14	209.68	615.	199.	0.055	25.38	0.933	-	s
988.28	236.08	490.	112.	0.031	29.45	1.144	-	D
1047.37	249.81	327.	65.	0.018	51.18	0.361	-	s
1094.35	260.69	160.	23.	0.006	82.97	0.332	-	sc
1384.36	327.88	300.	96.	0.027	32.45	0.436	-	s
1454.12	344.04	96.	28.	0.008	56.69	0.490	-	s
1535.97	363.01	78.	26.	0.007	54.08	0.632	-	s
1650.00	389.42	260.	142.	0.039	27.53	0.589	-	s
1965.33	462.48	188.	140.	0.039	23.10	0.419	-	s
2353.25	552.36	78.	56.	0.016	34.26	0.470	-	s

RSSI Spectrum name: G090151.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
2452.51	575.36	56.	31.	0.009	45.51	0.552	-	s
2679.80	628.03	33.	22.	0.006	46.03	0.614	-	s
3088.49	722.73	48.	28.	0.008	47.26	0.224	-	sM
3640.13	850.56	33.	28.	0.008	41.34	0.293	-	s
4905.00	1143.71	9.	9.	0.002	57.74	0.443	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity uCi/g	Peak Energy keV	Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	2.4056E-06						
			351.92	2.384E-06	(P	3.572E-08	4.10E+00	G
			295.21	2.379E-06	(P	5.023E-08	3.60E+00	G
								Energy duplication
			77.11	2.406E-06	} P	2.286E-07	5.62E+00	XA
			241.98	2.581E-06	(P	1.501E-07	6.83E+00	G
								Energy duplication
			74.81	2.406E-06	}	5.233E-07	5.97E+00	XA
			5 of 5 peaks found					
BI-214	N	2.3614E-06						
			609.31	2.361E-06	(P	3.114E-08	3.07E+00	G
			1764.49	3.053E-06	+	2.478E-07	5.63E+00	G
			1120.29	2.670E-06	+ P	2.239E-07	8.13E+00	G
			1238.11	3.974E-06	+ P	4.612E-07	1.16E+01	G
			768.36	2.741E-06	+ P	3.901E-07	1.61E+01	G
			5 of 5 peaks found					
AC-228	N	1.4587E-06						
			911.07	1.470E-06	(P	5.442E-08	7.34E+00	G
			969.11	1.139E-06	- P	1.390E-07	1.05E+01	G
			338.32	1.431E-06	(P	9.834E-08	1.03E+01	G
			964.77	1.917E-06	& P	3.807E-07	2.26E+01	GA
			4 of 4 peaks found					
Ra-224	N	1.3434E-06						
			240.98	1.343E-06	(	4.357E-07	3.30E+01	G
			1 of 1 peaks found					
PB-212	N	1.1188E-06						
			238.63	1.119E-06	(P	2.422E-08	3.12E+00	G
								Energy duplication
			77.11	1.119E-06	} P	1.754E-07	5.76E+00	XA
								Energy duplication
			74.81	1.119E-06	}	2.362E-07	6.09E+00	XA

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         300.09 1.485E-06 +   3.337E-07 2.57E+01 G
                            4 of   4 peaks found

BI-212   N   1.5298E-06
                         727.17 1.530E-06  (P 1.449E-07 1.44E+01 G
                        1620.50 3.789E-07 & P 4.150E-07 8.94E+01 G
                         785.46 5.229E-06 +   1.249E-06 2.59E+01 G
                            3 of   5 peaks found

TL-208   N   4.2737E-07
                         583.14 4.289E-07 *(P 1.451E-08 6.23E+00 G
                         510.84 4.214E-07  (P 7.638E-08 1.48E+01 G
                         860.37 5.063E-07 + P 1.202E-07 2.38E+01 G
                         277.36 5.269E-07 +   1.510E-07 3.29E+01 GA
                            4 of   5 peaks found

K-40     N   1.1664E-05
                        1460.80 1.166E-05  (P 2.615E-07 3.17E+00 G
                            1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Laboratory:  RSSI
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14

RSSI Spectrum name: G090152.Anl

Sample description
G090152 GAIATECH N23 992.4g

Spectrum Filename: H:\GammaVision\User\Spectra\G090152.Anl

Acquisition information

Start time:	09-Jun-2009 12:43:04
Live time:	3600
Real time:	3609
Dead time:	0.25 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_09.Clb

09_06_09

Energy Calibration

Created:	09-Jun-2009 09:38:49
Zero offset:	7.259 keV
Gain:	0.231 keV/channel
Quadratic:	3.605E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.36keV)
Stop channel:	8144 (1894.04keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	9.9240E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 9.9240E+02) = 1.0077E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1158

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
344.96	87.08	1680.	370.	0.103	18.27	1.262	-	sM
369.40	92.74	2127.	645.	0.179	13.20	1.440	-	M
772.19	185.95	2221.	1237.	0.344	8.05	1.560	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	2.8234E-06						
			351.92	2.860E-06	(P	2.832E-08	2.08E+00	G
			295.21	2.752E-06	(P	4.879E-08	3.00E+00	G
								Energy duplication
			77.11	2.823E-06	} P	2.380E-07	8.31E+00	XA
			241.98	3.117E-06	+ P	1.935E-07	5.37E+00	G
								Energy duplication
			74.81	2.823E-06	}	5.247E-07	1.48E+01	XA

5 of 5 peaks found

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-214   N   2.7474E-06
                         609.31 2.747E-06  (P 2.743E-08 2.34E+00 G
                        1764.49 3.368E-06 +   2.118E-07 4.73E+00 G
                        1120.29 3.092E-06 + P 1.931E-07 6.42E+00 G
                        1238.11 4.329E-06 + P 4.159E-07 1.29E+01 G
                         768.36 3.009E-06 + P 3.436E-07 1.47E+01 G
                            5 of   5 peaks found

AC-228   N   1.0563E-06
                         911.07 1.052E-06  (P 4.564E-08 8.22E+00 G
                         969.11 1.053E-06  (P 6.876E-08 8.17E+00 G
                         338.32 1.072E-06  (P 9.247E-08 1.25E+01 G
                         964.77 1.307E-06 + P 3.001E-07 1.87E+01 GA
                            4 of   4 peaks found

PB-212   N   1.0254E-06
                         238.63 1.030E-06  (P 2.348E-08 2.98E+00 G
                                                        Energy duplication
                          77.11 8.647E-07 } P 1.660E-07 1.60E+01 XA
                                                        Energy duplication
                          74.81 1.025E-06 }   2.609E-07 2.35E+01 XA
                         300.09 9.699E-07  (  2.539E-07 3.37E+01 G
                            4 of   4 peaks found

BI-212   N   1.3693E-06
                         727.17 1.369E-06 *(P 1.367E-07 1.69E+01 G
                            1 of   5 peaks found

TL-208   N   3.9434E-07
                         583.14 3.797E-07 @(P 1.567E-08 7.33E+00 G
                         510.84 4.275E-07 *(P 5.985E-08 1.38E+01 G
                         860.37 4.360E-07  (P 7.158E-08 2.48E+01 G
                         277.36 3.744E-07 ?   1.372E-07 4.30E+01 GA
                         763.13 8.633E-07 +   6.058E-07 9.76E+01 GA
                            5 of   5 peaks found

K-40     N   1.2166E-05
                        1460.80 1.217E-05  (P 1.929E-07 2.95E+00 G
                            1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
```

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

Laboratory: RSSI

15

RSSI Spectrum name: G090153.An1

Sample description
G090153 GAIATECH T27 559.1g

Spectrum Filename: H:\GammaVision\User\Spectra\G090153.An1

Acquisition information

Start time:	05-Jun-2009 14:39:32
Live time:	3600
Real time:	3606
Dead time:	0.16 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	G090153.An1

09_06_05

Energy Calibration

Created:	17-Jun-2009 14:35:14
Zero offset:	7.224 keV
Gain:	0.232 keV/channel
Quadratic:	6.815E-09 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.33keV)
Stop channel:	8144 (1894.52keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	5.5910E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 5.5910E+02) = 1.7886E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 33 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0757

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
115.03	33.88	336.	202.	0.056	18.75	1.985	-	s
207.38	55.27	392.	53.	0.015	64.79	0.424	-	s
243.09	63.55	725.	155.	0.043	33.48	0.738	-	
345.12	87.19	700.	335.	0.093	15.07	1.322	-	sM
368.93	92.70	1059.	434.	0.121	15.75	0.972	-	sM
422.24	105.05	437.	93.	0.026	38.00	0.646	-	sM
481.52	118.79	652.	77.	0.021	60.24	0.334	-	sM
746.81	180.25	662.	74.	0.020	66.55	0.432	-	sM
772.48	186.20	1088.	600.	0.167	12.75	1.186	-	sM
790.96	190.48	618.	70.	0.019	67.96	0.478	-	s
828.57	199.20	497.	94.	0.026	44.51	0.413	-	s
871.37	209.11	611.	248.	0.069	21.33	0.824	-	s
886.37	212.59	277.	45.	0.012	58.88	0.556	-	s
1097.97	261.62	220.	40.	0.011	62.58	0.682	-	s
1174.30	279.36	244.	45.	0.012	51.74	1.117	-	D
1329.40	315.24	130.	32.	0.009	58.28	0.579	-	s
1804.61	425.35	143.	38.	0.011	51.09	0.606	-	s
1933.46	455.20	51.	24.	0.007	46.77	0.308	-	s
2432.04	570.73	64.	15.	0.004	94.54	0.293	-	sc
3075.74	719.89	33.	31.	0.009	35.65	0.730	-	s
3266.10	764.00	54.	44.	0.012	37.10	0.340	-	s
3960.91	925.01	8.	15.	0.004	37.12	0.375	-	s
4080.41	952.71	20.	14.	0.004	58.44	0.455	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	2.8521E-06						
			351.92	2.894E-06	(P	3.058E-08	2.49E+00	G
			295.21	2.771E-06	(P	6.436E-08	3.92E+00	G
								Energy duplication
			77.11	2.852E-06	} P	2.432E-07	5.34E+00	XA
			241.98	2.563E-06	- P	2.275E-07	7.49E+00	G
								Energy duplication
			74.81	2.852E-06	}	5.925E-07	5.70E+00	XA
			5 of 5 peaks found					
BI-214	N	2.7782E-06						
			609.31	2.791E-06	(P	3.193E-08	2.85E+00	G
			1764.49	3.114E-06	+	2.728E-07	6.30E+00	G
			1120.29	2.740E-06	(P	1.086E-07	7.11E+00	G
			1238.11	3.236E-06	+ P	4.813E-07	1.64E+01	G
			768.36	3.061E-06	+ P	4.180E-07	1.33E+01	G
			5 of 5 peaks found					
AC-228	N	1.2932E-06						
			911.07	1.180E-06	(P	5.375E-08	7.67E+00	G
			969.11	1.398E-06	(P	8.309E-08	9.87E+00	G
			338.32	1.415E-06	(P	1.038E-07	9.79E+00	G
			964.77	1.607E-06	+ P	3.780E-07	2.32E+01	GA
			4 of 4 peaks found					
Ra-224	N	1.4515E-06						
			240.98	1.452E-06	(	4.509E-07	3.17E+01	G
			1 of 1 peaks found					
PB-212	N	1.1696E-06						
			238.63	1.170E-06	(P	2.754E-08	3.32E+00	G
								Energy duplication
			77.11	1.170E-06	} P	1.899E-07	5.88E+00	XA
								Energy duplication
			74.81	1.170E-06	}	2.778E-07	6.21E+00	XA
			300.09	2.056E-06	+	3.518E-07	1.75E+01	G
			4 of 4 peaks found					
BI-212	N	2.3014E-06						
			727.17	2.294E-06	*(P	1.940E-07	1.44E+01	G
			1620.50	2.328E-06	?(P	4.181E-07	3.12E+01	G
			785.46	7.249E-06	&	1.553E-06	2.43E+01	G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                        893.43 1.517E-06 - P 1.417E-06 7.18E+01 G
                           4 of   5 peaks found

TL-208   N   3.9451E-07
                        583.14 3.945E-07  (P 1.780E-08 7.83E+00 G
                        510.84 6.002E-07 + P 9.585E-08 1.08E+01 G
                        860.37 7.507E-07 + P 1.631E-07 2.62E+01 G
                        277.36 4.711E-07     1.587E-07 3.12E+01 GA
                           4 of   5 peaks found

K-40     N   1.3185E-05
                       1460.80 1.318E-05  (P 3.078E-07 3.28E+00 G
                           1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded
```

- -

Laboratory: RSSI

16

RSSI Spectrum name: G090154.An1

Sample description
G090154 GAIATECH E34 999.8g

Spectrum Filename: H:\GammaVision\User\Spectra\G090154.An1

Acquisition information
Start time: 09-Jun-2009 13:56:12
Live time: 3600
Real time: 3610
Dead time: 0.29 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_09a.Clb
09_06_09

Energy Calibration
Created: 17-Jun-2009 14:37:58
Zero offset: 7.440 keV
Gain: 0.231 keV/channel
Quadratic: 2.383E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.54keV)
Stop channel: 8144 (1893.37keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 9.9980E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 9.9980E+02) =
1.0002E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 36 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0782

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
113.94	33.80	588.	358.	0.100	12.62	0.700	-	sM
241.11	63.23	1753.	428.	0.119	20.95	1.173	-	sM
345.82	87.29	1825.	584.	0.162	11.15	1.199	-	D
357.63	90.02	1753.	292.	0.081	21.10	1.200	-	D
367.86	92.39	1736.	841.	0.234	7.80	1.201	-	D
456.35	113.03	1460.	246.	0.068	29.75	1.065	-	
673.56	163.30	1783.	297.	0.082	35.35	0.672	-	sM
752.07	181.47	1112.	102.	0.028	59.29	0.235	-	sM
772.60	186.22	2310.	1491.	0.414	9.20	1.321	-	M
854.82	205.24	701.	191.	0.053	24.39	1.052	-	
872.83	209.41	1383.	308.	0.085	25.80	0.714	-	s
1173.86	278.96	558.	42.	0.012	80.38	1.282	-	sc
1393.48	329.91	343.	51.	0.014	57.93	0.656	-	s
1539.35	363.67	320.	71.	0.020	50.87	0.689	-	s
1631.87	385.08	225.	42.	0.012	57.35	0.389	-	s
2010.65	472.76	99.	31.	0.009	53.83	0.489	-	s
2073.10	487.21	251.	128.	0.036	25.85	0.377	-	s
2524.70	591.75	94.	23.	0.006	75.93	0.339	-	s
2716.77	636.22	98.	50.	0.014	38.82	0.651	-	s
3005.86	703.15	114.	60.	0.017	37.86	0.550	-	s
3342.62	781.12	33.	25.	0.007	41.03	0.656	-	sM
3360.89	785.35	154.	178.	0.049	19.29	0.502	-	sM
3386.26	791.22	48.	23.	0.006	51.99	0.591	-	sM
4002.32	933.87	175.	208.	0.058	18.01	1.165	-	s
4195.98	978.72	27.	21.	0.006	42.85	0.594	-	s
4832.85	1126.21	77.	42.	0.012	46.93	0.378	-	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
5347.47	1245.41	84.	63.	0.018	36.85	0.463	-	s
6896.38	1604.25	0.	38.	0.011	16.22	0.406	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Peak Code	Peak MDA Value uCi/g	Peak	COMMENTS
PB-214	N	3.4199E-06						
			351.92	3.434E-06	(P	2.431E-08	1.74E+00	G
			295.21	3.392E-06	(P	5.239E-08	2.69E+00	G
								Energy duplication
			77.11	2.625E-06	} P	2.210E-07	8.94E+00	XA
			241.98	3.694E-06	+ P	1.890E-07	4.28E+00	G
								Energy duplication
			74.81	3.420E-06	}	4.545E-07	1.15E+01	XA
			5 of 5 peaks found					
BI-214	N	3.2590E-06						
			609.31	3.257E-06	(P	2.782E-08	2.02E+00	G
			1764.49	4.239E-06	+	2.356E-07	4.03E+00	G
			1120.29	3.923E-06	+ P	2.111E-07	5.16E+00	G
			1238.11	4.536E-06	+ P	4.152E-07	1.12E+01	G
			768.36	3.273E-06	(P	2.106E-07	1.13E+01	G
			5 of 5 peaks found					
AC-228	N	1.1811E-06						
			911.07	1.155E-06	(P	4.466E-08	7.50E+00	G
			969.11	1.314E-06	(P	6.068E-08	7.96E+00	G
			338.32	1.050E-06	(P	8.126E-08	9.97E+00	G
			964.77	1.348E-06	P	2.680E-07	2.13E+01	GA
			4 of 4 peaks found					
Ra-224	N	9.8576E-07						
			240.98	9.858E-07	(	3.875E-07	3.97E+01	G
			1 of 1 peaks found					
PB-212	N	1.0356E-06						
			238.63	1.036E-06	(P	2.190E-08	2.85E+00	G
								Energy duplication
			77.11	1.036E-06	} P	1.588E-07	5.59E+00	XA
								Energy duplication

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          74.81 1.036E-06 }   2.109E-07 5.94E+00 XA
                         300.09 1.392E-06 +   2.586E-07 1.98E+01 G
                            4 of   4 peaks found

BI-212   N   1.1452E-06
                         727.17 1.145E-06  (P 1.306E-07 1.68E+01 G
                        1620.50 2.478E-06 + P 5.995E-07 2.26E+01 G
                            2 of   5 peaks found

TL-208   N   3.7239E-07
                         583.14 3.724E-07 @(P 1.103E-08 6.07E+00 G
                         510.84 4.363E-07 + P 6.920E-08 1.25E+01 G
                         860.37 4.497E-07 + P 1.113E-07 3.10E+01 G
                         277.36 4.249E-07     1.275E-07 2.83E+01 GA
                            4 of   5 peaks found

K-40     N   1.3265E-05
                        1460.80 1.326E-05  (P 1.807E-07 2.55E+00 G
                            1 of   1 peaks found
```

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

17

RSSI Spectrum name: G090159.An1

Sample description
G090159 GAIATECH C37 988.9g

Spectrum Filename: H:\GammaVision\User\Spectra\G090159.An1

Acquisition information
Start time: 10-Jun-2009 10:05:14
Live time: 3600
Real time: 3609
Dead time: 0.25 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_10.Clb
09_06_10

Energy Calibration
Created: 10-Jun-2009 10:03:15
Zero offset: 6.902 keV
Gain: 0.231 keV/channel
Quadratic: 3.437E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.00keV)
Stop channel: 8144 (1893.56keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 9.8890E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 9.8890E+02) =
1.0112E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1641

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
115.56	33.64	396.	144.	0.040	22.13	0.542	-	s
198.83	52.91	364.	84.	0.023	39.21	0.648	-	s
243.63	63.28	1632.	296.	0.082	26.60	1.029	-	s
331.53	83.66	1465.	275.	0.076	20.60	1.539	-	D
346.33	87.09	1611.	657.	0.183	9.48	1.541	-	D
371.00	92.75	1745.	1087.	0.302	8.83	1.644	-	sM
460.23	113.40	1731.	89.	0.025	80.22	0.750	-	sc
590.62	143.57	1504.	164.	0.046	41.70	0.374	-	sM
635.43	153.94	1191.	131.	0.036	43.50	0.493	-	sM
749.86	180.64	1050.	114.	0.032	41.45	1.615	-	D
757.08	182.31	1602.	177.	0.049	32.80	1.617	-	D
773.25	186.05	1497.	1494.	0.415	4.49	1.620	-	D
1040.67	247.73	358.	43.	0.012	65.77	0.381	-	c
1970.45	462.96	325.	167.	0.046	21.90	0.947	-	s
2044.83	480.18	191.	77.	0.021	35.63	0.634	-	s
2375.21	556.68	98.	50.	0.014	38.82	0.366	-	s
2691.03	629.81	258.	37.	0.010	63.63	1.945	-	sc
2697.38	631.28	36.	18.	0.005	55.00	0.421	-	s
2909.95	680.28	189.	36.	0.010	56.22	1.980	-	D
2921.48	682.95	200.	55.	0.015	39.05	1.981	-	D
4001.26	933.27	154.	229.	0.064	16.69	1.205	-	sM
4221.48	984.29	48.	36.	0.010	40.01	0.421	-	s
5048.28	1175.86	21.	14.	0.004	55.10	0.684	-	s
7437.73	1729.76	0.	147.	0.041	8.25	0.413	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g	COMMENTS
PB-214	N	2.8062E-06					
			351.92	2.775E-06	(P	3.180E-08	2.94E+00 G
			295.21	2.867E-06	(P	5.471E-08	3.32E+00 G
							Energy duplication
			77.11	2.801E-06	} P	2.299E-07	8.26E+00 XA
			241.98	3.432E-06	+ P	1.872E-07	4.60E+00 G
			4 of 4 peaks found				
BI-214	N	2.6149E-06					
			609.31	2.615E-06	(P	2.522E-08	2.50E+00 G
			1764.49	3.526E-06	+	2.170E-07	4.62E+00 G
			1120.29	3.312E-06	+ P	1.984E-07	6.01E+00 G
			768.36	3.631E-06	+ P	3.455E-07	1.09E+01 G
			4 of 4 peaks found				
AC-228	N	1.0718E-06					
			911.07	1.080E-06	?(P	4.316E-08	7.68E+00 G
			969.11	1.058E-06	(P	6.623E-08	1.10E+01 G
			338.32	1.351E-06	+ P	1.080E-07	1.05E+01 G
			3 of 3 peaks found				
PB-212	N	1.0089E-06					
			238.63	1.009E-06	(P	2.339E-08	3.02E+00 G
							Energy duplication
			77.11	9.958E-07	} P	1.638E-07	1.36E+01 XA
			74.82	3.173E-06	+	3.022E-07	8.87E+00 XA
			300.09	1.294E-06	+	2.665E-07	2.43E+01 G
			4 of 4 peaks found				
BI-212	N	1.4662E-06					
			727.17	1.466E-06	@(P	1.421E-07	1.63E+01 G
			1620.60	3.343E-06	+ P	7.323E-07	2.11E+01 G
			785.46	6.302E-06	+	1.240E-06	2.86E+01 G
			3 of 4 peaks found				

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208   N   3.8267E-07
                          583.14 3.827E-07  (P 1.197E-08 5.84E+00 G
                          510.84 7.099E-07 + P 7.348E-08 1.10E+01 G
                             2 of   3 peaks found

K-40     N   1.3056E-05
                         1460.80 1.306E-05  (P 1.776E-07 2.55E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Laboratory:  RSSI
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18

ORTEC g v - i (1207) Env32 G53W4.22 17-JUN-2009 15:21:40 Page 1
RSSI Spectrum name: g090160.An1

Sample description
G090160 GAIATECH H46 12" 1012.3g

Spectrum Filename: H:\GammaVision\User\Spectra\g090160.An1

Acquisition information
Start time: 10-Jun-2009 11:47:26
Live time: 3600
Real time: 3610
Dead time: 0.28 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: g090160.An1
09_06_10

Energy Calibration
Created: 17-Jun-2009 15:08:41
Zero offset: 7.243 keV
Gain: 0.231 keV/channel
Quadratic: 1.498E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.34keV)
Stop channel: 8144 (1893.32keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 1.0123E+03
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0123E+03) =
9.8785E-04
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0354

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
114.76	33.81	542.	452.	0.126	10.72	1.010	-	s
125.24	36.23	551.	62.	0.017	58.88	0.747	-	sD
242.54	63.38	1473.	326.	0.090	23.73	0.745	-	
345.94	87.32	1547.	590.	0.164	12.85	1.404	-	sM
369.31	92.73	1695.	743.	0.206	11.00	1.020	-	sM
615.38	149.69	1341.	119.	0.033	55.60	0.516	-	sM
772.44	186.05	2053.	1543.	0.429	6.40	1.237	-	sM
853.01	204.70	1403.	135.	0.038	57.21	0.217	-	s
926.48	221.71	411.	38.	0.011	79.47	0.554	-	sc
1065.47	253.88	437.	52.	0.015	66.65	0.284	-	s
1212.33	287.88	443.	54.	0.015	63.36	0.328	-	sM
1385.87	328.06	416.	178.	0.049	23.19	0.717	-	s
1410.73	333.81	277.	66.	0.018	44.08	0.564	-	sM
1737.00	409.35	248.	145.	0.040	22.39	0.796	-	s
1852.80	436.16	229.	61.	0.017	49.49	0.617	-	s
1968.28	462.90	280.	186.	0.052	18.92	1.115	-	s
2000.30	470.31	82.	27.	0.008	52.29	0.688	-	s
2039.81	479.46	192.	53.	0.015	44.34	0.362	-	s
2423.41	568.28	219.	54.	0.015	54.28	0.448	-	s
2713.98	635.56	48.	16.	0.004	66.14	0.351	-	sc
3433.29	802.12	44.	24.	0.007	46.89	0.553	-	s
3829.03	893.77	104.	52.	0.015	44.78	0.279	-	s
3850.64	898.77	121.	65.	0.018	41.26	0.463	-	s
4001.12	933.62	125.	252.	0.070	13.04	1.595	-	s
4958.00	1155.24	97.	121.	0.034	21.57	0.459	-	s
5127.07	1194.40	101.	81.	0.022	33.32	0.506	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
5160.15	1202.06	21.	16.	0.004	51.64	0.453	-	sD
5313.70	1237.62	130.	376.	0.105	9.59	1.587	-	s
5370.90	1250.87	14.	19.	0.005	36.97	0.303	-	s
5917.29	1377.44	59.	245.	0.068	11.04	0.924	-	s
6066.63	1412.03	2.	6.	0.002	57.78	0.243	-	s
6633.70	1543.40	18.	74.	0.021	19.32	0.350	-	s
7907.50	1838.52	0.	17.	0.005	24.25	0.348	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Peak Code	Peak MDA Value uCi/g		COMMENTS
PB-214	N	3.3116E-06						
			351.92	3.360E-06	(P	2.930E-08	1.97E+00	G
			295.21	3.218E-06	(P	4.703E-08	2.70E+00	G
								Energy duplication
			77.11	2.483E-06	} P	1.971E-07	8.89E+00	XA
			241.98	3.094E-06	- P	1.896E-07	7.36E+00	G
			4 of 4 peaks found					
BI-214	N	3.1513E-06						
			609.31	3.151E-06	(P	2.583E-08	2.06E+00	G
			1764.49	4.175E-06	+	2.325E-07	4.07E+00	G
			1120.29	3.593E-06	+ P	2.003E-07	4.98E+00	G
			768.36	4.845E-06	+ P	4.144E-07	1.20E+01	G
			4 of 4 peaks found					
AC-228	N	1.1251E-06						
			911.07	1.121E-06	(P	4.678E-08	8.25E+00	G
			969.11	1.178E-06	(P	5.973E-08	8.91E+00	G
			338.32	1.058E-06	(P	8.051E-08	1.21E+01	G
			3 of 3 peaks found					
PB-212	N	8.6380E-07						
			238.63	8.638E-07	(P	2.546E-08	4.42E+00	G
								Energy duplication
			77.11	8.638E-07	} P	1.446E-07	6.59E+00	XA
			74.82	2.652E-06	+	2.471E-07	8.53E+00	XA
			300.09	1.130E-06	+	2.787E-07	3.03E+01	G
			4 of 4 peaks found					

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-212   N   1.7793E-06
                          727.17 1.779E-06  (P 1.222E-07 1.15E+01 G
                         1620.60 1.388E-06 - P 5.923E-07 4.59E+01 G
                          785.46 6.959E-06 &   1.195E-06 2.14E+01 G
                             3 of   4 peaks found

TL-208   N   3.8405E-07
                          583.14 3.893E-07  (P 1.344E-08 6.27E+00 G
                          510.84 3.636E-07  (P 5.891E-08 1.49E+01 G
                          277.35 2.055E-07 -   1.064E-07 5.17E+01 GA
                             3 of   3 peaks found

K-40     N   1.2154E-05
                         1460.80 1.215E-05  (P 1.809E-07 2.71E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                        Peak Codes:
   T - Thermal Neutron Activation        G - Gamma Ray
   F - Fast Neutron Activation           X - X-Ray
   I - Fission Product                   P - Positron Decay
   N - Naturally Occurring Isotope       S - Single-Escape
   P - Photon Reaction                   D - Double-Escape
   C - Charged Particle Reaction         K - Key Line
   M - No MDA Calculation                A - Not in Average
   R - Coincidence Corrected             C - Coincidence Peak
   H - Halflife limit exceeded

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Laboratory:  RSSI
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ORTEC g v - i (1207) Env32 G53W4.22 17-JUN-2009 15:24:08 Page 1
RSSI Spectrum name: G090161.An1

Sample description
G090161 GAIATECH E47 16" 1089.3g

Spectrum Filename: H:\GammaVision\User\Spectra\G090161.An1

Acquisition information
Start time: 08-Jun-2009 16:07:28
Live time: 3600
Real time: 3611
Dead time: 0.30 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_08.Clb
09_06_08

Energy Calibration
Created: 08-Jun-2009 10:14:38
Zero offset: 7.146 keV
Gain: 0.232 keV/channel
Quadratic: 3.506E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.25keV)
Stop channel: 8144 (1894.84keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 1.0893E+03
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0893E+03) =
9.1802E-04
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1580

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
113.97	33.53	555.	261.	0.072	16.22	0.586	-	s
240.86	62.91	2054.	370.	0.103	26.48	0.941	-	s
331.78	83.95	1906.	346.	0.096	18.64	1.417	-	D
345.75	87.18	2201.	703.	0.195	10.16	1.419	-	D
356.01	89.56	2601.	435.	0.121	17.24	1.421	-	D
368.15	92.37	2339.	1142.	0.317	6.68	1.424	-	D
463.72	114.51	1919.	153.	0.042	47.83	0.639	-	sM
486.47	119.77	1172.	96.	0.027	60.56	0.289	-	sM
515.94	126.60	1139.	112.	0.031	46.04	0.540	-	sM
565.65	138.11	1674.	142.	0.039	49.57	0.271	-	sM
771.86	185.88	2058.	1591.	0.442	4.75	1.497	-	D
872.39	209.14	1493.	367.	0.102	22.55	1.234	-	s
953.36	227.91	943.	121.	0.034	37.01	1.529	-	D
965.13	230.64	1371.	107.	0.030	49.67	1.531	-	D
1223.90	290.47	561.	71.	0.020	48.57	1.578	-	D
1333.88	316.01	214.	41.	0.011	51.55	0.452	-	s
1502.32	355.17	814.	70.	0.019	58.92	1.628	-	D
1930.10	454.10	373.	147.	0.041	32.43	0.714	-	s
2524.48	591.80	216.	98.	0.027	33.62	0.650	-	s
2548.98	597.47	191.	50.	0.014	51.88	0.565	-	s
2662.23	623.71	95.	32.	0.009	57.67	0.386	-	s
2842.62	665.51	187.	166.	0.046	21.03	1.103	-	s
3070.22	718.25	26.	8.	0.002	91.25	0.286	-	sc
3177.13	743.02	234.	103.	0.029	40.51	0.661	-	s
3648.85	852.34	63.	23.	0.006	64.34	0.944	-	s
3774.12	881.37	48.	30.	0.008	42.44	0.700	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
3922.70	915.58	173.	24.	0.007	79.19	2.064	-	sc
4291.69	1001.34	161.	162.	0.045	23.51	0.639	-	s
4592.96	1071.18	86.	74.	0.020	31.73	0.404	-	s
5135.50	1196.96	54.	34.	0.010	42.53	0.318	-	s
5918.02	1378.42	47.	326.	0.091	8.01	1.695	-	s
6064.91	1412.49	6.	9.	0.003	48.62	0.260	-	s
6825.20	1588.84	13.	54.	0.015	19.05	0.696	-	s
7588.06	1765.83	0.	694.	0.193	3.80	2.258	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g	COMMENTS
PB-214	N	3.7899E-06					
			351.92	3.790E-06	(P	2.123E-08 1.41E+00	G
			295.21	3.394E-06 -	P	9.910E-08 2.87E+00	G
							Energy duplication
			77.11	3.196E-06 }	P	2.163E-07 7.25E+00	XA
			241.98	4.083E-06 +	P	1.890E-07 3.87E+00	G
			4 of 4 peaks found				
BI-214	N	3.3518E-06					
			609.31	3.352E-06	(P	2.142E-08 1.79E+00	G
			1120.29	3.672E-06 +	P	2.021E-07 5.91E+00	G
			768.36	4.400E-06 +	P	3.860E-07 1.08E+01	G
			3 of 4 peaks found				
AC-228	N	1.1381E-06					
			911.07	1.159E-06	(P	3.960E-08 4.98E+00	G
			969.11	1.104E-06 ?	(P	8.034E-08 1.39E+01	G
			338.32	1.568E-06 +	P	1.202E-07 1.05E+01	G
			3 of 3 peaks found				
PB-212	N	1.0369E-06					
			238.63	1.037E-06	(P	2.174E-08 2.79E+00	G
							Energy duplication
			77.11	1.037E-06 }	P	1.577E-07 5.56E+00	XA
			74.82	3.273E-06 +		2.923E-07 8.32E+00	XA
			300.09	1.153E-06 +		2.622E-07 3.45E+01	G
			4 of 4 peaks found				

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

BI-212   N   1.5472E-06
                          727.17 1.547E-06  (P 1.439E-07 1.63E+01 G
                         1620.60 4.466E-07 & P 4.284E-07 9.35E+01 G
                          785.46 7.530E-06 +   1.272E-06 2.47E+01 G
                             3 of   4 peaks found

TL-208   N   3.3281E-07
                          583.14 3.328E-07  (P 1.530E-08 9.16E+00 G
                          510.84 5.957E-07 + P 6.704E-08 1.11E+01 G
                          277.35 6.497E-07 +   1.277E-07 2.49E+01 GA
                             3 of   3 peaks found

K-40     N   1.3158E-05
                         1460.80 1.316E-05  (P 1.667E-07 2.46E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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Laboratory:  RSSI
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RSSI Spectrum name: G090162.Anl

Sample description
G090162 GAIATECH F55 6" 1073.5g

Spectrum Filename: H:\GammaVision\User\Spectra\G090162.Anl

Acquisition information
Start time: 10-Jun-2009 15:43:06
Live time: 3600
Real time: 3611
Dead time: 0.31 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_10.Clb
09_06_10

Energy Calibration
Created: 10-Jun-2009 10:03:15
Zero offset: 6.902 keV
Gain: 0.231 keV/channel
Quadratic: 3.437E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.00keV)
Stop channel: 8144 (1893.56keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 1.0735E+03
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0735E+03) =
9.3153E-04
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2876

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
114.22	33.33	562.	240.	0.067	17.63	0.922	-	sM
166.57	45.44	609.	69.	0.019	56.22	0.571	-	sM
258.20	66.65	1889.	156.	0.043	51.00	0.450	-	s
318.00	80.49	2392.	72.	0.020	96.43	1.536	-	sc
329.31	83.10	2426.	364.	0.101	19.84	1.538	-	D
345.30	86.80	2519.	829.	0.230	9.24	1.541	-	D
357.10	89.53	2812.	591.	0.164	13.33	1.543	-	D
370.10	92.54	2348.	1110.	0.308	6.86	1.546	-	D
684.81	165.37	1602.	143.	0.040	54.09	0.594	-	sM
771.73	185.49	2292.	1477.	0.410	7.70	1.441	-	M
987.76	235.49	2240.	296.	0.082	23.32	1.658	-	D
1133.29	269.17	1452.	331.	0.092	28.73	2.121	-	s
1241.15	294.13	1553.	171.	0.048	33.40	1.703	-	D
1385.18	327.48	793.	336.	0.093	24.65	0.973	-	s
1485.30	350.65	1519.	347.	0.097	16.75	1.745	-	D
1592.08	375.37	390.	80.	0.022	45.89	0.826	-	s
1851.67	435.46	142.	42.	0.012	48.42	0.421	-	s
2331.02	546.45	185.	22.	0.006	97.21	0.307	-	sc
2365.76	554.49	250.	68.	0.019	47.30	0.441	-	s
2396.31	561.56	242.	91.	0.025	34.72	0.623	-	s
2597.49	608.15	1696.	558.	0.155	11.26	1.930	-	D
2841.51	664.66	152.	136.	0.038	20.39	0.430	-	s
2922.54	683.42	165.	60.	0.017	43.94	0.319	-	s
3626.03	846.35	140.	94.	0.026	31.06	0.534	-	s
3683.85	859.75	182.	158.	0.044	23.22	1.242	-	s
4001.72	933.38	225.	313.	0.087	16.17	1.885	-	

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
4133.21	963.84	165.	172.	0.048	13.05	2.163	-	D
4619.36	1076.48	133.	59.	0.016	51.22	0.466	-	s
4966.49	1156.91	88.	56.	0.015	40.59	0.393	-	s
5315.06	1237.69	122.	338.	0.094	9.37	1.333	-	s
5624.09	1309.31	55.	75.	0.021	26.83	0.635	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g	COMMENTS
PB-214	N	3.2296E-06					
			351.92	3.267E-06	?(P	2.842E-08	1.79E+00 G
			295.21	3.133E-06	?(P	5.349E-08	3.18E+00 G
							Energy duplication
			77.11	3.225E-06	} P	2.457E-07	6.91E+00 XA
			241.98	3.294E-06	(P	1.436E-07	5.06E+00 G
			4 of 4 peaks found				
BI-214	N	2.9189E-06					
			609.31	2.919E-06	?(P	3.410E-08	2.35E+00 G
			1764.49	4.404E-06	+	2.313E-07	3.77E+00 G
			1120.29	4.013E-06	+ P	2.008E-07	4.31E+00 G
			768.36	4.186E-06	+ P	3.962E-07	1.44E+01 G
			4 of 4 peaks found				
AC-228	N	1.2797E-06					
			911.07	1.280E-06	(P	4.350E-08	7.13E+00 G
			969.11	8.145E-07	- P	1.052E-07	1.01E+01 G
			338.32	1.033E-06	- P	1.146E-07	1.39E+01 G
			3 of 3 peaks found				
PB-212	N	9.0100E-07					
			238.63	9.010E-07	(P	2.776E-08	3.62E+00 G
							Energy duplication
			77.11	4.490E-07	} P	1.653E-07	3.01E+01 XA
			74.82	3.203E-06	+	3.183E-07	9.37E+00 XA
			300.09	1.618E-06	+	3.028E-07	2.38E+01 G
			4 of 4 peaks found				
BI-212	N	1.7780E-06					
			727.17	1.671E-06	(P	1.362E-07	1.40E+01 G
			1620.60	2.263E-06	?(P	4.107E-07	2.96E+01 G
			785.46	7.057E-06	+	1.210E-06	2.36E+01 G
			3 of 4 peaks found				

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208   N   3.5859E-07
                          583.14 3.586E-07  (P 1.227E-08 7.63E+00 G
                          510.84 5.404E-07 + P 6.840E-08 1.03E+01 G
                             2 of   3 peaks found

K-40     N   1.3458E-05
                         1460.80 1.346E-05  (P 1.774E-07 2.60E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Laboratory:  RSSI
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21

ORTEC g v - i (1207) Env32 G53W4.22 17-JUN-2009 15:27:17 Page 1
RSSI Spectrum name: G090163.An1

Sample description
G090163 GAIATECH C56 16" 850.2g

Spectrum Filename: H:\GammaVision\User\Spectra\G090163.An1

Acquisition information
Start time: 10-Jun-2009 17:19:56
Live time: 3600
Real time: 3610
Dead time: 0.27 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_10.Clb
09_06_10

Energy Calibration
Created: 10-Jun-2009 10:03:15
Zero offset: 6.902 keV
Gain: 0.231 keV/channel
Quadratic: 3.437E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.00keV)
Stop channel: 8144 (1893.56keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 8.5020E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 8.5020E+02) =
1.1762E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3209

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
113.59	33.19	466.	240.	0.067	15.93	1.044	-	s
242.15	62.93	1388.	329.	0.091	22.87	1.145	-	s
282.89	72.36	2215.	236.	0.065	28.99	1.530	-	D
344.80	86.53	1774.	704.	0.196	9.26	1.541	-	D
357.77	89.53	2485.	329.	0.091	22.14	1.544	-	D
368.71	92.07	2078.	912.	0.253	7.81	1.546	-	D
525.91	128.60	2246.	227.	0.063	37.97	0.491	-	sM
587.61	142.88	2529.	341.	0.095	35.01	0.424	-	sM
618.46	150.02	2037.	168.	0.047	47.93	0.245	-	sM
651.61	157.69	788.	122.	0.034	37.62	0.422	-	sM
701.94	169.34	1374.	178.	0.050	37.48	0.685	-	sM
771.33	185.40	2454.	1357.	0.377	9.34	1.368	-	M
872.36	208.78	1499.	281.	0.078	30.85	0.654	-	s
939.37	224.29	1323.	156.	0.043	47.38	0.206	-	s
1083.82	257.72	795.	203.	0.056	27.39	1.595	-	M
1153.03	273.74	416.	153.	0.043	25.06	0.897	-	sM
1212.00	287.39	298.	69.	0.019	42.81	0.357	-	sM
1237.65	293.33	1269.	130.	0.036	39.81	1.702	-	D
1386.13	327.70	637.	172.	0.048	30.28	0.744	-	s
1485.29	350.65	1362.	344.	0.096	16.10	1.745	-	D
1946.70	457.46	130.	79.	0.022	28.04	0.564	-	s
2032.74	477.38	152.	44.	0.012	54.04	0.271	-	s
2259.03	529.78	173.	45.	0.012	50.77	0.350	-	s
2484.52	581.91	407.	599.	0.166	6.27	1.912	-	D
2579.79	604.05	140.	29.	0.008	78.56	0.559	-	sD
2599.06	608.52	193.	3807.	1.057	1.70	1.930	-	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
3105.73	725.81	273.	129.	0.036	20.09	2.010	-	D
3744.44	873.78	39.	17.	0.005	59.83	0.502	-	s
3799.80	886.61	30.	30.	0.008	34.16	0.482	-	s
3967.23	925.39	34.	24.	0.007	44.58	0.303	-	s
4842.75	1128.24	94.	92.	0.026	28.61	0.566	-	sM
5313.62	1237.35	111.	358.	0.099	9.49	1.482	-	s
5448.80	1268.68	17.	17.	0.005	45.34	0.730	-	s
5916.88	1377.17	52.	236.	0.065	10.35	0.902	-	s
7943.39	1847.03	7.	121.	0.034	10.91	0.437	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	3.6544E-06						
			351.92	3.642E-06	?(P	3.826E-08	2.25E+00	G
			295.21	3.647E-06	?(P	5.637E-08	2.89E+00	G
								Energy duplication
			77.11	3.186E-06	} P	2.737E-07	8.96E+00	XA
			241.98	3.733E-06	(P	1.625E-07	5.13E+00	G
			4 of 4 peaks found					
AC-228	N	1.0939E-06						
			911.07	1.051E-06	(P	5.055E-08	8.28E+00	G
			969.11	8.469E-07	- P	1.219E-07	1.40E+01	G
			338.32	1.200E-06	(P	1.022E-07	1.19E+01	G
			3 of 3 peaks found					
PB-212	N	9.8141E-07						
			238.63	9.814E-07	(P	3.355E-08	3.96E+00	G
								Energy duplication
			77.11	9.814E-07	} P	1.906E-07	6.28E+00	XA
			74.82	4.182E-06	+	3.832E-07	8.57E+00	XA
			300.09	1.480E-06	+	3.281E-07	2.70E+01	G
			4 of 4 peaks found					
BI-212	N	6.5650E-07						
			727.17	6.565E-07	(P	2.063E-07	2.83E+01	G
			1 of 4 peaks found					
TL-208	N	1.3922E-07						
			583.14	1.392E-07	(P	2.176E-08	1.48E+01	G
			510.84	6.364E-07	+ P	8.248E-08	1.26E+01	G
			2 of 3 peaks found					

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40 N	1.4133E-05						
		1460.80	1.413E-05	(P	2.165E-07	2.70E+00	G

1 of 1 peaks found

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

22

RSSI Spectrum name: G090164.Anl

Sample description
G090164 GAIATECH D 59 12" 949.6g

Spectrum Filename: H:\GammaVision\User\Spectra\G090164.Anl

Acquisition information
Start time: 10-Jun-2009 13:12:48
Live time: 3600
Real time: 3610
Dead time: 0.28 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_10.Clb
09_06_10

Energy Calibration
Created: 10-Jun-2009 10:03:15
Zero offset: 6.902 keV
Gain: 0.231 keV/channel
Quadratic: 3.437E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.00keV)
Stop channel: 8144 (1893.56keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 9.4960E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 9.4960E+02) =
1.0531E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

RSSI Spectrum name: G090164.Anl

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1604

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
113.86	33.25	470.	219.	0.061	16.20	0.876	-	s
197.84	52.68	1054.	99.	0.027	51.90	0.698	-	s
243.32	63.20	2128.	550.	0.153	19.55	1.145	-	s
263.18	67.80	635.	62.	0.017	60.82	0.400	-	s
345.98	86.73	1836.	701.	0.195	9.43	1.541	-	D
357.12	89.31	2655.	349.	0.097	21.56	1.543	-	D
368.92	92.04	2355.	1057.	0.294	7.19	1.546	-	D
420.97	104.31	1337.	173.	0.048	35.86	0.380	-	sM
572.66	139.42	1782.	121.	0.034	62.43	0.457	-	sM
671.48	162.29	1490.	98.	0.027	86.44	0.341	-	sM
772.37	185.63	2346.	1581.	0.439	6.41	1.462	-	M
872.30	208.76	947.	250.	0.069	23.38	1.117	-	s
953.59	227.58	960.	176.	0.049	54.95	0.851	-	s
1312.41	310.63	307.	52.	0.015	53.25	0.331	-	s
1342.86	317.68	256.	67.	0.019	38.96	0.475	-	s
1412.67	333.84	517.	96.	0.027	41.51	0.367	-	sM
1769.74	416.50	199.	41.	0.011	55.95	0.269	-	s
2467.65	578.08	87.	27.	0.008	58.82	0.616	-	sD
2758.95	645.54	29.	10.	0.003	80.91	0.363	-	sc
2828.41	661.62	67.	31.	0.009	46.15	0.277	-	s
2951.76	690.19	42.	21.	0.006	53.45	0.826	-	s
3136.69	733.01	82.	29.	0.008	59.34	0.315	-	sM
3230.64	754.77	102.	59.	0.016	36.63	0.987	-	s
3362.80	785.39	150.	167.	0.046	19.76	0.797	-	sM
3837.34	895.30	35.	31.	0.009	33.81	0.682	-	s
4002.82	933.64	162.	214.	0.059	17.16	1.000	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
4132.83	964.03	183.	113.	0.031	19.46	2.163	-	D
4235.35	987.50	126.	99.	0.027	31.64	0.388	-	s
5316.84	1238.10	177.	380.	0.106	12.10	0.751	-	s
5918.72	1377.59	42.	260.	0.072	9.05	0.667	-	s
6588.35	1532.82	21.	49.	0.014	25.47	0.345	-	s
7143.76	1661.60	8.	46.	0.013	19.71	0.697	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Activity uCi/g	Code	MDA Value uCi/g	COMMENTS
PB-214	N	3.6923E-06					
			351.92	3.762E-06	(P	3.382E-08 2.05E+00	G
			295.21	3.571E-06	?(P	6.383E-08 3.15E+00	G
							Energy duplication
			77.11	3.148E-06	} P	2.365E-07 7.97E+00	XA
			241.98	3.657E-06	(P	1.450E-07 4.75E+00	G
			4 of 4 peaks found				
BI-214	N	3.6109E-06					
			609.31	3.623E-06	(P	2.349E-08 1.90E+00	G
			1764.49	4.470E-06	+	2.486E-07 4.12E+00	G
			1120.29	3.514E-06	(P	9.293E-08 5.71E+00	G
			768.36	3.786E-06	(P	2.276E-07 1.09E+01	G
			4 of 4 peaks found				
AC-228	N	1.2547E-06					
			911.07	1.260E-06	?(P	4.948E-08 7.72E+00	G
			969.11	1.165E-06	(P	7.489E-08 8.02E+00	G
			338.32	1.372E-06	?(P	9.289E-08 1.04E+01	G
			3 of 3 peaks found				
PB-212	N	1.0595E-06					
			238.63	1.059E-06	(P	2.757E-08 3.23E+00	G
							Energy duplication
			77.11	1.059E-06	} P	1.701E-07 5.80E+00	XA
			74.82	3.478E-06	+	3.471E-07 9.39E+00	XA
			300.09	1.814E-06	+	3.218E-07 2.47E+01	G
			4 of 4 peaks found				
BI-212	N	1.7644E-06					
			727.17	1.764E-06	(P	1.547E-07 1.55E+01	G
			1620.60	3.746E-06	+ P	8.033E-07 1.99E+01	G
			2 of 4 peaks found				

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208   N   4.2834E-07
                          583.14 4.283E-07  (P 1.365E-08 6.29E+00 G
                          510.84 7.640E-07 + P 7.643E-08 9.85E+00 G
                          277.35 4.487E-07 &   1.806E-07 5.37E+01 GA
                             3 of   3 peaks found

K-40     N   1.3600E-05
                         1460.80 1.360E-05  (P 1.949E-07 2.69E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Laboratory:  RSSI
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23

RSSI Spectrum name: G090165.An1

Sample description
G090165 GAIATECH E62 12" 1010.6g

Spectrum Filename: H:\GammaVision\User\Spectra\G090165.An1

Acquisition information

Start time:	10-Jun-2009 14:38:28
Live time:	3600
Real time:	3611
Dead time:	0.30 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_10.Clb

09_06_10

Energy Calibration

Created:	10-Jun-2009 10:03:15
Zero offset:	6.902 keV
Gain:	0.231 keV/channel
Quadratic:	3.437E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001alt.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.00keV)
Stop channel:	8144 (1893.56keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	1.0106E+03
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0106E+03) = 9.8951E-04
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2055

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
115.16	33.55	722.	559.	0.155	9.08	0.865	-	s
331.37	83.58	2080.	328.	0.091	20.42	1.539	-	D
344.11	86.52	2433.	729.	0.202	10.26	1.541	-	D
357.37	89.59	2811.	450.	0.125	17.33	1.544	-	D
369.44	92.38	2432.	1077.	0.299	7.16	1.546	-	D
590.73	143.60	2378.	217.	0.060	39.51	0.555	-	sM
707.30	170.58	1323.	145.	0.040	42.42	0.824	-	sM
772.46	185.66	2029.	1374.	0.382	6.37	1.458	-	M
873.66	209.08	1701.	300.	0.083	30.21	0.694	-	s
892.45	213.43	1539.	119.	0.033	63.60	0.317	-	s
1035.27	246.48	894.	147.	0.041	37.58	0.686	-	sM
1074.53	255.57	961.	132.	0.037	44.91	0.319	-	s
1132.22	268.92	988.	556.	0.154	21.21	1.145	-	s
1531.55	361.36	496.	135.	0.038	38.42	1.070	-	s
1755.12	413.11	416.	159.	0.044	26.38	0.333	-	s
1775.81	417.90	441.	105.	0.029	41.09	0.726	-	s
1941.77	456.32	147.	42.	0.012	49.18	0.467	-	s
2040.58	479.20	247.	107.	0.030	31.95	0.485	-	s
2380.48	557.90	155.	69.	0.019	36.39	0.239	-	s
2416.11	566.15	60.	16.	0.004	72.89	0.335	-	sc
2787.29	652.10	62.	32.	0.009	45.57	0.483	-	s
3684.57	859.91	253.	186.	0.052	26.22	0.873	-	s
4497.75	1048.30	58.	34.	0.009	44.15	0.286	-	s
5130.57	1194.93	77.	59.	0.016	34.67	0.384	-	s
5539.95	1289.80	28.	32.	0.009	35.88	0.762	-	s
5679.95	1322.25	42.	46.	0.013	34.47	0.747	-	s
6825.77	1587.87	50.	90.	0.025	24.88	0.454	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g		COMMENTS
PB-214	N	3.7180E-06						
			351.92	3.748E-06	(	2.885E-08	1.82E+00	G
			295.21	3.661E-06	?(	5.959E-08	3.14E+00	G
								Energy duplication
			77.11	3.713E-06	}	2.559E-07	6.29E+00	XA
			241.98	4.147E-06	+	2.029E-07	4.17E+00	G
			4 of 4 peaks found					
BI-214	N	3.7325E-06						
			609.31	3.732E-06	(	1.978E-08	1.79E+00	G
			1764.49	4.429E-06	+	2.417E-07	4.19E+00	G
			1120.29	4.254E-06	+	2.144E-07	4.48E+00	G
			768.36	5.007E-06	+	4.068E-07	1.09E+01	G
			4 of 4 peaks found					
AC-228	N	1.4340E-06						
			911.07	1.430E-06	(	4.012E-08	6.45E+00	G
			969.11	1.441E-06	(	5.891E-08	8.07E+00	G
			338.32	1.173E-06	-	1.199E-07	1.46E+01	G
			3 of 3 peaks found					
PB-212	N	1.0444E-06						
			238.63	1.044E-06	(	2.743E-08	3.31E+00	G
								Energy duplication
			77.11	5.632E-07	}	1.762E-07	2.53E+01	XA
			74.82	4.269E-06	+	3.382E-07	7.36E+00	XA
			300.09	7.140E-07	-	3.144E-07	7.79E+01	G
			4 of 4 peaks found					
BI-212	N	1.8758E-06						
			727.17	1.876E-06	(	1.662E-07	1.76E+01	G
			1620.60	3.824E-06	&	7.809E-07	1.90E+01	G
			785.46	4.703E-06	+	1.072E-06	2.67E+01	G
			3 of 4 peaks found					
TL-208	N	3.6463E-07						
			583.14	3.646E-07	?(	1.155E-08	5.60E+00	G
			510.84	7.248E-07	+	7.444E-08	1.40E+01	G
			277.35	4.051E-07	?	1.585E-07	5.18E+01	GA
			3 of 3 peaks found					

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N 1.5242E-05						
		1460.80	1.524E-05	(	1.112E-07	2.74E+00	G

1 of 1 peaks found

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

24

RSSI Spectrum name: g090166.An1

Sample description
G090166 GAIATECH G66 12" 878.6g

Spectrum Filename: H:\GammaVision\User\Spectra\g090166.An1

Acquisition information
Start time: 11-Jun-2009 13:42:47
Live time: 3600
Real time: 3609
Dead time: 0.25 %
Detector ID: 1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_11.Clb
09_06_11

Energy Calibration
Created: 15-Jun-2009 11:12:07
Zero offset: 7.078 keV
Gain: 0.231 keV/channel
Quadratic: 3.527E-08 keV/channel^2

Efficiency Calibration
Created: 04-May-2009 16:15:28
Type: Polynomial
Uncertainty: 1.565 %
Coefficients: -0.256202 -4.803420 0.697441
-0.095055 0.005293 -0.000126

Library Files
Main analysis library: 1001alt.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 35 (15.18keV)
Stop channel: 8144 (1894.69keV)
Peak rejection level: 100.000%
Peak search sensitivity: 2
Sample Size: 8.7860E+02
Activity scaling factor: 1.0000E+00/(1.0000E+00* 8.7860E+02) =
1.1382E-03
Detection limit method: Traditional ORTEC method
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 10.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2389

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
114.11	33.49	418.	210.	0.058	17.23	0.721	-	s
241.97	63.09	1801.	234.	0.065	35.73	0.977	-	s
331.10	83.75	1606.	204.	0.057	28.67	1.488	-	D
345.05	86.98	1594.	579.	0.161	10.59	1.490	-	D
368.58	92.41	2348.	689.	0.191	18.99	1.212	-	M
437.92	108.46	892.	131.	0.036	39.39	0.807	-	sM
496.66	122.06	794.	52.	0.015	85.95	0.491	-	sc
691.86	167.25	616.	67.	0.019	53.57	0.292	-	sM
771.46	185.69	1632.	1254.	0.348	6.33	1.295	-	M
788.26	189.57	1060.	108.	0.030	48.86	0.334	-	sM
925.24	221.29	338.	66.	0.018	42.88	0.521	-	s
979.96	233.97	393.	93.	0.026	38.50	0.861	-	sM
1693.01	398.84	265.	31.	0.009	76.55	1.651	-	sc
1701.12	400.72	396.	66.	0.018	44.60	1.652	-	D
2010.60	472.66	161.	29.	0.008	94.66	0.353	-	c
2330.32	546.72	161.	68.	0.019	41.40	0.631	-	s
2476.80	580.65	373.	78.	0.022	36.96	1.759	-	D
2638.23	618.05	36.	16.	0.004	58.63	0.355	-	s
2864.40	670.45	70.	57.	0.016	30.49	0.377	-	s
3255.83	761.15	119.	62.	0.017	40.58	0.540	-	sM
3381.05	789.89	160.	20.	0.006	91.78	1.894	-	sc
3399.65	794.20	134.	113.	0.031	17.34	1.897	-	D
3473.64	811.62	27.	18.	0.005	48.08	0.654	-	s
3510.18	820.09	66.	41.	0.011	42.60	0.375	-	s
3681.90	859.89	121.	107.	0.030	26.42	0.802	-	s
3999.29	933.45	112.	227.	0.063	13.48	1.044	-	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
4448.61	1037.59	63.	36.	0.010	48.53	0.344	-	s
5180.29	1207.22	105.	138.	0.038	22.66	0.340	-	s
5206.00	1213.18	51.	46.	0.013	34.63	0.765	-	s
5350.54	1246.69	24.	14.	0.004	59.76	0.635	-	s
5735.50	1335.96	11.	10.	0.003	56.57	0.414	-	s
5912.65	1377.04	33.	211.	0.059	9.78	1.516	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Code	MDA Value uCi/g	COMMENTS
PB-214	N	3.3911E-06					
			351.92	3.452E-06	. (P	3.457E-08	2.23E+00 G
			295.21	3.274E-06	?(P	5.808E-08	3.25E+00 G
							Energy duplication
			77.11	3.391E-06	} P	2.605E-07	7.68E+00 XA
			241.98	3.955E-06	+ P	2.053E-07	4.31E+00 G
			4 of 4 peaks found				
BI-214	N	3.3613E-06					
			609.31	3.361E-06	(P	2.421E-08	2.07E+00 G
			1764.49	4.130E-06	+	2.470E-07	4.17E+00 G
			1120.29	3.844E-06	+ P	2.297E-07	6.46E+00 G
			768.36	4.299E-06	+ P	3.859E-07	9.65E+00 G
			4 of 4 peaks found				
AC-228	N	1.1181E-06					
			911.07	1.123E-06	?(P	5.066E-08	8.55E+00 G
			969.11	1.088E-06	(P	6.376E-08	9.46E+00 G
			338.32	1.151E-06	(P	8.919E-08	1.12E+01 G
			3 of 3 peaks found				
PB-212	N	1.1455E-06					
			238.63	1.146E-06	(P	2.457E-08	2.89E+00 G
							Energy duplication
			77.11	1.111E-06	} P	1.866E-07	1.38E+01 XA
			74.82	4.106E-06	+	3.409E-07	7.65E+00 XA
			300.09	1.840E-06	+	3.099E-07	2.18E+01 G
			4 of 4 peaks found				
BI-212	N	1.6432E-06					
			727.17	1.643E-06	(P	1.475E-07	1.45E+01 G
			1620.60	2.907E-06	+ P	7.132E-07	1.90E+01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          785.46 6.343E-06 +   1.172E-06 1.54E+01 G
                             3 of   4 peaks found

TL-208   N   3.4333E-07
                          583.14 3.433E-07  (P 1.262E-08 6.39E+00 G
                          510.84 5.273E-07 + P 7.756E-08 1.24E+01 G
                             2 of   3 peaks found

K-40     N   1.3912E-05
                         1460.80 1.391E-05  (P 2.088E-07 2.82E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Laboratory:  RSSI
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25

RSSI Spectrum name: G090167.An1

Sample description
G090167 GAIATECH G71012" 1002.5g

Spectrum Filename: H:\GammaVision\User\Spectra\G090167.An1

Acquisition information

Start time:	11-Jun-2009 14:51:58
Live time:	3600
Real time:	3611
Dead time:	0.29 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_11.Clb

09_06_11

Energy Calibration

Created:	15-Jun-2009 11:12:07
Zero offset:	7.078 keV
Gain:	0.231 keV/channel
Quadratic:	3.527E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001alt.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.18keV)
Stop channel:	8144 (1894.69keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	1.0025E+03
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0025E+03) = 9.9751E-04
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1689

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
115.06	33.71	728.	367.	0.102	13.14	0.845	-	s
241.43	63.09	1551.	128.	0.036	44.42	1.478	-	D
345.49	86.95	1869.	617.	0.171	10.70	1.490	-	D
356.52	89.50	2456.	374.	0.104	19.42	1.491	-	D
368.68	92.32	2244.	933.	0.259	7.89	1.492	-	D
433.00	107.32	1062.	65.	0.018	71.98	0.543	-	c
677.77	163.99	579.	44.	0.012	78.80	0.495	-	c
771.92	185.79	1763.	1457.	0.405	5.90	1.569	-	M
953.43	227.82	1318.	151.	0.042	47.20	0.720	-	s
986.97	235.84	2065.	119.	0.033	54.90	1.563	-	D
1072.70	255.44	630.	80.	0.022	49.20	0.376	-	s
1279.03	303.22	752.	63.	0.017	63.29	1.599	-	sc
1605.58	378.85	213.	25.	0.007	90.91	0.292	-	sc
1700.75	400.89	304.	236.	0.065	19.64	1.147	-	s
1735.69	409.00	326.	40.	0.011	64.98	1.657	-	sc
1774.11	417.88	182.	41.	0.011	55.48	0.436	-	s
1838.68	432.84	253.	103.	0.029	39.24	0.330	-	s
2396.68	561.95	264.	62.	0.017	38.96	1.747	-	D
2407.75	564.51	234.	34.	0.009	65.58	1.749	-	c
2732.19	639.82	107.	62.	0.017	34.16	0.568	-	s
3529.49	824.57	38.	12.	0.003	78.35	0.590	-	sc
4086.08	953.56	48.	28.	0.008	46.84	0.557	-	s
4167.94	972.54	139.	28.	0.008	62.62	2.023	-	D
4643.72	1082.82	74.	58.	0.016	34.27	0.390	-	s
5312.25	1237.82	121.	346.	0.096	9.37	1.518	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001alt.Lib

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/g	Peak Energy keV	Peak Activity uCi/g	Peak Code	Peak MDA Value uCi/g		COMMENTS
PB-214	N	3.5975E-06						
			351.92	3.585E-06	(P	3.223E-08	1.91E+00	G
			295.21	3.622E-06	(P	5.926E-08	3.35E+00	G
								Energy duplication
			77.11	3.405E-06 }	P	2.480E-07	7.32E+00	XA
			241.98	4.162E-06 +	P	2.008E-07	4.05E+00	G
			4 of 4 peaks found					
BI-214	N	3.5283E-06						
			609.31	3.528E-06	(P	2.234E-08	1.86E+00	G
			1764.49	4.544E-06 +		2.435E-07	3.90E+00	G
			1120.29	4.081E-06 +	P	2.143E-07	4.82E+00	G
			768.36	5.423E-06 +	P	4.235E-07	1.05E+01	G
			4 of 4 peaks found					
AC-228	N	1.2051E-06						
			911.07	1.248E-06	(P	4.856E-08	7.79E+00	G
			969.11	1.122E-06	(P	6.427E-08	7.53E+00	G
			338.32	1.223E-06	(P	7.900E-08	9.21E+00	G
			3 of 3 peaks found					
PB-212	N	1.0579E-06						
			238.63	1.058E-06	(P	2.430E-08	2.97E+00	G
								Energy duplication
			77.11	1.058E-06 }	P	1.759E-07	5.66E+00	XA
			74.82	3.441E-06 +		3.184E-07	8.64E+00	XA
			300.09	1.577E-06 +		2.996E-07	1.76E+01	G
			4 of 4 peaks found					
BI-212	N	1.9190E-06						
			727.17	1.789E-06	(P	1.446E-07	1.36E+01	G
			1620.60	2.506E-06 ?	(P	2.087E-07	1.88E+01	G
			785.46	6.353E-06 +		1.130E-06	2.07E+01	G
			3 of 4 peaks found					
TL-208	N	2.9877E-07						
			583.14	2.988E-07	(P	1.550E-08	1.05E+01	G
			510.84	6.166E-07 +	P	7.211E-08	1.15E+01	G
			277.35	6.345E-07 +		1.328E-07	2.60E+01	GA
			3 of 3 peaks found					

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N 1.3341E-05						
		1460.80	1.334E-05	(P	1.814E-07	2.59E+00	G

1 of 1 peaks found

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

Laboratory: RSSI

Excavation
BH-35

RSSI Spectrum name: G090155.An1

Sample description
G090155 GAIATECH BH35 EXCAVATION 4.5' 463.9g

Spectrum Filename: H:\GammaVision\User\Spectra\G090155.An1

Acquisition information

Start time:	08-Jun-2009 11:25:28
Live time:	3600
Real time:	3603
Dead time:	0.10 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_08.Clb
09_06_08

Energy Calibration

Created:	08-Jun-2009 10:14:38
Zero offset:	7.146 keV
Gain:	0.232 keV/channel
Quadratic:	3.506E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.25keV)
Stop channel:	8144 (1894.84keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	4.6390E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 4.6390E+02) = 2.1556E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections

	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1050

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
113.98	33.53	94.	107.	0.030	18.43	0.367	-	s
334.36	84.73	545.	120.	0.033	29.02	1.417	-	D
345.15	87.23	406.	195.	0.054	16.29	1.419	-	D
506.04	124.31	470.	92.	0.026	78.85	0.406	-	sM
605.47	147.33	126.	19.	0.005	82.47	0.257	-	sc
773.38	186.21	375.	250.	0.069	16.73	1.325	-	M
1136.68	270.34	185.	95.	0.026	27.41	0.568	-	s
1580.11	373.04	28.	12.	0.003	68.72	0.611	-	sc
2285.59	536.45	50.	40.	0.011	40.05	0.398	-	s
5255.10	1224.69	4.	18.	0.005	31.71	0.425	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

```
*****  S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name   Code  Activity      Energy   Activity Code MDA Value
             uCi/g          keV      uCi/g         uCi/g          COMMENTS
-----------------------------------------------------------------------------

PB-214   N   1.1462E-06
                            351.92 1.098E-06  (P 3.031E-08 4.98E+00 G
                            295.21 1.239E-06  (P 6.233E-08 7.66E+00 G
                                                            Energy duplication
                             77.11 1.146E-06 } P 2.453E-07 2.15E+01 XA
                            241.98 1.310E-06 + P 1.897E-07 1.20E+01 G
                                                            Energy duplication
                             74.81 1.146E-06 }   5.642E-07 4.13E+01 XA
                               5 of   5 peaks found

BI-214   N   1.1388E-06
                            609.31 1.139E-06  (P 3.511E-08 5.82E+00 G
                           1764.49 1.507E-06 +   2.093E-07 9.49E+00 G
                           1120.29 1.473E-06 + P 2.012E-07 1.13E+01 G
                           1238.11 2.389E-06 + P 4.246E-07 1.71E+01 G
                            768.36 1.552E-06 + P 3.715E-07 2.67E+01 G
                               5 of   5 peaks found

AC-228   N   7.6608E-07
                            911.07 7.765E-07  (P 4.915E-08 9.30E+00 G
                            969.11 7.487E-07  (P 8.746E-08 1.25E+01 G
                            338.32 9.908E-07 + P 1.413E-07 1.61E+01 G
                            964.77 9.806E-07   P 3.982E-07 2.86E+01 GA
                               4 of   4 peaks found

PB-212   N   6.2031E-07
                            238.63 6.203E-07  (P 2.606E-08 5.14E+00 G
                                                            Energy duplication
                             77.11 6.106E-07 } P 1.726E-07 2.29E+01 XA
                                                            Energy duplication
                             74.81 6.203E-07 }   2.756E-07 4.33E+01 XA
                            300.09 1.445E-06 +   3.349E-07 2.83E+01 G
                               4 of   4 peaks found

TL-208   N   2.0455E-07
                            583.14 2.046E-07  (P 1.371E-08 9.51E+00 G
                            510.84 3.930E-07 + P 9.348E-08 1.15E+01 G
                            860.37 3.716E-07 + P 1.239E-07 2.93E+01 G
                            277.36 6.645E-07 +   1.708E-07 3.42E+01 GA
                               4 of   5 peaks found

K-40     N   8.3111E-06
                           1460.80 8.311E-06  (P 3.479E-07 3.87E+00 G
                               1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
```

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

RSSI Spectrum name: G090156.Anl

Sample description
G090156 GAIATECH BH35 Excavation SE Corner 7.5' 472.8g

Spectrum Filename: H:\GammaVision\User\Spectra\G090156.Anl

Acquisition information

Start time:	09-Jun-2009 14:57:56
Live time:	3600
Real time:	3603
Dead time:	0.09 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_09.Clb

09_06_09

Energy Calibration

Created:	09-Jun-2009 09:38:49
Zero offset:	7.259 keV
Gain:	0.231 keV/channel
Quadratic:	3.605E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.36keV)
Stop channel:	8144 (1894.04keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	4.7280E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 4.7280E+02) = 2.1151E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1889

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
113.35	33.49	70.	58.	0.016	26.59	0.726	-	sM
237.12	62.13	349.	154.	0.043	24.85	0.343	-	sM
719.28	173.71	353.	58.	0.016	60.68	0.469	-	sM
785.93	189.13	183.	46.	0.013	44.68	0.355	-	sM
935.37	223.80	191.	66.	0.018	32.02	1.582	-	D
948.27	226.78	213.	50.	0.014	43.23	1.585	-	D
1310.33	310.51	133.	51.	0.014	49.97	0.376	-	s
2156.82	506.57	62.	39.	0.011	32.82	1.815	-	D
2186.17	513.37	122.	42.	0.012	40.46	1.821	-	D
2999.01	701.51	29.	52.	0.014	26.58	0.518	-	s
3839.12	896.10	34.	57.	0.016	31.69	0.627	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak --------------
Name    Code  Activity      Energy   Activity Code MDA Value
              uCi/g          keV      uCi/g         uCi/g          COMMENTS
-----------------------------------------------------------------------------

PB-214    N   6.2222E-07
                            351.92 6.202E-07  (P 2.604E-08 6.60E+00 G
                            295.21 6.262E-07  (P 6.180E-08 1.32E+01 G
                                                            Energy duplication
                             77.11 6.222E-07 ) P 2.450E-07 3.58E+01 XA
                            241.98 1.126E-06 + P 1.917E-07 1.43E+01 G
                               4 of   5 peaks found

BI-214    N   7.7151E-07
                            609.31 7.395E-07  (P 2.865E-08 6.80E+00 G
                           1120.29 8.693E-07  (P 1.085E-07 1.76E+01 G
                           1238.11 2.029E-06 + P 3.704E-07 1.50E+01 G
                            768.36 1.651E-06 + P 3.450E-07 2.18E+01 G
                               4 of   5 peaks found

AC-228    N   5.7141E-07
                            911.07 5.714E-07  (P 5.606E-08 1.39E+01 G
                            969.11 8.840E-07 + P 1.494E-07 1.13E+01 G
                            338.32 1.020E-06 + P 1.393E-07 1.61E+01 G
                            964.77 7.577E-07   P 3.591E-07 3.19E+01 GA
                               4 of   4 peaks found

PB-212    N   6.6992E-07
                            238.63 6.699E-07  (P 2.340E-08 4.61E+00 G
                                                            Energy duplication
                             77.11 5.902E-07 ) P 1.635E-07 2.07E+01 XA
                                                            Energy duplication
                             74.81 1.850E-06 +   3.032E-07 1.49E+01 XA
                            300.09 1.457E-06 +   3.168E-07 2.50E+01 G
                               4 of   4 peaks found

BI-212    N   8.2544E-07
                            727.17 8.254E-07 ?(P 1.192E-07 1.74E+01 G
                               1 of   5 peaks found

TL-208    N   1.8787E-07
                            583.14 1.879E-07  (P 1.475E-08 1.15E+01 G
                            510.84 1.100E-07 - P 8.249E-08 1.20E+01 G
                            860.37 6.399E-07 + P 1.263E-07 1.35E+01 G
                            277.36 8.103E-07 &   1.701E-07 2.65E+01 GA
                               4 of   5 peaks found

K-40      N   8.2913E-06
                           1460.80 8.291E-06  (P 3.413E-07 3.85E+00 G
                               1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

RSSI Spectrum name: G090157.An1

Sample description
G090157 GAIATECH BH35 Excavation 10.5' 626.2g

Spectrum Filename: H:\GammaVision\User\Spectra\G090157.An1

Acquisition information

Start time:	09-Jun-2009 16:05:11
Live time:	3600
Real time:	3604
Dead time:	0.11 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration

Filename:	09_06_09.Clb

09_06_09

Energy Calibration

Created:	09-Jun-2009 09:38:49
Zero offset:	7.259 keV
Gain:	0.231 keV/channel
Quadratic:	3.605E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.36keV)
Stop channel:	8144 (1894.04keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	6.2620E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 6.2620E+02) = 1.5969E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1856

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
113.35	33.49	123.	139.	0.039	15.86	0.746	-	sM
173.22	47.34	109.	21.	0.006	73.62	0.426	-	sc
371.01	93.11	849.	124.	0.035	52.30	0.611	-	sM
420.54	104.57	495.	111.	0.031	36.78	0.337	-	sM
543.51	133.03	686.	122.	0.034	42.42	0.582	-	sM
772.92	186.37	561.	237.	0.066	15.57	1.550	-	D
1720.29	405.41	122.	46.	0.013	52.58	0.354	-	s
1949.68	458.52	53.	45.	0.012	34.70	0.617	-	s
2024.07	475.74	66.	40.	0.011	45.05	0.601	-	s
4864.20	1133.61	4.	8.	0.002	47.18	0.677	-	s
4996.58	1164.29	6.	13.	0.004	38.58	0.348	-	s
5193.11	1209.83	8.	12.	0.003	44.10	0.411	-	s
5272.71	1228.28	14.	52.	0.015	21.44	0.356	-	s
7589.48	1765.42	0.	126.	0.035	8.91	0.711	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average      ------------- Peak -------------
Name    Code  Activity     Energy   Activity Code MDA Value
              uCi/g         keV      uCi/g         uCi/g          COMMENTS
-----------------------------------------------------------------------------

PB-214    N   9.1963E-07
                           351.92 9.196E-07 ?(P 2.587E-08 5.16E+00 G
                           295.21 1.053E-06 + P 8.108E-08 8.33E+00 G
                                                           Energy duplication
                            77.11 9.185E-07 } P 2.232E-07 2.40E+01 XA
                           241.98 1.059E-06 + P 1.716E-07 1.40E+01 G
                                                           Energy duplication
                            74.81 9.196E-07 }   4.533E-07 3.83E+01 XA
                              5 of   5 peaks found

BI-214    N   7.7188E-07
                           609.31 7.719E-07  (P 2.604E-08 6.12E+00 G
                          1120.29 1.029E-06 + P 1.509E-07 1.24E+01 G
                          1238.11 2.702E-06 + P 3.823E-07 1.51E+01 G
                           768.36 1.078E-06 + P 2.921E-07 3.28E+01 G
                              4 of   5 peaks found

AC-228    N   7.9039E-07
                           911.07 7.318E-07  (P 3.798E-08 8.09E+00 G
                           969.11 8.881E-07  (P 6.923E-08 9.75E+00 G
                           338.32 1.094E-06 + P 1.172E-07 1.16E+01 G
                           964.77 8.108E-07   P 3.029E-07 2.67E+01 GA
                              4 of   4 peaks found

Ra-224    N   5.3286E-07
                           240.98 5.329E-07  (  4.123E-07 7.76E+01 G
                              1 of   1 peaks found

PB-212    N   7.4126E-07
                           238.63 7.398E-07  (P 1.978E-08 3.79E+00 G
                                                           Energy duplication
                            77.11 6.750E-07 } P 1.526E-07 1.82E+01 XA
                                                           Energy duplication
                            74.81 7.413E-07 }   2.192E-07 2.66E+01 XA
                           300.09 7.610E-07 ?(  1.938E-07 3.48E+01 G
                              4 of   4 peaks found

BI-212    N   8.2472E-07
                           727.17 7.010E-07  (P 1.279E-07 2.35E+01 G
                          1620.50 1.306E-06 ?(P 1.119E-07 2.50E+01 G
                              2 of   5 peaks found

TL-208    N   2.6072E-07
                           583.14 2.607E-07  (P 1.247E-08 8.74E+00 G
                           510.84 4.237E-07 + P 7.805E-08 1.20E+01 G
                           860.37 9.001E-07 + P 1.398E-07 1.75E+01 G
                           277.36 5.171E-07 +   1.383E-07 3.24E+01 GA
                              4 of   5 peaks found

K-40      N   9.5750E-06
                          1460.80 9.575E-06  (P 2.577E-07 3.28E+00 G
                              1 of   1 peaks found
```

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
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N - Naturally Occurring Isotope	S - Single-Escape
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R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

Laboratory: RSSI

Sample description
G090158 GAIATECH BH35 Excavation NE Corner 14-15' 998.9g

Spectrum Filename: H:\GammaVision\User\Spectra\G090158.An1

Acquisition information

Start time:	09-Jun-2009 17:09:08
Live time:	3600
Real time:	3604
Dead time:	0.10 %
Detector ID:	1

Detector system
USER-802B915354 MCB 9

Calibration
Filename: 09_06_09.Clb
09_06_09

Energy Calibration

Created:	09-Jun-2009 09:38:49
Zero offset:	7.259 keV
Gain:	0.231 keV/channel
Quadratic:	3.605E-08 keV/channel^2

Efficiency Calibration

Created:	04-May-2009 16:15:28
Type:	Polynomial
Uncertainty:	1.565 %
Coefficients:	-0.256202 -4.803420 0.697441
	-0.095055 0.005293 -0.000126

Library Files

Main analysis library:	1001.Lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.22
Start channel:	35 (15.36keV)
Stop channel:	8144 (1894.04keV)
Peak rejection level:	100.000%
Peak search sensitivity:	2
Sample Size:	9.9890E+02
Activity scaling factor:	1.0000E+00/(1.0000E+00* 9.9890E+02) = 1.0011E-03
Detection limit method:	Traditional ORTEC method
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	10.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000

Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	09_05_13.Pbc 13-May-2009 16:37:50
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 27 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1626

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	1 Sigma %	FWHM keV	Suspected Nuclide	
114.90	33.97	133.	175.	0.048	12.03	1.418	-	D
126.51	36.66	371.	104.	0.029	27.88	1.420	-	D
134.20	38.43	268.	68.	0.019	36.40	1.422	-	D
294.92	75.50	787.	78.	0.022	52.24	1.454	-	D
345.75	87.23	686.	148.	0.041	26.28	1.465	-	D
357.04	89.85	606.	36.	0.010	97.16	1.467	-	c
636.21	154.48	311.	66.	0.018	42.68	0.540	-	sM
686.03	166.01	211.	53.	0.015	45.10	0.650	-	sM
771.98	185.90	513.	219.	0.061	21.09	0.755	-	sM
820.79	197.31	376.	44.	0.012	64.51	1.560	-	sc
833.25	200.19	318.	39.	0.011	66.47	1.562	-	sc
1523.05	359.75	116.	98.	0.027	26.57	0.757	-	s
1660.03	391.46	54.	34.	0.009	42.36	0.546	-	s
1774.45	417.95	40.	20.	0.005	58.85	0.289	-	s
1866.72	439.31	24.	16.	0.004	53.03	0.380	-	s
2005.22	471.38	51.	43.	0.012	35.91	0.548	-	s
2112.33	496.18	80.	70.	0.019	34.31	0.300	-	s
2642.78	619.01	39.	53.	0.015	30.48	0.247	-	s
2719.59	636.80	58.	55.	0.015	34.52	0.527	-	s
2972.99	695.48	12.	11.	0.003	53.39	0.668	-	s
3664.75	855.71	48.	30.	0.008	36.84	2.083	-	D
4157.74	969.92	232.	92.	0.026	25.54	2.165	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: 1001.Lib

```
*****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             uCi/g         keV      uCi/g         uCi/g          COMMENTS
-----------------------------------------------------------------------------

PB-214   N   3.7277E-07
                          351.92 3.836E-07  (P 1.378E-08 5.98E+00 G
                          295.21 3.519E-07  (P 3.482E-08 1.47E+01 G
                                                          Energy duplication
                           77.11 3.728E-07 ) P 1.319E-07 3.15E+01 XA
                          241.98 4.601E-07 + P 1.020E-07 1.92E+01 G
                                                          Energy duplication
                           74.81 3.728E-07 )   2.659E-07 6.13E+01 XA
                             5 of   5 peaks found

BI-214   N   3.9888E-07
                          609.31 3.989E-07  (P 1.601E-08 6.89E+00 G
                         1120.29 5.772E-07 + P 9.461E-08 1.64E+01 G
                          768.36 5.859E-07 + P 1.570E-07 2.76E+01 G
                             3 of   5 peaks found

AC-228   N   3.4549E-07
                          911.07 3.581E-07  (P 2.625E-08 1.08E+01 G
                          338.32 3.146E-07  (P 4.739E-08 2.22E+01 G
                          964.77 3.116E-07   P 1.741E-07 3.71E+01 GA
                             3 of   4 peaks found

PB-212   N   2.9326E-07
                          238.63 2.933E-07  (P 1.226E-08 5.12E+00 G
                                                          Energy duplication
                           77.11 2.933E-07 ) P 8.791E-08 2.22E+01 XA
                                                          Energy duplication
                           74.81 2.933E-07 )   1.300E-07 4.38E+01 XA
                          300.09 6.272E-07 +   1.618E-07 2.86E+01 G
                             4 of   4 peaks found

BI-212   N   7.6073E-07
                          727.17 7.607E-07  (P 8.898E-08 2.12E+01 G
                             1 of   5 peaks found

TL-208   N   1.1026E-07
                          583.14 1.103E-07 ?(P 6.561E-09 9.30E+00 G
                          510.84 1.605E-07 + P 4.497E-08 1.51E+01 G
                          860.37 2.052E-07 + P 6.673E-08 2.29E+01 G
                          277.36 3.761E-07 &   7.837E-08 2.92E+01 GA
                             4 of   5 peaks found

K-40     N   7.8379E-06
                         1460.80 7.838E-06  (P 1.677E-07 3.09E+00 G
                             1 of   1 peaks found
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
```

```
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
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Laboratory:  RSSI
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Appendix C

Visual Summary

Photo 1: Looking east at north end of site after slab removal. May 2009

Photo 2: Looking north as slab is pulled up. May 2009

Photo 3: Looking west as concrete is loaded. May 2009

Photo 4: Looking north during surface survey. May 2009

Photo 5: Looking down into BH-35 excavation as second 18-inch lift is removed along with sub-grade concrete slab. 6/3/09

Photo 6: Looking down into BH-35 excavation during surveying activities. 6/3/09

Photo 7: Looking down as a deeper bench is surveyed in BH-35 excavation. 6/3/09

Photo 8: Looking down into BH-35 excavation as soil is surveyed just above the water table. 6/3/09

Photo 9: Looking down as first quadrant is excavated in BH-35 excavation. 6/3/09

Photo 10: Removing last of soil below the water table in BH-35 excavation. 6/3/09

Photo 11: Looking north as BH-35 is backfilled. 6/3/09