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VIA EXPRESS DELIVERY SERVICE

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Subject: **Docket No. 70-734; SNM-696: Request to Release a Certain Portion of General Atomics Facility to Unrestricted Use and Delete it from License SNM-696: Namely, GA's "Former L-307 Tank Pit Site"**

and

Dr. Ron Rogus (In Duplicate)
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Subject: **Radioactive Materials License No. 0145-37: Request to Release a Certain Portion of General Atomics Facility to Unrestricted Use and Delete it from License 0145-37: Namely, GA's "Former L-307 Tank Pit Site"**

Dear Mr. Baker and Dr. Rogus:

General Atomics (GA) is continuing its efforts directed at decontaminating, as appropriate, and obtaining the release to unrestricted use of selected facilities and land areas at General Atomics. GA has most recently completed the Final Radiological Surveys on a small portion of land where an underground low-level radioactive liquid waste tank had formerly been located. During its use (from ~1955 to ~1980), the reinforced concrete tank (known as the "L-307 Tank") held liquid waste resulting from activities involving radioactive material performed in Laboratories 307 and 309 of GA's Building 2.

On June 28, 1984, GA excavated the L-307 Tank and subsequently disposed of it as radioactive waste by shipping it to an authorized low-level radioactive waste disposal site. Samples were collected from the soil removed during the excavation and from the soil remaining in the resultant pit. These samples were analyzed by gamma spectroscopy and for Sr-90 contamination. Practically all of the contaminated soil was removed and disposed of as low-level radioactive waste.

By letter dated November 30, 1984¹, GA requested approval from the U.S. Nuclear Regulatory Commission (NRC) to backfill the L-307 pit. Submitted with the request was a corresponding report which summarized the results of the radiation survey measurements and soil sampling and analyses completed on the site. Approval to backfill the pit was granted by the NRC on December 5, 1984 and GA backfilled the pit on February 25, 1985. GA did not request the site to be released to unrestricted use at that time, but noted in the request that "Backfilling at this time should present no undue obstacles to releasing this area to unrestricted use since both GA and Region V staff have taken many independent surveys and samples."

[It is noted that there was no NRC- and State of California-approved "General Atomics Site Decommissioning Plan" in 1984 or early 1985. Therefore, the initial activities associated with remediation of the L-307 tank pit site predated GA's NRC- and State-approved release criteria.]

More recently, in 2003, GA began an evaluation to determine what, if anything, should be done prior to requesting release of the former L-307 Tank Pit Site to unrestricted use. Based upon the 1984 survey results, it was known that some small amount of soil contaminated with Cs-137, Co-60 and Sr-90 remained in the pit at concentrations exceeding the State- and NRC- approved soil release criteria specified in GA's Site Decommissioning Plan. Accordingly, GA developed plans to characterize the site and remove contaminated soil, as needed, in order to meet the NRC- and State- approved criteria for release to unrestricted use.

The enclosed report documents the results of GA's final radiological measurements and soil sampling and analyses performed at the site. In all, a total of 423 soil samples (including core samples down to a depth of ~20' in some locations) were collected from the site, in order to locate any residual contamination.

All of the soil samples were counted by gamma spectroscopy; the results for Cs-137 and Co-60 concentrations were all well below the NRC- and State- approved soil release limits.

¹Letter dated November 30, 1984 from W. R. Mowry (signed by F.O. Bold) to William T. Crow (NRC Headquarters), "Request for Approval to Backfill L-307 Pit" with Final Report: L-307 Pit at GA Site".

Twenty-one (21) soil samples (including composite samples) were sent to an offsite laboratory for Sr-90 analyses. All of the Sr-90 concentrations were also well below the NRC- and State- approved soil release limits.

The total quantities of residual contamination remaining (in 2006) are estimated to be 0.084 μCi Cs-137, 0.026 μCi Co-60 and 1.28 μCi Sr-90. It is also noted that because of the relatively short half lives of Cs-137 (30 yr), Co-60 (5.263 yr) and Sr-90 (27.7 yr), this small amount of residual contamination will continue to decay and eventually be impossible to measure.

Consequently, additional soil remediation was determined to be unnecessary. The results of the final surveys and analyses, as documented in the enclosed report, demonstrate that the land area associated with the former L-307 tank pit meets the approved criteria for release to unrestricted use as specified in GA's NRC- and State-approved Site Decommissioning Plan.

Accordingly, GA hereby requests the NRC and the State to release the "L-307 Waste Tank Pit Area," as described in the enclosed report, to unrestricted use and to delete it from GA's NRC and State special nuclear material and radioactive material licenses, respectively.

Consistent with decisions made during joint NRC, State of California and GA decommissioning coordination meetings, the NRC has the regulatory lead for the release of the L-307 Tank Pit Site to unrestricted use.

If you should have any questions regarding this request, or the enclosure, please don't hesitate to contact Ms. Laura Q. Gonzales at (858) 455-2758 or laura.gonzales@gat.com, or me at (858) 455-2823.

Very truly yours,



Keith E. Asmussen, Ph.D., Director
Licensing, Safety and Nuclear Compliance

Enclosure: "Final Radiological Survey Report for the Former L-307 Tank Pit Site",
dated February 2007

cc: Dr. D. Blair Spitzberg, Chief, NMSS Branch 3, Region IV
Mr. Robert Evans, Fuel Cycle Inspector, NRC Region IV
Mr. Jeff Wong, State of CA, Berkeley, CA
Ms. Barbara Hamrick, State of CA, Brea, CA



FINAL RADIOLOGICAL SURVEY REPORT

FOR THE

FORMER L-307 TANK PIT SITE

Prepared By: Laura Gonzales, Paul R. Maschka and William LaBonte

Survey Technicians: William Shuck and Scott Cowan

February 2007

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Introduction

General Atomics (GA) is continuing its efforts directed at decontaminating, as appropriate, and obtaining the release to unrestricted use of selected facilities and land areas at General Atomics. GA has completed the Final Radiological Surveys on a small portion of land where a former underground low-level radioactive liquid waste tank had been located. During its use (~1955-~1980), the reinforced concrete tank (known as the "L-307 Tank") held liquid waste resulting from activities involving radioactive material performed in Laboratories 307 and 309 of Building 2.

On June 28, 1984, GA excavated the L-307 Tank and later disposed of the tank as radioactive waste by shipping it to an approved low-level radioactive waste disposal site. Samples of the soil removed and of the soil remaining in the resultant pit were collected and analyzed by gamma spectroscopy and for Sr-90 contamination. Practically all of the contaminated soil was removed and later disposed of as radioactive waste in an approved low-level radioactive waste disposal site. The small amount of contamination that was not removed in 1984 is addressed in this report.

By letter dated November 30, 1984¹, GA requested approval from the NRC to backfill the L-307 pit. Submitted with the request was a corresponding report which summarized the results of the radiation survey measurements and soil sampling and analyses completed on the site. Approval to backfill the pit was granted by the NRC on December 5, 1984². GA backfilled the pit on February 25, 1985. A request to release the site to unrestricted use was not made at that time.

More recently, in 2003, GA began an evaluation to determine what, if anything, should be done prior to requesting release of the former L-307 Tank Pit Site to unrestricted use. Based upon the 1984 survey results, it was known that some soil contaminated with Cs-137, Co-60 and Sr-90 remained in the pit at concentrations exceeding the State- and NRC- approved soil release criteria specified in GA's Site Decommissioning Plan. Accordingly, GA developed plans to characterize the site and remove contaminated soil, as needed, in order to meet the NRC- and State- approved criteria for release to unrestricted use. The objectives of the plans were as follows:

1. To determine the location and extent of residual radioactive contamination remaining in the soil on the L-307 Tank Pit Site and to define the approximate boundaries.
2. To determine the concentrations of Sr-90, Cs-137, Co-60 and other potential radionuclides at various locations and depths remaining on the former L-307 Tank Pit Site.

¹Letter dated November 30, 1984 from W. R. Mowry (signed by F.O. Bold) to William T. Crow (NRC Headquarters), "Request for Approval to Backfill L-307 Pit" with Final Report: L-307 Pit at GA Site".

²Memo dated 12/5/84 (FOB:84:148) from R. J. Nirschl (for F.O. Bold) to R. H. Dalry, "L-307 Pit Backfill".



History of Use and Prior Decontamination Efforts

The underground steel reinforced L-307 concrete waste tank was used between ~1955-1980 to store low-level liquid radioactive waste generated in association with research labs in Building 2, mainly from Lab 307 and Lab 309. The waste was primarily contaminated with liquids containing Cs-137, Co-60 and Sr-90.

On June 28, 1984, the L-307 tank was excavated, resulting in a pit which was ~13' x 13' x 15' deep. The concrete tank was transferred to GA's Nuclear Waste Processing Facility, and ultimately disposed of as radioactive waste at an approved low-level radioactive waste disposal facility.

Prior to its removal, soil (as deep as 3') from around and downhill from the tank was removed and analyzed for radioactive contamination³. The results showed Cs-137 contamination ranging from 0.75 pCi/g to 42 pCi/g.

During its removal, it was observed that a leak had occurred along the north wall of the tank approximately 2½ feet above the bottom of the tank. Radiation levels were about 25 mR/hr at the "leak" side of the tank.⁴ Approximately 1,500 ft³ of loosely packed soil was removed during initial excavation. During and after removal of the tank, the soil was separated into two types: (1) Waste which had levels typically > 500 cpm measured with a geiger counter, called "Type A" soil which resulted in 216 barrels of soil (1,620 ft³) being generated, and, (2) Waste which had levels < 500 cpm, called "Type B" soil (which totaled 5,000 ft³). Five soil samples were collected from the Type B soil.⁵ Sr-90 concentrations in these soil samples (identified as DS-20 through DS-24) ranged from 6.2 pCi/g to 43.1 pCi/g.

³ Memo dated June 16, 1984 from E.I. White (an environmental consultant) to F.O. Bold "Soil Survey at L-307 Waste Tank".

⁴ From memo dated 7/6/84 (LRQ:84:74) from L.R. Quintana to F.O. Bold, "Health Physics Monthly Report for the Period June 6, 1984 through July 3, 1984".

⁵ Memo dated July 23, 1984 (LRQ:84:82) from L.R. Quintana to W.R. Mowry, "Plan for NRC and State Approval" and Letter dated August 1, 1984 from L.R. Quintana to Gerald H. Hamada (NRC) regarding soil samples sent to NRC.

From a review of historical records^{6, 7, and 8}, it is concluded that the following occurred:

- The Type A soil which had geiger counter readings ranging from 500 - 100,000 cpm (most of the soil readings were between 500-1000 cpm) was disposed of as radioactive waste.
- The Type B soil (approximately 5,000 ft³) was placed on the East End of the "evaporation pond" area of the former Nuclear Waste Processing Facility located northeast of Building 22 on October 19, 1984. The former Nuclear Waste Processing Facility was located on ~85 acres of land which was the subject of a separate decontamination effort, release requests, and final release to unrestricted use by the NRC and State. The corresponding land area is no longer a part of the GA site.

The pit, called the "L-307 Pit", was surveyed and soil samples were collected from it in 1984 by both GA and the NRC. Soil samples from each wall of the pit were collected and some of them were split with the NRC. NRC results showed Sr-90 levels from 309-420 pCi/g.⁹ (Thorium and uranium concentrations were background and there was no tritium measured in the soil samples).

The soil contamination was primarily in the vicinity of the tank leak (about 2 ½ feet up from the pit on floor at the north wall). About 1,500 ft³ of soil was removed resulting in an excavation ~1-3' deep and 3'-4' high on the north wall and along the pit floor which significantly reduced the concentrations of each of the contaminants (Sr-90, Cs-137 and Co-60). The removal of the contaminated soil continued until hazards from a possible cave-in of the pit wall prevented a safe excavation operation.

Once the contaminated soil was removed, a radiation survey was conducted to document radiation levels and levels of residual contamination. A summary of this survey is provided below:

Summary of Radiation Surveys prior to Backfilling

Radiation Measurements - Measurements were taken using a thin window GM pancake probe (Ludlum Model 44-9 with 15 cm² pancake window). In general, the residual radiation levels were

⁶Memo to H.C. House dated 9/13/84 (WRM:84:77) "Proposal for releasing contaminated soil at the GA Site.

⁷Memo dated 10/17/84 from W.R. Mowry to H. Lomax "L-307 dirt Movement to Lower Pond Area" - concurrence obtained from R. Nirschl (Nuclear Safety Manager).

⁸Memo dated November 9, 1984 (LRQ:84:137) from L. R. Quintana to F. O. Bold "Health Physics Monthly Report for the Period October 4, 1984 through November 8, 1984.

⁹Memo dated 9/26/84 (LRQ:84:111) from L.R. Quintana to Distribution "NRC Results on L-540/L-307 Soil Samples."



less than twice background. A few elevated reading locations were observed which represented small area hot spots that could not be safely removed. Most specifically, results after clean-up ranged from <250-1400 cpm. Elevated radiation levels were found on every wall of the pit although the highest readings were on the north and east walls.

Exposure Rate Measurements - Exposure rate measurements taken 1 m from any wall or floor surface ranged from 13 - 27 μ R/hr. The exposure rate measurements measured 1 m from the wall in the excavated area (where radioactive contamination remains) ranged from 22-27 μ R/hr.

Soil Samples - Soil samples were collected and analyzed by gamma spectroscopy. A summary of the results is provided below.

<u>Sample ID</u>	<u>Location</u>	<u>Original pCi/g</u>		
		<u>Cs-137</u>	<u>Co-60</u>	<u>Sr-90</u>
NRC-B1	North wall lower right "hot spot"	30	61	116
NRC-B2	East lower right wall "hot spot"	5.3	67	227
NRC-B3	West lower right wall "hot spot"	17	14	297
NRC-B4	North Lower left "hot spot"	ND	1.5	65
DS-43	Composite mid-south wall	ND	1.3	ND
DS-44	Composite upper east wall	0.01	0.3	ND
DS-45	Composite upper north wall	0.09	0.8	2.3
DS-46	Composite lower west wall	0.42	4.0	22.5

On November 30, 1984, GA, requested approval from the Nuclear Regulatory Commission (NRC) to backfill the pit ¹⁰. The request provided the Final Report for the L-307 Pit which stated "we propose to backfill it with clean dirt" and "Backfilling at this time should present no undue obstacles to releasing this area to unrestricted use since both GA and Region V staff have taken many independent surveys and samples".

The NRC notified GA on December 5, 1984, that it was acceptable to backfill the L-307 pit with clean dirt. ¹¹ R. J. Nirschl who issued the memo to R.H. Dalry indicated "It would be prudent to mark the four corners of the pit with stakes to assist in location for any future considerations". (Plastic tubes were found during the 2003 sampling and core drilling but not in a square formation, some of the plastic tubes were horizontal instead of vertical).

The pit was backfilled on February 19, 1985. Documents reviewed indicate that some of the slightly

¹⁰ Letter dated November 30, 1984 from William R. Mowry (GA) to William T. Crow, (NRC), 696-6083 "Request for Approval to Backfill L-307 Pit".

¹¹ Memo dated 12/5/84 (FOB:84:148) from R. J. Nirschl (for F.O. Bold) to R. H. Dalry, "L-307 Pit Backfill".

contaminated soil removed during the tank excavation was used to backfill the pit.¹² This soil is believed to have been the topsoil removed prior to the excavation of the pit. Soil samples of the fill soil taken during the backfilling of the pit showed low levels of Cs-137 (~1-2 pCi/g) and Co-60 (< 1 pCi/g) contamination in the soil.¹³

Classification

The area was classified as a Suspect Affected Area for radiological survey purposes.

Criteria for Release to Unrestricted Use

As Low As Reasonably Achievable (ALARA)

During its decommissioning efforts, GA always attempts to decontaminate to as close to natural background levels, and as far below the NRC- and State- approved release criteria, as is reasonably achievable.

Release Criteria for Soils

The predominant contaminants, based on analyses of soil samples were identified as Sr-90, Cs-137, and Co-60. The NRC- and State- approved release criteria in pCi/g (above natural background concentrations) for these radionuclides in soil are as follows:

Sr-90	1800 pCi/g
Cs-137	15 pCi/g
Co-60	8 pCi/g

If more than one radionuclide exists, the sum of the fractions of the concentrations is calculated as follows:

$$\sum_{i=1}^n \frac{C_i}{L_i} = <1$$

Where: C_i = The average concentration levels of radionuclide I in the sample (above background).

L_i = The release criteria for radionuclide I .

And, the sum of the fractions must be less than or equal to one (1).

¹²Memo dated February 26, 1985 (LRQ:85:044) from L.R. Quintana to F.O. Bold, "Ge(Li) Scan Results on L-307 Soil Samples Collected 2/19/85.

¹³Memo dated 2/26/85 from L.R. Quintana to F.O. Bold "Ge(Li) Scan Results on L-307 Soil Samples Collected 2/19/85".

Exposure Rate Guideline

Exposure rates measured at 1 m above the surface are not to exceed 10 $\mu\text{R/hr}$ above natural background levels.

Instrumentation and Background Measurements

A list of instruments used during the radiological surveys is shown in Table 1. The table includes: (1) a description of the instrument, model number and its serial number, (2) a description of the detector (if applicable) and its serial number, (3) instrument ranges, (4) calibration due dates, (5) typical background readings and minimum detectable activity (MDA's, if applicable) and (6) calibration efficiencies (if applicable). All of the instruments used were calibrated semiannually and after repair, except for exposure rate meters which were calibrated quarterly.

Radionuclide Concentrations in Background Soil

Typical background radionuclide concentrations measured by gamma spectroscopy in uncontaminated (i.e., "background") soil samples collected near the GA site have been established (at the 95% confidence level) and are provided in Table 2 along with a list of locations where the samples were collected from.

Additionally, the gamma spectroscopy results of subsurface background soil samples are provided in Table 3. The subsurface soil samples were collected about 5' from the surface inside a pit excavated in an undisturbed and uncontaminated (i.e., "background") area of the GA site (specifically, from within the Torrey Pines West Land Area).

Exposure Rate Background

Typical exposure rate background for GA's site using a Ludlum Model 19 micro R meter is 12-18 $\mu\text{R/hr}$ measured at 1 m from the surface of soil. This range of exposure rates can be measured south of Building 15 (an office building on the eastern portion of the GA site). Measurements taken at 10 different locations (9 offsite and 1 onsite at a non-impacted area near Building 15) over a period of 15 months also averaged $\sim 15 \mu\text{R/hr}$ (measured at 1 m from the surface). The range of 12-18 $\mu\text{R/hr}$ is typical at the GA site for the external dose rates measured 1 meter from the surface.

Final Surveys Performed

Objectives and Responsibilities

The objectives of the final survey plans were: (1) to demonstrate that the results of analyzing samples of soil collected at and below the surface are well below GA's approved release criteria for release to unrestricted use, and, (2) that the exposure rate measurements taken in these areas, measured at 1 meter above the surface, were less than 10 $\mu\text{R/hr}$ above background.

Survey Plans

Survey Plans (provided in Appendix A) were developed based on the previous use history of this

site, the radionuclides of concern for this area, the potential for contamination, and the survey classification.

Surveys were taken in accordance with an approved survey plan(s) by qualified Health Physics Technicians having a minimum of three years health physics experience. Soil samples were counted in GA's Health Physics Laboratory which maintains an effective QA program.

Every survey taken was documented on a daily basis to a worksheet/drawing showing the approximate locations surveyed/sampled. The documentation included the results of the measurements (including units), the technician's name, date, instrument(s) used (including the model and serial number of both the ratemeter and detector), calibration due date, % efficiency, background readings (if applicable) and any other pertinent information.

Soil Sampling

Soil samples were collected in and around the area where it was determined that waste tank pit was formerly located. Samples were collected in the approximate locations shown in Figures 6 and 7. Each of the soil samples taken were approximately 1 kilogram in mass. The samples were properly logged, labeled, tracked and packaged into plastic bags. All debris (i.e., grass, rocks, sticks, asphalt and foreign objects) was removed from each sample. Each soil sample was individually crushed to reduce large lumps, dried, placed into tarred marinelli beakers (filled to the top), weighed, sealed and transported to GA's Health Physics Laboratory. Soil samples were analyzed using a Canberra Low Sensitivity Gamma Spectroscopy MCA System using a high purity germanium detector. The system is calibrated using NIST traceable standards and performance checked daily. Soil samples were counted for a minimum of 30 minutes each. A 30 minute count was sufficient to detect the radionuclides of concern at levels below GA's approved soil release criteria.

Survey Plans and Results of Surveys

Objectives

1. To determine the location and extent of residual radioactive contamination remaining on the L-307 Tank Pit Site and to define the approximate boundaries.
2. To determine the concentrations of Sr-90, Cs-137, Co-60 and other potential radionuclides at various locations and depths remaining on the former L-307 Tank Pit Site.
3. To determine if additional remediation is warranted, remediate as needed, and re-survey.

Phase I and Phase II Plan

There was some evidence from historical documents that soil removed prior to or during excavation of the tank was used to backfill the pit and that this soil may have been slightly contaminated with Cs-137, Co-60 and Sr-90. Therefore, the "Phase I" survey plan (provided in Appendix A) was developed in May 2003 to characterize the top 3" of soil from the 25' x 25' area. The plan called for



the relocation of the fence enclosed trash receptacles (dumpsters), removal of the concrete pad and clearing the entire 25' x 25' area of vegetation and debris before commencing the survey.

A 100% gamma scan of the area, a 100% beta scan of the area and the collection of 20 soil samples at 10 different locations (2 samples per location; sample A at 0-1.5' and sample "B" at 1.5'-3' as shown in Figure 6) were planned. Sample locations 1-5 were in the 13' x 13' area where the "tank pit" was assumed to be located and sample locations 6-10 were taken in the larger 25' x 25' area.

The Phase I Plan was later revised in July 2003 (Appendix A) to add another 5 locations (11-15) which were outside of the 25' x 25' area for a total of 30 soil samples (see Figure 7).

The Phase II plan was developed to collect core samples at various depths down to 15' deep (below where radioactive contamination was suspected). The core samples would be collected every foot (down to ~15') in locations 1-20. A total of 20 soil samples would be selected for Sr-90 analysis.

Phase I and Phase II Results

A gamma scan of ~100% of the entire 25' x 25' cleared area was conducted. Radiation dose levels, which ranged from 10-15 $\mu\text{R/hr}$, were not distinguishable from normal background levels (12-19 $\mu\text{R/hr}$) as shown in Figure 8.

The beta scan was not performed because gamma scans were negative, the terrain was uneven making a beta scan difficult to perform, and soil samples were going to be collected.

Initially, 2 soil samples were collected at each of 10 locations. These initial 20 soil samples were collected in June 2003 from the top 3' of soil in the 25' x 25' area and were analyzed by gamma spectroscopy. The results for this set of soil samples (locations 1-10 and samples "A" (0-1.5") and "B" (1.5'-3')) are provided in Table 4. Cs-137 concentrations were all < 0.2 pCi/g and Co-60 was not detected in any of the soil samples. The results indicate that the top 3' of soil in the 25' x 25' area was "clean" (radionuclide concentrations are not discernable from normal background levels).

Core samples were then collected at various depths down to 15' (beginning at the new grade which was ~3' below the initial grade). Sample locations within the 25' x 25' area are numbered 1-15. Soil samples collected outside the 25' x 25' area are identified as locations 16-27. The samples from locations 1-15 began at sample "C" which was collected from 3'-4' deep, "D" was collected from 4'-5' deep, "E" from 5'-6' deep, and so on. The samples from locations 16 through 27 began at surface grade and started with sample "A" (0-1.5'), sample "B" (1.5'-3'), sample "C" (3'-4' deep), sample "D" (4'-5' deep), "E" from 5'-6' deep, and so on.

Core samples could not be collected from locations 8, 10, 11 and 15 because the core drilling rig could not be set up to sample these locations safely. Core samples (samples below 3') were collected in 23 out a total of 27 locations (new locations were added prior to and during the core drilling after cores could not be collected from some of the locations).

Additionally, most locations were sampled to a depth of 16' (sample "O" was from 15'-16' deep) while other locations could not be sampled as deep; e.g., location 18 was sampled to a depth of 10' (sample "T"). In some cases, a soil sample could not be collected at certain depths for various reasons. The approximate locations of the soil samples collected and the depth of soil samples collected at each location are provided in Figure 9. In all, 323 soil samples were collected from 27 locations and counted by gamma spectroscopy; the results are provided in Table 4.

Radioactive concentrations of Cs-137 and/or Co-60 were detected above background levels in 10 of the 23 locations, however these levels were all well below the NRC- and State- approved soil release criteria. Locations 2, 7 and 16 indicated activity in the last sample collected. Location #16 had the highest concentrations.

The highest Cs-137 concentration measured in any of the 323 soil samples collected was 2.44 ± 0.36 pCi/g (location 16) and the highest Co-60 measured was 0.50 ± 0.14 pCi/g (in a different sample). These values are well below GA's NRC- and State- approved release criteria of 15 pCi/g for Cs-137 and 8 pCi/g Co-60 in soil. Uranium and thorium concentrations were not discernable from normal background levels.

Phase III Plan

The Phase III Plan was developed in October 2003 after reviewing the results of the previous 323 soil samples. It was decided to collect core samples adjacent to locations 2 and 7 down to 20', to collect a core sample between location 15 and 9 to bound this area and collect core samples in different directions around location 16 to bound this area. A total of 12 of the soil samples would be selected for Sr-90 analysis.

Phase III Results

A total of 100 soil samples were collected every ~1' in 10 locations (locations 28-37 shown in Figure 10) beginning at 10' all the way down to 20'; samples "J" (10'-11') through "S" (19'-20').

The soil samples were analyzed by gamma spectroscopy. The results are provided in Table 5. The highest concentration of Cs-137 measured in any of the soil samples was 2.78 ± 0.34 pCi/g, the highest concentration of Co-60 measured was 0.25 ± 0.12 pCi/g (in a different sample). These values are way below GA's NRC- and State- approved release criteria of 15 pCi/g for Cs-137 and 8 pCi/g Co-60 in soil. Uranium and thorium concentrations were not discernable from normal background levels.

Sr-90 Analysis

A total of 21 soil samples were analyzed for Sr-90 by an offsite laboratory (Severn Trent Laboratories). Included in the 21 soil samples were six (6) samples which were composites of anywhere from 20-68 samples, the soil sample containing the highest Cs-137 concentration, and the soil sample containing the highest Co-60 concentration.

The results are provided in Table 6. The highest result was for an individual sample measuring 14.9 ± 3.2 pCi/g Sr-90 (well below the approved soil release criteria of 1800 pCi/g). The rest of the results were < 3 pCi/g.

Decontamination and Decommissioning (D&D) Activities

Because the results of all of the soil samples showed Cs-137, Co-60, and Sr-90 concentrations at levels well below the NRC- and State- approved soil release criteria, no remediation was required.

Estimates of the Contaminated Area

Figure 1 of the 1984 Final Report¹⁴ provided the locations of the soil samples collected from the pit prior to backfilling and the results of radioactive analyses completed on these samples. The following table provides the 1984 original concentrations of Cs-137, Co-60 and Sr-90 in soil samples collected from the four "hot spots" as well as the revised 2006 concentrations (in parenthesis and bolded). Concentrations were revised using a half-life of 30 yr for Cs-137, 5.263 yr for Co-60, and 27.7 yr for Sr-90 as well as 22.5 years decay time.

Sample ID	Location	1984 Original pCi/g (Remaining 2006 pCi/g)		
		Cs-137	Co-60	Sr-90
NRC-B1	North wall lower right hot spot	30 (18)	61 (3)	116 (66)
NRC-B2	East lower right wall hot spot	5.3 (3)	67 (3.4)	227 (129)
NRC-B3	West lower right wall hot spot	17 (10)	14 (0.7)	297 (169)
NRC-B4	North Lower left hot spot	ND (ND)	1.5 (0.08)	65 (37)

Using the above revised concentrations for the "hot spots" and other information provided in the 1984 report, the following calculations were completed: 1) The average concentrations remaining in various portions of the pit were calculated, 2) The quantity of contaminated soil remaining in each wall was estimated, and 3) the total quantities of Cs-137, Co-60 and Sr-90 remaining in the pit were estimated.

	Remaining pCi/g		
	Cs-137	Co-60	Sr-90
<u>North Wall Contamination:</u>			
Average of samples NRC-B1& NRC-B4	9	1.5	52
5' from wall (cores B1, B2 & B3 - 12'-15' deep)	1 (max)	ND	5(max)
Average	5	0.7	29

¹⁴ From "Final Report L-307 Pit at GA Site" submitted with "Letter dated November 30, 1984 from W. R. Mowry (signed by F.O. Bold) to William T. Crow (NRC Headquarters), "Request for Approval to Backfill L-307 Pit" with Final Report: L-307 Pit at GA Site".

Quantity of soil (13' wide x 6' high x 5' deep) = 390 ft³
 Quantity of Cs-137 = 390 ft³ x 1 ft³/85 lbs x 2.2 lbs/kg = 10 kg
 10,000 g x 5 pCi/g x 1 μCi/10⁶ pCi = 0.05 μCi
 Quantity of Co-60 = 0.007 μCi
 Quantity of Sr-90 = 0.29 μCi

<u>East Wall Contamination:</u>	<u>Remaining pCi/g</u>		
	<u>Cs-137</u>	<u>Co-60</u>	<u>Sr-90</u>
NRC-B2	3	3.4	129
@ 5' from wall (core B4 12'-15' deep)	ND	ND	1.3 (max)
Average in 390 ft ³ or 10 kg total soil	1.5	1.7	65

Quantity of Cs-137 = 0.02 μCi
 Quantity of Co-60 = 0.02 μCi
 Quantity of Sr-90 = 0.65 μCi

<u>Lower West Wall</u>	<u>Remaining pCi/g</u>		
	<u>Cs-137</u>	<u>Co-60</u>	<u>Sr-90</u>
Sample NRC-B3	10 (max)	0.7 (max)	169 (max)

Quantity of soil is estimated as 75 ft³ (3'x5'x5' deep)
 Quantity of Cs-137 = 75 ft³ x 1 ft³/85 lbs x 2.2 lbs/kg = 1.94 kg =
 1940 g x 10 pCi/g x 1 μCi/10⁶ pCi = 0.02 μCi
 Quantity of Co-60 = 0.001 μCi
 Quantity of Sr-90 = 0.33 μCi

<u>Average concentrations in all 855 ft³:</u>	<u>Cs-137</u>	<u>Co-60</u>	<u>Sr-90</u>
5(390/855) + 1.5(390/855) + 10(75/855)	3.8	--	--
0.7(390/855) + 1.7(390/855) + 0.7(75/855)	--	1.2	--
29(390/855) + 65(390/855) + 169(75/855)	--	--	58

Total Estimate of Residual Contamination Remaining in a total of 855 ft³ (~22 kg) of soil:

Cs-137 = 0.084 μCi
 Co-60 = 0.026 μCi
 Sr-90 = 1.28 μCi

Conclusions

Although some individual soil samples collected and analyzed in 1984 indicated concentrations exceeding the current NRC- and State- approved soil release criteria, a review of the 1984 data and the completion of this Final Survey revealed the following:

1. All of the soil samples collected during this survey (423) were analyzed and found to have lower concentrations than the soil samples collected in 1984 consistent with observation¹³ in the 1984 Final Report that the residual contamination was in small and isolated layers of soil.
2. Although a few individual soil samples collected and analyzed in 1984 indicated soil concentrations exceeding the NRC- and State- approved soil release criteria, only one result is above the NRC- and State- approved release criteria when corrected for natural radioactive decay.

This result, when taking the sum of the fractions into account, is < 3 times the release limit;¹⁴ i.e., the sum of fractions results in 1.61 times the limit as follows:

$$\frac{18 \text{ pCi/g Cs-137}}{15 \text{ pCi/g Cs-137}} + \frac{3 \text{ pCi/g Co-60}}{8 \text{ pCi/g Co-60}} + \frac{66 \text{ pCi/g Sr-90}}{1800 \text{ pCi/g Sr-90}} = 1.61$$

3. The average concentrations of soil samples collected in 1984 (corrected for decay) are well below the NRC- and State- approved soil release criteria.
4. The total quantity of contaminated soil was estimated to be 855 ft³ and the average concentrations of Cs-137, Co-60 and Sr-90 in this quantity of soil was calculated to be well below the release criteria for each contaminant: Cs-137 = 3.8 pCi/g (limit is 15 pCi/g), Co-60 = 1.2 pCi/g (limit is 8 pCi/g), and Sr-90 was 58 pCi/g (limit is 1800 pCi/g).
5. All of the soil samples collected during this survey (423) were analyzed and found to be below the NRC- and State- approved soil release criteria.
6. The total quantities of residual contamination remaining has been estimated to be 0.084 μCi Cs-137, 0.026 μCi Co-60 and 1.28 μCi Sr-90.

¹³ 1984 Final Report, Section 4.0, 2nd paragraph, last sentence.

¹⁴ Consistent with the maximum allowable release criteria for release of facilities and equipment to unrestricted use, being a factor of 3 higher than the average allowable criteria.

7. Because of the relatively short half lives of Cs-137 (30 yr), Co-60 (5.263 yr) and Sr-90 (27.7 yr), any residual contamination remaining will continue to decay and eventually be impossible to measure.

The final radiation survey and the results of the soil sample analyses, as documented in this report, demonstrate that the former L-307 Waste Tank Pit Area meets the NRC and the State-approved criteria for release to unrestricted use.

Table 1: List of Instruments Used For the L-307 Waste Tank Pit Site Survey

Instrument	Detector	Range	Calibration due date	Efficiency	Background	Description
Ludlum Model 3 S/N 153311	Ludlum Model 44-10 NaI (TI) Scintillator Gamma Detector S/N 155594	Four Ranges 0 - 500 μ R/hr	10-09-03	NA	12-19 μ R/hr contact	2 inch X 2 inch NaI(Tl) scintillator. Used for measuring external dose rates on the surface and at one meter.
Canberra Gamma Spectroscopy System	High Purity Germanium Detector	N/A	As needed	Varies with Sample	Varies with Sample	Gamma Spectroscopy MCA system using a high purity Germanium detector

Table 2: General Atomic's Gamma Spectroscopy Results of Background Surface Soil Samples

September 24, 2002

Energy Peaks →	¹³⁷ Cs 661.6 keV	⁶⁰ Co 1173 keV	²²⁸ Th 238 keV (²¹² Pb)	²²⁸ Ra (²³² Th) 911 keV (²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U 144 (186) keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts</i>						
Samples collected June, 2000 Re- analyzed November, 2001							
X-1	ND ¹	ND	0.49 ± 0.15	1.25 ± 0.34	1.74 ± 0.48	ND	ND
X-2	ND	ND	0.91 ± 0.23	0.91 ± 0.23	1.81 ± 0.46	1.17 ± 1.13	(0.09 ± 0.05)
X-3	ND	ND	1.40 ± 0.27	1.79 ± 0.37	3.19 ± 0.63	1.51 ± 1.20	(0.09 ± 0.09)
X-4	0.08 ± 0.07	ND	1.71 ± 0.31	2.08 ± 0.47	3.78 ± 0.78	ND	(0.18 ± 0.13)
X-5	ND	ND	1.52 ± 0.29	2.83 ± 0.70	4.35 ± 0.99	ND	(0.20 ± 0.15)
X-6	ND	ND	1.14 ± 0.32	1.12 ± 0.26	2.25 ± 0.58	ND	(0.09 ± 0.05)
X-7	0.11 ± 0.07	ND	1.68 ± 0.24	2.18 ± 0.47	3.86 ± 0.71	ND	(0.22 ± 0.10)
X-8	ND	ND	2.32 ± 0.38	2.14 ± 0.54	4.45 ± 0.92	ND	(0.26 ± 0.14)
X-9	ND	ND	0.61 ± 0.15	1.59 ± 0.42	2.20 ± 0.57	ND	ND
X-10	0.09 ± 0.06	ND	1.59 ± 0.26	1.39 ± 0.36	2.98 ± 0.61	0.75 ± 1.22	(0.13 ± 0.07)
Samples collected and analyzed September, 2002							
X-11	0.23 ± 0.07	ND	1.37 ± 0.29	1.71 ± 0.37	3.07 ± 0.66	1.13 ± 1.30	(0.25 ± 0.11)
X-12	0.31 ± 0.08	ND	0.50 ± 0.08	0.65 ± 0.18	1.14 ± 0.26	ND	(0.11 ± 0.07)
X-13	ND	ND	0.95 ± 0.20	1.13 ± 0.23	2.08 ± 0.43	1.29 ± 0.99	(0.14 ± 0.05)

¹ ND = Energy peak not identified

Table 2: General Atomics Gamma Spectroscopy Results of Background Surface Soil Samples

September 24, 2002

Energy Peaks →	¹³⁷ Cs 661.6 keV	⁶⁰ Co 1173 keV	²²⁸ Th 238 keV (²¹² Pb)	²²⁸ Ra (²³² Th) 911 keV (²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U 144 (186) keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts</i>						
X-14	ND	ND	1.42 ± 0.19	1.59 ± 0.29	3.01 ± 0.48	0.67 ± 0.71	(0.11 ± 0.05)
X-15	ND	ND	0.37 ± 0.09	0.56 ± 0.16	0.92 ± 0.25	0.50 ± 0.66	(0.04 ± 0.04)
X-16	0.06 ± 0.03	ND	0.97 ± 0.22	1.15 ± 0.23	2.12 ± 0.45	ND	(0.10 ± 0.05)
X-17	ND	ND	0.80 ± 0.12	0.96 ± 0.40	1.76 ± 0.52	ND	ND
X-18	0.25 ± 0.07	ND	0.77 ± 0.21	0.94 ± 0.24	1.71 ± 0.45	0.92 ± 0.94	(0.13 ± 0.08)
X-19	ND	ND	0.72 ± 0.12	0.68 ± 0.23	1.40 ± 0.35	ND	(0.11 ± 0.07)
X-20	ND	ND	1.42 ± 0.17	1.40 ± 0.27	2.82 ± 0.45	ND	(0.20 ± 0.09)
X-21	ND	ND	1.51 ± 0.32	1.48 ± 0.30	2.99 ± 0.62	2.47 ± 1.71	0.26 ± 0.23
X-22	0.07 ± 0.05	ND	0.85 ± 0.12	0.98 ± 0.29	1.83 ± 0.41	ND	(0.10 ± 0.08)
X-23	ND	ND	1.17 ± 0.15	1.33 ± 0.28	2.50 ± 0.42	ND	(0.10 ± 0.05)
X-24	ND	ND	2.03 ± 0.26	1.70 ± 0.33	3.73 ± 0.59	1.75 ± 1.37	(0.17 ± 0.06)
X-25	ND	ND	1.44 ± 0.29	1.36 ± 0.28	2.80 ± 0.57	1.52 ± 1.26	(0.19 ± 0.08)
X-26	ND	ND	1.81 ± 0.24	1.41 ± 0.31	3.22 ± 0.54	0.68 ± 0.96	(0.13 ± 0.06)
X-27	ND	ND	1.65 ± 0.20	2.00 ± 0.34	3.65 ± 0.54	ND	(0.15 ± 0.07)
X-28	ND	ND	1.40 ± 0.20	1.47 ± 0.33	2.87 ± 0.54	1.35 ± 1.03	(0.28 ± 0.07)
X-29	0.01 ± 0.07	ND	0.81 ± 0.17	1.61 ± 0.34	2.42 ± 0.51	ND	(0.09 ± 0.06)
X-30	ND	ND	1.90 ± 0.22	1.88 ± 0.33	3.79 ± 0.55	2.67 ± 1.79	(0.35 ± 0.11)

Sample Locations:

- X1 Sorrento Valley Road near sample location ST65 on the hillside ~1 mile from Building 37.
- X2 Sorrento Valley Road near Carmel Mountain Road junction on steep cliff.
- X3 Sorrento Valley Road in Los Peñasquitos Preserve ~2 miles from Building 37.
- X4 Sorrento Valley Court at the end of the road in the field.
- X5 Roselle Street, East of sample location ST64 ~ ½ mile from Building 37 (collected on the hillside)
- X6 Roselle Street, East of sample location ST64 ~1 ½ mile from Building 37 (collected on hillside).
- X7 Lusk Boulevard, from the hillside ~ 1 ½ miles from Building 37 (collected on the hillside).
- X8 Vista Sorrento Parkway, ~ ½ mile from Building 37 (collected on the hillside).
- X9 Callahan Road, ~ ½ mile from Building 37 (collected on the hillside).
- X10 Eastgate Mall road, ~3 miles from Building 37 (collected in a field).
- X11 Creek Road (North County).
- X12 Canyon de Oro (North County).
- X13 Palomar (North E County).
- X14 Deer Springs Rd. (North County).
- X15 Rice Canyon Rd. (North County).
- X16 Las Pulgas Rd. (North County).
- X17 Boderfield Park (South W County).
- X18 Otay Mesa (South E County).
- X19 Sunset Cliff (South W County).
- X20 Marion Bear Park (South County).
- X21 Mission Valley (South County).
- X22 Santee (South E County)
- X23 Ramona (East County).
- X24 Via Abitura (San Diego).
- X25 Black Mtn. Park (San Diego).
- X26 Park Village (San Diego).
- X27 Harris Plant Rd. (San Diego).
- X28 Daley Center Dr. (San Diego).
- X29 Harbison Canyon (East County).
- X30 Apple St. (East San Diego).

Table 3: General Atomics Gamma Spectroscopy Results of Subsurface (5' Pit) Background Soil Samples

February 23, 2000

Energy Peaks →	¹³⁷ Cs 661.6 keV	⁶⁰ Co 1173 keV	²²⁸ Th 238 keV (²¹² Pb)	²²⁸ Ra (²³² Th) 911 keV (²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U 144 (186) keV
Sample ID ↓	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts</i>						
	Samples collected and counted in February 2000						
BKG PIT #1	ND	ND	1.44 ± 0.16	2.23 ± 0.54	3.67 ± 0.70	2.45 ± 0.74	0.24 ± 0.11
BKG PIT #2	ND	ND	1.56 ± 0.14	2.10 ± 0.43	3.66 ± 0.57	2.80 ± 0.66	0.23 ± 0.07
BKG PIT #3	ND	ND	1.42 ± 0.16	2.72 ± 0.61	4.14 ± 0.77	2.73 ± 0.82	0.27 ± 0.11
BKG PIT #4	ND	ND	1.23 ± 0.13	1.77 ± 0.43	3.00 ± 0.56	2.62 ± 0.69	0.34 ± 0.11
BKG PIT #5	ND	ND	1.56 ± 0.24	2.29 ± 0.61	3.85 ± 0.85	2.56 ± 0.85	0.19 ± 0.11
BKG PIT #6	ND	ND	1.22 ± 0.10	1.85 ± 0.41	3.07 ± 0.51	2.67 ± 0.72	0.21 ± 0.08
BKG PIT #7	ND	ND	1.23 ± 0.16	2.40 ± 0.50	3.63 ± 0.66	2.56 ± 0.88	0.24 ± 0.10
BKG PIT #8	ND	ND	1.12 ± 0.11	1.73 ± 0.37	2.85 ± 0.48	2.35 ± 0.68	0.20 ± 0.09
BKG PIT #9	ND	ND	1.15 ± 0.14	1.93 ± 0.47	3.08 ± 0.61	2.02 ± 0.86	0.11 ± 0.09
BKG PIT #10	ND	ND	1.18 ± 0.13	1.78 ± 0.39	2.96 ± 0.52	2.99 ± 0.74	0.20 ± 0.07
BKG PIT #11	ND	ND	1.27 ± 0.15	1.95 ± 0.52	3.22 ± .067	1.77 ± 0.72	0.20 ± 0.11
BKG PIT #12	ND	ND	1.35 ± 0.12	2.07 ± 0.42	3.42 ± .054	2.45 ± 0.75	0.24 ± 0.08
BKG PIT #13	ND	ND	1.44 ± 0.17	2.34 ± 0.56	3.78 ± 0.73	3.32 ± 1.15	0.24 ± 0.11
BKG PIT #14	ND	ND	1.36 ± 0.15	2.29 ± 0.42	3.65 ± 0.57	3.39 ± 0.80	0.23 ± 0.07

Table 3: General Atomics Gamma Spectroscopy Results of Subsurface (5' Pit) Background Soil Samples

February 23, 2000

Energy Peaks →	¹³⁷ Cs 661.6 keV	⁶⁰ Co 1173 keV	²²⁸ Th 238 keV (²¹² Pb)	²²⁸ Ra (²³² Th) 911 keV (²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U 144 (186) keV
Sample ID ↓	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts</i>						
	Samples collected and counted in February 2000						
BKG PIT #15	ND	ND	1.40 ± 0.18	2.34 ± 0.59	3.74 ± 0.77	2.60 ± 0.91	0.23 ± 0.12
BKG PIT #16	ND	ND	1.30 ± 0.12	2.29 ± 0.40	3.59 ± 0.52	3.17 ± 0.92	0.21 ± 0.09
BKG PIT #17	ND	ND	1.48 ± 0.14	2.57 ± 0.45	4.05 ± 0.59	2.46 ± 0.79	0.23 ± 0.10
BKG PIT #18	ND	ND	1.74 ± 0.19	1.91 ± 0.37	3.65 ± 0.56	2.86 ± 0.54	0.25 ± 0.08
BKG PIT #19	ND	ND	1.36 ± 0.13	1.95 ± 0.52	3.31 ± 0.65	2.39 ± 0.85	0.16 ± 0.10
BKG PIT #20	ND	ND	1.26 ± 0.13	2.15 ± 0.35	3.41 ± 0.48	3.06 ± 0.76	0.21 ± 0.08
BKG PIT #21	ND	ND	1.27 ± 0.15	2.21 ± 0.55	3.48 ± 0.70	2.14 ± 0.83	0.17 ± 0.09

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (µCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-1A	ND	ND	1.18 ± 0.26	1.30 ± 0.26	2.48 ± 0.52	ND	0.13 ± 0.06
L307-1B	ND	ND	1.23 ± 0.24	1.19 ± 0.22	2.42 ± 0.46	1.47 ± 1.33	0.11 ± 0.05
L307-1C	ND	ND	1.23 ± 0.24	1.44 ± 0.20	2.67 ± 0.44	ND	0.11 ± 0.05
L307-1D	0.09 ± 0.05	ND	1.32 ± 0.28	1.40 ± 0.26	2.72 ± 0.54	1.86 ± 1.57	0.12 ± 0.07
L307-1E	ND	ND	1.18 ± 0.25	1.31 ± 0.24	2.49 ± 0.49	2.05 ± 1.81	0.13 ± 0.06
L307-1F	ND	ND	1.30 ± 0.23	1.41 ± 0.27	2.71 ± 0.50	ND	0.12 ± 0.05
L307-1G	0.22 ± 0.06	ND	1.41 ± 0.25	1.48 ± 0.28	2.89 ± 0.53	ND	0.12 ± 0.05
L307-1H	0.15 ± 0.06	ND	1.32 ± 0.24	1.44 ± 0.30	2.76 ± 0.54	1.31 ± 1.29	0.14 ± 0.07
L307-1I	0.19 ± 0.06	ND	1.63 ± 0.20	2.01 ± 0.40	3.64 ± 0.60	ND	0.14 ± 0.07
L307-1J	0.19 ± 0.07	ND	1.32 ± 0.17	1.47 ± 0.28	2.79 ± 0.45	1.95 ± 1.77	0.14 ± 0.05
L307-1K	0.27 ± 0.07	ND	1.55 ± 0.28	1.54 ± 0.32	3.09 ± 0.60	0.58 ± 0.91	0.12 ± 0.06
L307-1L	0.16 ± 0.06	ND	2.01 ± 0.28	1.58 ± 0.33	3.59 ± 0.61	1.36 ± 1.32	0.20 ± 0.11
L307-1M	ND	ND	1.99 ± 0.28	1.90 ± 0.37	3.89 ± 0.65	2.46 ± 2.02	0.13 ± 0.07
L307-1N	ND	ND	1.75 ± 0.31	1.80 ± 0.39	3.55 ± 0.70	0.79 ± 1.47	0.17 ± 0.09
L307-1O	ND	ND	1.70 ± 0.21	1.63 ± 0.31	3.33 ± 0.52	1.55 ± 0.16	0.10 ± 0.07

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-2A	ND	ND	0.97 ± 0.21	1.09 ± 0.24	2.06 ± 0.45	0.65 ± 0.73	0.09 ± 0.04
L307-2B	ND	ND	1.15 ± 0.15	1.11 ± 0.25	2.26 ± 0.40	0.83 ± 0.83	0.16 ± 0.07
L307-2C	0.06 ± 0.05	ND	1.42 ± 0.18	1.59 ± 0.29	3.01 ± 0.46	0.68 ± 0.99	0.14 ± 0.06
L307-2D	0.05 ± 0.05	ND	1.34 ± 0.27	1.40 ± 0.29	2.74 ± 0.56	1.40 ± 1.37	0.16 ± 0.07
L307-2E	0.11 ± 0.06	ND	1.62 ± 0.21	1.75 ± 0.38	3.37 ± 0.59	1.13 ± 1.45	0.15 ± 0.06
L307-2F	ND	ND	1.38 ± 0.21	2.26 ± 0.50	3.64 ± 0.71	ND	0.17 ± 0.12
L307-2G	0.15 ± 0.07	ND	1.84 ± 0.26	1.59 ± 0.37	3.43 ± 0.63	1.06 ± 1.06	0.14 ± 0.08
L307-2H	ND	ND	1.50 ± 0.29	1.75 ± 0.38	3.25 ± 0.67	ND	0.19 ± 0.11
L307-2I	ND	ND	1.35 ± 0.22	2.15 ± 0.42	3.50 ± 0.64	ND	0.14 ± 0.09
L307-2J	ND	ND	2.03 ± 0.41	2.51 ± 0.48	4.54 ± 0.89	2.12 ± 2.05	0.15 ± 0.11
L307-2K	0.17 ± 0.08	ND	1.58 ± 0.21	2.40 ± 0.45	3.98 ± 0.66	ND	0.14 ± 0.08
L307-2L	0.55 ± 0.10	ND	1.63 ± 0.32	1.98 ± 0.38	3.61 ± 0.70	ND	0.22 ± 0.10
L307-2M	0.60 ± 0.13	ND	1.70 ± 0.35	1.77 ± 0.40	3.47 ± 0.75	ND	0.12 ± 0.07
L307-2N	0.54 ± 0.11	ND	1.71 ± 0.36	1.74 ± 0.37	3.45 ± 0.73	ND	0.21 ± 0.10
L307-2O	0.73 ± 0.12	0.04 ± 0.09	1.36 ± 0.24	2.10 ± 0.42	3.46 ± 0.66	ND	0.21 ± 0.11

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-3A	ND	ND	1.26 ± 0.16	1.18 ± 0.28	2.44 ± 0.44	1.75 ± 1.74	0.13 ± 0.06
L307-3B	ND	ND	1.15 ± 0.25	1.25 ± 0.29	2.40 ± 0.54	1.64 ± 1.35	0.14 ± 0.05
L307-3C	ND	ND	1.08 ± 0.14	1.23 ± 0.25	2.31 ± 0.39	0.85 ± 0.90	0.11 ± 0.05
L307-3D	0.09 ± 0.05	ND	1.48 ± 0.21	1.27 ± 0.26	2.75 ± 0.47	1.85 ± 1.50	0.10 ± 0.05
L307-3E	ND	ND	1.21 ± 0.29	1.32 ± 0.25	2.53 ± 0.54	ND	0.13 ± 0.05
L307-3F	0.02 ± 0.04	ND	1.20 ± 0.24	1.24 ± 0.23	2.44 ± 0.47	ND	0.12 ± 0.07
L307-3G	ND	ND	1.34 ± 0.17	1.17 ± 0.27	2.51 ± 0.44	1.03 ± 0.79	0.16 ± 0.07
L307-3H	ND	ND	1.53 ± 0.31	1.38 ± 0.27	2.91 ± 0.58	1.74 ± 1.64	0.11 ± 0.08
L307-3I	ND	ND	1.30 ± 0.16	1.53 ± 0.28	2.83 ± 0.44	1.13 ± 1.23	0.15 ± 0.06
L307-3J	0.06 ± 0.04	ND	1.47 ± 0.26	1.37 ± 0.28	2.84 ± 0.54	1.50 ± 1.24	0.16 ± 0.06
L307-3K	0.27 ± 0.07	ND	1.36 ± 0.17	1.44 ± 0.26	2.80 ± 0.43	0.43 ± 0.78	0.26 ± 0.09
L307-3L	0.24 ± 0.08	ND	1.29 ± 0.24	1.13 ± 0.28	2.42 ± 0.52	0.93 ± 1.21	0.15 ± 0.06
L307-3M	0.24 ± 0.07	ND	1.29 ± 0.16	1.23 ± 0.27	2.52 ± 0.43	1.69 ± 0.15	0.13 ± 0.05
L307-3N	0.12 ± 0.05	0.08 ± 0.05	1.48 ± 0.18	1.38 ± 0.28	2.86 ± 0.46	ND	0.15 ± 0.08
L307-3O	0.19 ± 0.06	0.08 ± 0.06	1.58 ± 0.22	1.42 ± 0.29	3.00 ± 0.51	ND	0.13 ± 0.05

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-4A	0.09 ± 0.05	ND	1.21 ± 0.24	1.11 ± 0.23	2.32 ± 0.47	0.96 ± 0.93	0.09 ± 0.05
L307-4B	ND	ND	1.19 ± 0.28	1.33 ± 0.27	2.52 ± 0.55	1.20 ± 1.29	0.12 ± 0.06
L307-4C	ND	ND	1.17 ± 0.16	1.33 ± 0.26	2.50 ± 0.42	ND	0.14 ± 0.06
L307-4D	ND	ND	1.18 ± 0.22	1.47 ± 0.30	2.65 ± 0.52	ND	0.13 ± 0.07
L307-4E	0.05 ± 0.08	ND	1.21 ± 0.16	1.34 ± 0.31	2.55 ± 0.47	0.76 ± 0.95	0.18 ± 0.09
L307-4F	ND	ND	1.26 ± 0.70	1.62 ± 0.36	2.88 ± 1.06	ND	0.10 ± 0.09
L307-4G	ND	ND	1.04 ± 0.13	0.97 ± 0.24	2.01 ± 0.37	ND	0.13 ± 0.06
L307-4H	ND	ND	1.49 ± 0.22	1.47 ± 0.27	2.96 ± 0.49	0.97 ± 1.27	0.10 ± 0.06
L307-4I	ND	ND	1.42 ± 0.18	1.37 ± 0.29	2.79 ± 0.47	1.75 ± 1.59	0.08 ± 0.06
L307-4J	0.09 ± 0.09	ND	1.59 ± 0.33	2.01 ± 0.86	3.60 ± 1.19	ND	0.14 ± 0.09
L307-4K	ND	ND	3.85 ± 0.74	4.25 ± 0.99	8.10 ± 1.73	ND	1.44 ± 2.14
L307-4L	ND	ND	1.76 ± 0.22	1.98 ± 0.34	3.74 ± 0.56	1.15 ± 1.32	0.07 ± 0.06
L307-4M	ND	ND	1.78 ± 0.22	2.02 ± 0.41	3.80 ± 0.63	1.71 ± 1.54	0.17 ± 0.06
L307-4N	ND	ND	1.80 ± 0.26	2.00 ± 0.29	3.80 ± 0.55	1.73 ± 1.35	0.23 ± 0.06
L307-4O	ND	ND	1.74 ± 0.34	2.11 ± 0.43	3.85 ± 0.77	ND	0.14 ± 0.07

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-5A	0.05 ± 0.04	ND	1.16 ± 0.18	1.16 ± 0.29	2.32 ± 0.47	ND	0.09 ± 0.05
L307-5B	ND	ND	1.06 ± 0.14	1.12 ± 0.25	2.18 ± 0.39	ND	0.18 ± 0.07
L307-5C	ND	ND	1.12 ± 0.18	1.19 ± 0.18	2.31 ± 0.36	1.18 ± 1.01	0.10 ± 0.04
L307-5D	ND	ND	0.97 ± 0.11	1.37 ± 0.28	2.34 ± 0.39	1.15 ± 1.01	0.14 ± 0.07
L307-5E	ND	ND	1.27 ± 0.20	2.27 ± 0.44	3.54 ± 0.64	ND	0.13 ± 0.08
L307-5F	0.35 ± 0.09	ND	0.93 ± 0.34	1.78 ± 0.36	2.71 ± 0.70	ND	0.07 ± 0.06
L307-5G	ND	ND	1.70 ± 0.24	1.39 ± 0.31	3.09 ± 0.55	ND	0.15 ± 0.07
L307-5H	ND	ND	1.58 ± 0.34	1.58 ± 0.36	3.16 ± 0.70	ND	0.13 ± 0.06
L307-5I	ND	ND	1.27 ± 0.30	1.59 ± 0.39	2.86 ± 0.69	ND	0.23 ± 0.11
L307-5J	ND	ND	1.50 ± 0.34	1.50 ± 0.30	3.00 ± 0.64	1.16 ± 1.08	0.13 ± 0.07
L307-5K	0.06 ± 0.05	ND	1.36 ± 0.18	1.36 ± 0.31	2.72 ± 0.49	ND	0.14 ± 0.06
L307-5L	0.09 ± 0.04	ND	1.46 ± 0.19	1.59 ± 0.32	3.05 ± 0.51	ND	0.16 ± 0.07
L307-5M	0.08 ± 0.08	ND	1.63 ± 0.22	2.13 ± 0.43	3.76 ± 0.65	ND	ND
L307-5N	0.33 ± 0.09	ND	1.58 ± 0.25	1.46 ± 0.36	3.04 ± 0.61	0.68 ± 1.01	0.14 ± 0.08
L307-5O	0.09 ± 0.04	ND	2.14 ± 0.33	2.05 ± 0.39	4.19 ± 0.72	ND	0.20 ± 0.11

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-6A	0.11 ± 0.05	ND	1.26 ± 0.18	1.16 ± 0.24	2.42 ± 0.42	ND	0.10 ± 0.04
L307-6B	ND	ND	0.97 ± 0.13	1.03 ± 0.23	2.00 ± 0.36	0.69 ± 0.79	0.09 ± 0.04
L307-6C	0.10 ± 0.05	ND	1.38 ± 0.20	1.20 ± 0.26	2.58 ± 0.46	ND	0.16 ± 0.08
L307-6D	ND	ND	1.11 ± 0.15	1.13 ± 0.27	2.24 ± 0.42	0.93 ± 1.11	0.13 ± 0.08
L307-6E	ND	ND	1.30 ± 0.20	1.18 ± 0.29	2.48 ± 0.49	ND	0.11 ± 0.07
L307-6F	ND	ND	1.51 ± 0.32	1.50 ± 0.32	3.01 ± 0.64	ND	0.14 ± 0.07
L307-6G	ND	ND	1.62 ± 0.21	1.50 ± 0.32	3.12 ± 0.53	ND	0.11 ± 0.06
L307-6H	ND	ND	1.62 ± 0.21	2.24 ± 0.41	3.86 ± 0.62	2.07 ± 1.84	0.14 ± 0.08
L307-6I	ND	ND	1.95 ± 0.27	1.82 ± 0.31	3.77 ± 0.58	1.75 ± 1.47	0.15 ± 0.06
L307-6J	ND	ND	1.94 ± 0.26	1.92 ± 0.34	3.86 ± 0.60	1.20 ± 1.40	0.17 ± 0.07
L307-6K	ND	ND	1.73 ± 0.18	1.98 ± 0.32	3.71 ± 0.50	2.47 ± 1.97	0.17 ± 0.06
L307-6L	ND	ND	1.78 ± 0.22	1.66 ± 0.33	3.44 ± 0.55	2.16 ± 2.03	0.17 ± 0.07
L307-6M	ND	ND	2.02 ± 0.27	1.77 ± 0.35	3.79 ± 0.62	1.44 ± 1.47	0.14 ± 0.06
L307-6N	ND	ND	1.76 ± 0.32	1.51 ± 0.33	3.27 ± 0.65	0.49 ± 0.84	0.14 ± 0.09
L307-6O	ND	ND	1.81 ± 0.34	2.23 ± 0.38	4.04 ± 0.72	ND	0.20 ± 0.09

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-7A	ND	ND	1.06 ± 0.14	0.99 ± 0.26	2.05 ± 0.40	ND	0.11 ± 0.08
L307-7B	ND	ND	1.06 ± 0.14	1.16 ± 0.24	2.22 ± 0.38	ND	0.13 ± 0.06
L307-7C	ND	ND	1.70 ± 0.29	1.42 ± 0.35	3.12 ± 0.64	ND	0.11 ± 0.08
L307-7D	ND	ND	1.16 ± 0.20	2.12 ± 0.45	3.28 ± 0.65	ND	0.14 ± 0.10
L307-7E	0.08 ± 0.05	ND	1.27 ± 0.16	1.50 ± 0.27	2.77 ± 0.43	0.95 ± 0.98	0.15 ± 0.07
L307-7F	ND	ND	1.47 ± 0.19	1.96 ± 0.40	3.43 ± 0.59	0.45 ± 0.99	0.12 ± 0.06
L307-7G	0.20 ± 0.07	ND	1.75 ± 0.24	1.60 ± 0.30	3.35 ± 0.54	1.88 ± 1.63	0.13 ± 0.07
L307-7H	0.08 ± 0.07	ND	1.54 ± 0.32	1.55 ± 0.35	3.09 ± 0.67	ND	0.18 ± 0.08
L307-7I	0.13 ± 0.07	ND	1.62 ± 0.34	2.00 ± 0.48	3.62 ± 0.82	ND	0.19 ± 0.10
L307-7J	0.11 ± 0.05	ND	1.76 ± 0.24	1.48 ± 0.31	3.24 ± 0.55	ND	0.14 ± 0.09
L307-7K	0.07 ± 0.05	ND	1.62 ± 0.21	1.87 ± 0.35	3.49 ± 0.56	1.74 ± 1.50	0.15 ± 0.07
L307-7L	0.19 ± 0.07	ND	1.12 ± 0.17	1.76 ± 0.39	2.88 ± 0.56	ND	0.14 ± 0.09
L307-7M	0.14 ± 0.06	ND	1.30 ± 0.24	1.25 ± 0.24	2.55 ± 0.48	ND	0.15 ± 0.07
L307-7N	1.89 ± 0.20	0.31 ± 0.09	1.17 ± 0.15	1.41 ± 0.28	2.58 ± 0.43	ND	0.13 ± 0.09
L307-7O	1.68 ± 0.20	0.35 ± 0.09	1.22 ± 0.16	1.50 ± 0.33	2.72 ± 0.49	ND	0.14 ± 0.06

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (µCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-8A	0.13 ± 0.05	ND	0.89 ± 0.15	0.78 ± 0.21	1.67 ± 0.36	ND	0.06 ± 0.04
L307-8B	0.06 ± 0.04	ND	1.14 ± 0.15	1.32 ± 0.25	2.46 ± 0.40	0.97 ± 0.96	0.10 ± 0.07
L307-9A	ND	ND	0.81 ± 0.11	0.95 ± 0.23	1.76 ± 0.34	ND	0.12 ± 0.06
L307-9B	ND	ND	1.09 ± 0.24	1.28 ± 0.25	2.37 ± 0.49	ND	0.13 ± 0.07
L307-9C	ND	ND	1.48 ± 0.25	1.75 ± 0.35	3.23 ± 0.60	0.15 ± 1.02	ND
L307-9D	ND	ND	1.34 ± 0.19	1.14 ± 0.24	2.48 ± 0.43	0.63 ± 0.70	0.14 ± 0.06
L307-9E	ND	ND	1.02 ± 0.18	1.61 ± 0.43	2.63 ± 0.61	1.04 ± 1.47	ND
L307-9F	ND	ND	1.33 ± 0.17	1.48 ± 0.32	2.81 ± 0.49	0.53 ± 0.79	0.19 ± 0.06
L307-9G	ND	ND	1.26 ± 0.17	1.86 ± 0.37	3.12 ± 0.54	ND	0.14 ± 0.08
L307-9H	0.05 ± 0.04	ND	1.49 ± 0.29	1.28 ± 0.35	2.77 ± 0.64	ND	0.16 ± 0.07
L307-9I	0.08 ± 0.11	ND	1.49 ± 0.34	2.00 ± 0.40	3.49 ± 0.74	ND	0.15 ± 0.07
L307-9J	0.05 ± 0.06	ND	1.36 ± 0.24	1.17 ± 0.26	2.53 ± 0.50	1.12 ± 1.22	0.18 ± 0.07
L307-9K	0.16 ± 0.06	ND	1.41 ± 0.18	1.69 ± 0.33	3.10 ± 0.51	ND	0.16 ± 0.08
L307-9L	0.11 ± 0.06	ND	1.56 ± 0.21	1.67 ± 0.35	3.23 ± 0.56	1.37 ± 1.61	0.12 ± 0.10
L307-9M	ND	ND	1.24 ± 0.36	1.37 ± 0.36	2.61 ± 0.72	ND	ND

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-9N	0.07 ± 0.04	0.07 ± 0.05	1.58 ± 0.20	1.78 ± 0.32	3.36 ± 0.52	0.61 ± 0.82	0.09 ± 0.07
L307-9O	ND	ND	1.14 ± 0.18	1.94 ± 0.37	3.08 ± 0.55	ND	0.19 ± 0.07
L307-10A	0.14 ± 0.03	ND	1.23 ± 0.20	1.25 ± 0.17	2.48 ± 0.37	0.56 ± 0.44	0.12 ± 0.04
L307-10B	0.07 ± 0.04	ND	1.14 ± 0.15	1.12 ± 0.23	2.26 ± 0.38	0.99 ± 1.04	0.07 ± 0.07
L307-11A	Unable to collect sample						
L307-11B	0.15 ± 0.05	ND	0.96 ± 0.13	1.11 ± 0.28	2.07 ± 0.41	0.58 ± 0.69	0.13 ± 0.06
L307-12A	0.10 ± 0.04	ND	1.22 ± 0.25	1.16 ± 0.25	2.38 ± 0.50	1.41 ± 1.23	0.13 ± 0.07
L307-12B	0.07 ± 0.05	ND	1.31 ± 0.17	1.34 ± 0.28	2.65 ± 0.45	ND	0.12 ± 0.07
L307-12C	ND	ND	1.12 ± 0.26	1.33 ± 0.30	2.45 ± 0.56	1.02 ± 1.23	0.15 ± 0.08
L307-12D	0.02 ± 0.02	ND	1.08 ± 0.17	1.30 ± 0.30	2.38 ± 0.47	ND	0.10 ± 0.06
L307-12E	ND	ND	0.97 ± 0.16	1.12 ± 0.29	2.09 ± 0.45	ND	0.05 ± 0.05
L307-12F	Unable to collect sample						
L307-12G	ND	ND	2.41 ± 0.60	2.83 ± 0.71	5.24 ± 1.31	ND	ND

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-12H	ND	ND	1.17 ± 0.18	1.19 ± 0.31	2.36 ± 0.49	ND	0.12 ± 0.06
L307-12I	ND	ND	1.68 ± 0.28	1.83 ± 0.37	3.51 ± 0.65	2.34 ± 2.09	0.16 ± 0.04
L307-12J	0.04 ± 0.04	0.22 ± 0.08	3.68 ± 0.74	7.62 ± 1.65	11.30 ± 2.39	0.35 ± 0.94	0.43 ± 0.08
L307-12K	ND	0.48 ± 0.18	3.09 ± 0.52	3.82 ± 0.81	6.91 ± 1.33	1.60 ± 2.14	0.43 ± 0.26
L307-12L	Unable to collect sample						
L307-12M	Unable to collect sample						
L307-12N	Unable to collect sample						
L307-12O	Unable to collect sample						
L307-13A	0.08 ± 0.04	ND	0.83 ± 0.20	1.06 ± 0.24	1.89 ± 0.44	ND	0.09 ± 0.05
L307-13B	0.40 ± 0.07	ND	0.90 ± 0.16	0.94 ± 0.21	1.84 ± 0.37	0.73 ± 0.80	0.10 ± 0.05
L307-13C	0.24 ± 0.11	ND	1.18 ± 0.23	1.28 ± 0.31	2.46 ± 0.54	ND	0.09 ± 0.08
L307-13D	0.13 ± 0.06	ND	1.17 ± 0.23	1.04 ± 0.23	2.21 ± 0.49	0.57 ± 1.09	0.12 ± 0.06
L307-13E	0.04 ± 0.04	ND	1.37 ± 0.29	1.43 ± 0.29	2.80 ± 0.58	ND	0.12 ± 0.09
L307-13F	ND	ND	1.44 ± 0.18	1.46 ± 0.31	2.90 ± 0.49	ND	0.21 ± 0.08
L307-13G	0.09 ± 0.05	ND	1.04 ± 0.14	1.34 ± 0.36	2.38 ± 0.50	ND	0.07 ± 0.06

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-13H	ND	ND	1.23 ± 0.19	1.79 ± 0.41	3.02 ± 0.60	0.83 ± 1.15	0.11 ± 0.07
L307-13I	ND	ND	1.75 ± 0.22	1.98 ± 0.36	3.73 ± 0.58	1.21 ± 1.25	0.18 ± 0.07
L307-13J	ND	ND	1.37 ± 0.23	2.24 ± 0.48	3.61 ± 0.71	ND	0.13 ± 0.11
L307-13K	ND	ND	1.68 ± 0.30	1.98 ± 0.35	3.66 ± 0.65	2.16 ± 1.84	0.17 ± 0.07
L307-13L	ND	ND	2.11 ± 0.29	2.01 ± 0.37	4.12 ± 0.66	1.79 ± 1.70	0.27 ± 0.11
L307-13M	ND	ND	1.43 ± 0.24	2.34 ± 0.50	3.77 ± 0.74	ND	0.14 ± 0.12
L307-13N	ND	ND	1.77 ± 0.19	1.76 ± 0.33	3.53 ± 0.52	1.46 ± 1.44	0.13 ± 0.07
L307-13O	ND	ND	2.05 ± 0.30	2.00 ± 0.41	4.05 ± 0.71	ND	0.12 ± 0.10
L307- 14A	0.12 ± 0.05	ND	1.00 ± 0.16	1.05 ± 0.27	2.05 ± 0.43	1.41 ± 1.33	0.06 ± 0.07
L307-14B	0.28 ± 0.06	ND	0.64 ± 0.09	0.60 ± 0.18	1.24 ± 0.27	ND	0.08 ± 0.07
L307-14C	ND	ND	1.60 ± 0.36	1.58 ± 0.40	3.18 ± 0.76	0.66 ± 0.93	0.17 ± 0.09
L307-14D	ND	ND	1.65 ± 0.35	2.25 ± 0.47	3.90 ± 0.82	1.14 ± 1.36	0.12 ± 0.07
L307-14E	Unable to collect sample						
L307-14F	ND	ND	1.05 ± 0.17	1.38 ± 0.32	2.43 ± 0.49	0.47 ± 0.64	ND
L307-14G	ND	ND	1.08 ± 0.19	0.94 ± 0.25	2.02 ± 0.44	ND	0.05 ± 0.04

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-14H	ND	ND	0.86 ± 0.18	1.35 ± 0.40	2.21 ± 0.58	ND	ND
L307-14I	ND	ND	0.93 ± 0.23	1.12 ± 0.25	2.05 ± 0.48	0.52 ± 0.89	0.12 ± 0.05
L307-14J	ND	ND	1.05 ± 0.17	1.41 ± 0.35	2.46 ± 0.52	0.45 ± 0.77	0.13 ± 0.07
L307-14K	ND	ND	0.63 ± 0.21	1.04 ± 0.22	1.67 ± 0.43	ND	0.06 ± 0.03
L307-14L	ND	ND	1.34 ± 0.32	1.67 ± 0.40	3.01 ± 0.72	1.04 ± 1.26	0.12 ± 0.08
L307-14M	ND	ND	1.80 ± 0.33	1.87 ± 0.47	3.67 ± 0.80	ND	0.10 ± 0.08
L307-14N	ND	ND	0.70 ± 0.25	1.40 ± 0.30	2.10 ± 0.55	ND	0.06 ± 0.03
L307-14O	ND	ND	0.82 ± 0.28	1.20 ± 0.25	2.02 ± 0.53	ND	0.05 ± 0.03
L307-15A	0.11 ± 0.06	ND	0.92 ± 0.12	1.00 ± 0.26	1.92 ± 0.38	ND	0.08 ± 0.05
L307-15B	0.09 ± 0.06	ND	0.97 ± 0.09	0.76 ± 0.19	1.73 ± 0.28	0.50 ± 0.65	0.08 ± 0.05
L307-16A	0.09 ± 0.05	ND	1.50 ± 0.31	1.65 ± 0.37	3.15 ± 0.68	1.83 ± 1.64	0.12 ± 0.05
L307-16B	0.53 ± 0.10	ND	1.72 ± 0.30	1.73 ± 0.37	3.45 ± 0.67	ND	0.14 ± 0.07
L307-16C	0.21 ± 0.07	ND	1.53 ± 0.34	1.58 ± 0.34	3.11 ± 0.68	ND	0.16 ± 0.08
L307-16D	0.11 ± 0.06	ND	1.61 ± 0.26	2.34 ± 0.52	3.95 ± 0.78	ND	0.14 ± 0.07

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (μCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-16E	0.08 ± 0.09	ND	1.47 ± 0.24	1.85 ± 0.44	3.32 ± 0.68	ND	0.10 ± 0.08
L307-16F	0.12 ± 0.10	ND	1.85 ± 0.35	1.82 ± 0.46	3.67 ± 0.81	1.78 ± 1.86	0.15 ± 0.10
L307-16G	0.09 ± 0.05	ND	1.52 ± 0.24	1.42 ± 0.34	2.94 ± 0.58	1.06 ± 0.83	0.12 ± 0.08
L307-16H	0.03 ± 0.07	ND	1.49 ± 0.34	1.80 ± 0.39	3.29 ± 0.73	0.66 ± 0.89	0.11 ± 0.06
L307-16I	ND	ND	1.63 ± 0.26	2.25 ± 0.46	3.88 ± 0.72	ND	0.11 ± 0.11
L307-16J	1.44 ± 0.21	ND	1.46 ± 0.23	1.53 ± 0.34	2.99 ± 0.57	1.26 ± 1.40	0.16 ± 0.10
L307-16K	2.44 ± 0.36	ND	1.69 ± 0.28	2.38 ± 0.54	4.07 ± 0.82	0.54 ± 1.24	0.16 ± 0.09
L307-16L	1.30 ± 0.21	ND	1.61 ± 0.31	2.10 ± 0.53	3.71 ± 0.84	0.96 ± 1.58	0.14 ± 0.09
L307-16M	0.77 ± 0.13	ND	1.41 ± 0.50	1.44 ± 0.34	2.85 ± 0.84	1.16 ± 1.27	0.19 ± 0.09
L307-16N	0.33 ± 0.08	ND	1.18 ± 0.21	2.09 ± 0.48	3.27 ± 0.69	1.85 ± 1.75	0.12 ± 0.07
L307-16O	0.23 ± 0.09	ND	1.74 ± 0.32	1.90 ± 0.49	3.64 ± 0.81	0.78 ± 1.20	0.11 ± 0.09
L307-17A	ND	ND	0.86 ± 0.12	1.08 ± 0.23	1.94 ± 0.35	ND	0.07 ± 0.07
L307-17B	ND	ND	1.06 ± 0.22	1.22 ± 0.32	2.28 ± 0.54	ND	0.07 ± 0.08
L307-17C	ND	ND	1.53 ± 0.25	1.88 ± 0.44	3.41 ± 0.69	ND	0.10 ± 0.11
L307-17D	ND	ND	1.36 ± 0.18	1.54 ± 0.32	2.90 ± 0.50	1.69 ± 1.59	ND

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (μCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-17E	ND	ND	0.74 ± 0.14	1.18 ± 0.31	1.92 ± 0.45	0.35 ± 0.68	0.18 ± 0.09
L307-17F	ND	ND	1.09 ± 0.21	1.41 ± 0.31	2.50 ± 0.52	ND	0.06 ± 0.07
L307-17G	ND	ND	1.20 ± 0.20	1.52 ± 0.37	2.72 ± 0.57	0.81 ± 1.00	0.10 ± 0.07
L307-17H	ND	ND	0.94 ± 0.12	1.10 ± 0.24	2.04 ± 0.36	ND	0.07 ± 0.04
L307-17I	ND	ND	1.12 ± 0.14	1.38 ± 0.27	2.50 ± 0.41	ND	0.14 ± 0.08
L307-17J	ND	ND	1.52 ± 0.20	1.58 ± 0.31	3.10 ± 0.51	ND	0.07 ± 0.08
L307-17K	ND	0.12 ± 0.06	1.49 ± 0.23	1.70 ± 0.37	3.19 ± 0.60	1.11 ± 1.32	0.13 ± 0.08
L307-17L	ND	0.41 ± 0.11	1.77 ± 0.29	1.65 ± 0.34	3.42 ± 0.63	ND	0.15 ± 0.08
L307-17M	ND	0.50 ± 0.14	1.98 ± 0.26	2.35 ± 0.49	4.33 ± 0.75	ND	ND
L307-17N	ND	0.38 ± 0.11	1.87 ± 0.23	1.78 ± 0.36	3.65 ± 0.59	ND	0.14 ± 0.07
L307-17O	ND	0.16 ± 0.13	1.72 ± 0.23	2.26 ± 0.43	3.98 ± 0.66	ND	ND
L307-18A	ND	ND	1.12 ± 0.26	1.27 ± 0.30	2.39 ± 0.56	0.97 ± 0.88	0.10 ± 0.06
L307-18B	ND	ND	1.26 ± 0.20	1.34 ± 0.30	2.60 ± 0.50	ND	0.09 ± 0.06
L307-18C	ND	ND	1.04 ± 0.22	1.78 ± 0.37	2.82 ± 0.59	1.29 ± 1.49	0.14 ± 0.11
L307-18D	ND	ND	1.45 ± 0.25	1.46 ± 0.34	2.91 ± 0.59	0.78 ± 1.11	0.10 ± 0.06

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-18E	ND	ND	1.16 ± 0.23	1.86 ± 0.42	3.02 ± 0.65	1.49 ± 1.51	0.08 ± 0.10
L307-18F	ND	ND	1.43 ± 0.26	1.59 ± 0.40	3.02 ± 0.66	0.96 ± 1.53	0.19 ± 0.12
L307-18G	ND	ND	1.35 ± 0.40	1.77 ± 0.45	3.12 ± 0.85	ND	0.12 ± 0.08
L307-18H	ND	ND	1.45 ± 0.36	1.58 ± 0.36	3.03 ± 0.72	1.04 ± 1.27	0.23 ± 0.10
L307-18I	ND	ND	1.45 ± 0.32	1.68 ± 0.34	3.13 ± 0.66	0.53 ± 0.74	0.14 ± 0.07
L307-18J	Unable to collect sample						
L307-18K	Unable to collect sample						
L307-18L	Unable to collect sample						
L307-18M	Unable to collect sample						
L307-18N	Unable to collect sample						
L307-18O	Unable to collect sample						
L307-19A	ND	ND	1.31 ± 0.25	1.53 ± 0.41	2.84 ± 0.66	ND	0.11 ± 0.12
L307-19B	0.12 ± 0.08	ND	0.83 ± 0.16	1.66 ± 0.44	2.49 ± 0.60	ND	0.14 ± 0.07
L307-19C	0.03 ± 0.03	ND	0.68 ± 0.12	0.86 ± 0.24	1.54 ± 0.36	0.30 ± 0.58	0.06 ± 0.05
L307-19D	ND	ND	0.85 ± 0.18	0.82 ± 0.24	1.67 ± 0.42	ND	0.19 ± 0.05

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-19E	0.03 ± 0.05	ND	0.53 ± 0.12	0.93 ± 0.24	1.46 ± 0.36	ND	ND
L307-19F	ND	ND	1.07 ± 0.17	1.20 ± 0.27	2.27 ± 0.44	ND	0.09 ± 0.05
L307-19G	0.01 ± 0.04	ND	1.30 ± 0.24	1.43 ± 0.34	2.73 ± 0.58	ND	ND
L307-19H	ND	ND	1.32 ± 0.25	1.41 ± 0.37	2.73 ± 0.62	ND	0.06 ± 0.07
L307-19I	ND	ND	1.29 ± 0.27	1.37 ± 0.32	2.66 ± 0.59	0.99 ± 0.79	0.10 ± 0.06
L307-19J	ND	ND	1.53 ± 0.25	1.41 ± 0.31	2.94 ± 0.56	ND	0.11 ± 0.07
L307-19K	ND	ND	1.27 ± 0.62	1.58 ± 0.36	2.85 ± 0.98	ND	0.11 ± 0.07
L307-19L	ND	ND	1.12 ± 0.18	1.42 ± 0.32	2.54 ± 0.50	1.16 ± 1.27	0.08 ± 0.06
L307-19M	ND	ND	1.34 ± 0.21	1.38 ± 0.32	2.72 ± 0.53	ND	0.20 ± 0.07
L307-19N	ND	ND	1.51 ± 0.24	1.59 ± 0.37	3.10 ± 0.61	0.73 ± 1.02	0.14 ± 0.08
L307-19O	ND	ND	1.54 ± 0.35	1.74 ± 0.40	3.28 ± 0.75	ND	0.16 ± 0.10
L307-20A	ND	ND	0.98 ± 0.25	1.08 ± 0.28	2.06 ± 0.53	ND	0.11 ± 0.06
L307-20B	ND	ND	1.01 ± 0.26	1.11 ± 0.29	2.12 ± 0.55	ND	0.11 ± 0.06
L307-20C	ND	ND	1.21 ± 0.24	2.32 ± 0.51	3.53 ± 0.75	0.89 ± 1.13	0.11 ± 0.09
L307-20D	0.02 ± 0.04	ND	1.20 ± 0.22	1.13 ± 0.31	2.33 ± 0.53	ND	0.13 ± 0.06

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-20E	0.11 ± 0.05	ND	1.18 ± 0.26	1.28 ± 0.26	2.46 ± 0.52	1.54 ± 1.60	0.07 ± 0.06
L307-20F	ND	ND	1.26 ± 0.20	1.45 ± 0.33	2.71 ± 0.53	ND	0.13 ± 0.06
L307-20G	ND	ND	1.58 ± 0.25	2.10 ± 0.46	3.68 ± 0.71	2.37 ± 2.11	0.26 ± 0.11
L307-20H	Unable to collect sample						
L307-20I	ND	0.04 ± 0.04	1.93 ± 0.31	1.66 ± 0.44	3.59 ± 0.75	ND	0.16 ± 0.07
L307-20J	ND	ND	1.53 ± 0.24	1.32 ± 0.32	2.85 ± 0.56	ND	0.12 ± 0.09
L307-20K	ND	ND	1.69 ± 0.30	1.50 ± 0.37	3.19 ± 0.67	ND	0.20 ± 0.08
L307-20L	ND	ND	1.61 ± 0.26	2.19 ± 0.44	3.80 ± 0.70	2.04 ± 1.97	0.14 ± 0.09
L307-20M	Unable to collect sample						
L307-20N	Unable to collect sample						
L307-20O	Unable to collect sample						
L307-21A	ND	ND	0.91 ± 0.16	1.18 ± 0.31	2.09 ± 0.47	ND	0.10 ± 0.09
L307-21B	ND	ND	0.56 ± 0.15	1.44 ± 0.43	2.00 ± 0.58	ND	ND
L307-21C	0.02 ± 0.04	ND	0.97 ± 0.19	1.68 ± 0.37	2.65 ± 0.56	ND	0.15 ± 0.09
L307-21D	ND	ND	0.55 ± 0.16	1.18 ± 0.34	1.73 ± 0.50	ND	ND

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-21E	ND	ND	1.07 ± 0.25	1.10 ± 0.26	2.17 ± 0.51	0.33 ± 0.87	ND
L307-21F	ND	ND	1.35 ± 0.24	1.48 ± 0.37	2.83 ± 0.61	ND	0.13 ± 0.08
L307-21G	ND	ND	1.08 ± 0.18	1.77 ± 0.39	2.85 ± 0.57	ND	0.04 ± 0.07
L307-21H	ND	ND	0.98 ± 0.21	1.27 ± 0.38	2.25 ± 0.59	ND	0.09 ± 0.07
L307-21I	ND	ND	1.11 ± 0.12	1.36 ± 0.25	2.47 ± 0.37	1.27 ± 1.18	0.08 ± 0.06
L307-21J	ND	ND	1.15 ± 0.28	1.34 ± 0.34	2.49 ± 0.28	ND	0.15 ± 0.09
L307-21K	ND	ND	1.18 ± 0.20	1.59 ± 0.40	2.77 ± 0.60	ND	0.09 ± 0.08
L307-21L	ND	ND	1.40 ± 0.22	1.66 ± 0.40	3.06 ± 0.62	2.41 ± 2.11	0.13 ± 0.07
L307-21M	ND	ND	1.86 ± 0.32	1.74 ± 0.41	3.60 ± 0.73	ND	0.09 ± 0.08
L307-21N	Unable to collect sample						
L307-21O	ND	ND	1.56 ± 0.28	ND	1.56 ± 0.28	ND	ND
L307-22A	ND	ND	0.92 ± 0.25	0.96 ± 0.29	1.88 ± 0.54	0.90 ± 1.08	0.10 ± 0.05
L307-22B	ND	ND	1.66 ± 0.29	1.45 ± 0.32	3.11 ± 0.61	ND	0.17 ± 0.08
L307-22C	0.11 ± 0.06	ND	1.33 ± 0.23	1.56 ± 0.37	2.89 ± 0.60	ND	0.09 ± 0.09
L307-22D	0.19 ± 0.06	ND	1.08 ± 0.26	1.13 ± 0.28	2.21 ± 0.54	ND	0.09 ± 0.06

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-22E	0.23 ± 0.07	ND	1.04 ± 0.18	1.02 ± 0.25	2.06 ± 0.43	1.43 ± 1.36	0.14 ± 0.05
L307-22F	0.04 ± 0.06	ND	1.24 ± 0.23	1.81 ± 0.43	3.05 ± 0.66	ND	0.16 ± 0.12
L307-22G	Unable to collect sample						
L307-22H	Unable to collect sample						
L307-22I	Unable to collect sample						
L307-22J	Unable to collect sample						
L307-22K	ND	ND	1.71 ± 0.30	1.65 ± 0.36	3.36 ± 0.66	1.93 ± 1.87	0.15 ± 0.07
L307-22L	ND	ND	1.98 ± 0.33	1.80 ± 0.37	3.78 ± 0.70	ND	0.16 ± 0.04
L307-22M	ND	ND	1.68 ± 0.26	1.85 ± 0.42	3.53 ± 0.68	2.65 ± 2.31	0.10 ± 0.06
L307-22N	ND	ND	1.56 ± 0.31	1.68 ± 0.35	3.24 ± 0.66	1.31 ± 1.42	0.15 ± 0.09
L307-22O	ND	ND	1.66 ± 0.39	1.93 ± 0.40	3.59 ± 0.79	2.40 ± 2.00	0.12 ± 0.08
L307-23A	ND	ND	0.96 ± 0.26	1.20 ± 0.32	2.16 ± 0.58	0.87 ± 1.27	0.08 ± 0.06
L307-23B	ND	ND	1.80 ± 0.30	1.65 ± 0.35	3.45 ± 0.65	0.17 ± 0.82	0.18 ± 0.08
L307-23C	0.06 ± 0.07	ND	2.21 ± 0.40	2.21 ± 0.47	4.42 ± 0.87	1.33 ± 1.65	0.15 ± 0.10
L307-23D	ND	ND	1.60 ± 0.29	2.38 ± 0.64	3.98 ± 0.93	0.69 ± 1.12	0.13 ± 0.14

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	^(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-23E	0.05 ± 0.04	ND	1.69 ± 0.26	1.96 ± 0.41	3.65 ± 0.67	1.91 ± 1.80	0.13 ± 0.07
L307-23F	ND	ND	1.76 ± 0.27	1.64 ± 0.40	3.40 ± 0.67	1.02 ± 1.06	0.18 ± 0.08
L307-23G	0.06 ± 0.06	ND	1.50 ± 0.36	1.47 ± 0.37	2.97 ± 0.73	ND	0.11 ± 0.12
L307-23H	ND	ND	1.18 ± 0.26	1.24 ± 0.29	2.42 ± 0.55	ND	0.16 ± 0.08
L307-23I	ND	ND	0.79 ± 0.16	1.54 ± 0.43	2.33 ± 0.59	0.08 ± 0.71	0.21 ± 0.11
L307-23J	ND	ND	1.03 ± 0.17	1.17 ± 0.28	2.20 ± 0.45	ND	0.12 ± 0.07
L307-23K	ND	ND	1.65 ± 0.28	1.76 ± 0.36	3.41 ± 0.64	0.82 ± 1.00	0.19 ± 0.08
L307-23L	ND	ND	2.04 ± 0.35	2.04 ± 0.50	4.08 ± 0.85	1.71 ± 1.78	0.16 ± 0.09
L307-23M	ND	ND	1.44 ± 0.26	2.42 ± 0.51	3.86 ± 0.77	1.49 ± 1.69	0.09 ± 0.07
L307-23N	ND	ND	1.34 ± 0.21	1.62 ± 0.35	2.96 ± 0.56	0.56 ± 0.74	0.11 ± 0.08
L307-23O	ND	ND	1.77 ± 0.40	2.48 ± 0.55	4.25 ± 0.95	1.77 ± 1.79	ND
L307-24A	Unable to collect sample						
L307-24B	ND	ND	1.52 ± 0.32	1.71 ± 0.44	3.23 ± 0.76	ND	ND
L307-24C	ND	ND	1.74 ± 0.28	2.50 ± 0.55	4.24 ± 0.83	ND	0.20 ± 0.10
L307-24D	ND	ND	1.30 ± 0.30	1.42 ± 0.34	2.72 ± 0.64	0.91 ± 1.18	0.08 ± 0.07

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-24E	0.02 ± 0.06	ND	1.70 ± 0.32	1.91 ± 0.50	3.61 ± 0.82	ND	ND
L307-24F	ND	ND	1.41 ± 0.23	1.78 ± 0.44	3.19 ± 0.67	ND	0.13 ± 0.09
L307-24G	ND	ND	1.36 ± 0.31	1.48 ± 0.33	2.84 ± 0.64	0.75 ± 0.82	0.14 ± 0.06
L307-24H	ND	ND	1.73 ± 0.30	1.63 ± 0.34	3.36 ± 0.64	1.14 ± 1.29	0.18 ± 0.07
L307-24I	ND	ND	1.79 ± 0.31	1.91 ± 0.45	3.70 ± 0.76	ND	0.15 ± 0.08
L307-24J	ND	ND	1.49 ± 0.33	1.51 ± 0.32	3.00 ± 0.65	0.75 ± 0.89	0.13 ± 0.06
L307-24K	ND	ND	1.52 ± 0.23	1.46 ± 0.35	2.98 ± 0.58	0.87 ± 1.11	0.13 ± 0.07
L307-24L	ND	ND	1.59 ± 0.25	1.88 ± 0.43	3.47 ± 0.68	ND	0.18 ± 0.08
L307-24M	ND	ND	1.68 ± 0.35	2.14 ± 0.45	3.82 ± 0.80	2.25 ± 1.98	0.15 ± 0.12
L307-24N	ND	ND	1.55 ± 0.32	1.46 ± 0.35	3.01 ± 0.67	0.81 ± 1.15	0.14 ± 0.07
L307-24O	0.04 ± 0.08	ND	2.86 ± 0.45	3.85 ± 0.58	6.71 ± 1.03	2.06 ± 1.77	0.25 ± 0.09
L307-25A	ND	ND	1.52 ± 0.24	1.56 ± 0.31	3.08 ± 0.55	2.09 ± 2.04	0.13 ± 0.09
L307-25B	ND	ND	1.17 ± 0.19	1.56 ± 0.32	2.73 ± 0.51	0.53 ± 1.07	0.14 ± 0.07
L307-25C	ND	ND	1.76 ± 0.32	1.72 ± 0.39	3.48 ± 0.71	0.84 ± 1.12	ND
L307-25D	0.02 ± 0.04	ND	1.07 ± 0.26	1.28 ± 0.30	2.35 ± 0.56	ND	0.12 ± 0.06

Table 4: Gamma Spectroscopy <i>Phase I and II</i> Results of Soil Samples Collected From the L-307 Waste Tank Pit Site							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-25E	ND	ND	0.70 ± 0.17	0.93 ± 0.32	1.63 ± 0.49	ND	0.12 ± 0.09
L307-25F	ND	ND	1.47 ± 0.23	1.51 ± 0.32	2.98 ± 0.55	1.60 ± 1.52	0.13 ± 0.07
L307-25G	ND	ND	1.78 ± 0.28	1.89 ± 0.42	3.67 ± 0.70	1.88 ± 1.78	0.25 ± 0.10
L307-25H	ND	ND	1.62 ± 0.26	2.07 ± 0.46	3.69 ± 0.72	ND	0.17 ± 0.12
L307-25I	ND	ND	1.74 ± 0.27	1.90 ± 0.48	3.64 ± 0.75	1.56 ± 1.36	0.18 ± 0.08
L307-25J	Unable to collect sample						
L307-25K	ND	ND	1.64 ± 0.25	1.73 ± 0.35	3.37 ± 0.60	1.79 ± 1.68	0.16 ± 0.07
L307-25L	ND	ND	1.57 ± 0.29	1.78 ± 0.48	3.35 ± 0.77	ND	ND
L307-25M	0.02 ± 0.04	ND	1.04 ± 0.20	2.25 ± 0.50	3.29 ± 0.70	0.75 ± 1.17	0.17 ± 0.08
L307-25N	Unable to collect sample						
L307-25O	ND	ND	1.49 ± 0.34	1.59 ± 0.38	3.08 ± 0.72	ND	0.15 ± 0.07
L307-26A	0.20 ± 0.15	ND	1.31 ± 0.30	2.31 ± 0.58	3.62 ± 0.88	ND	0.31 ± 0.19
L307-26B	ND	ND	1.07 ± 0.17	1.09 ± 0.31	2.16 ± 0.48	0.85 ± 0.87	0.08 ± 0.06
L307-26C	ND	ND	2.82 ± 0.72	2.77 ± 0.77	5.59 ± 1.49	0.34 ± 1.23	0.28 ± 0.17
L307-26D	ND	ND	1.04 ± 0.19	1.07 ± 0.27	2.11 ± 0.46	0.67 ± 0.78	0.10 ± 0.07

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (μCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-26E	ND	ND	1.45 ± 0.29	1.53 ± 0.43	2.98 ± 0.29	ND	ND
L307-26F	ND	ND	1.70 ± 0.45	1.90 ± 0.53	3.60 ± 0.98	ND	0.15 ± 0.14
L307-26G	ND	ND	1.07 ± 0.17	1.41 ± 0.31	2.48 ± 0.48	ND	0.09 ± 0.05
L307-26H	ND	ND	1.73 ± 0.34	1.59 ± 0.53	3.32 ± 0.87	ND	0.14 ± 0.08
L307-26I	ND	ND	1.31 ± 0.31	1.75 ± 0.41	3.06 ± 0.72	ND	ND
L307-26J	ND	ND	1.26 ± 0.20	1.32 ± 0.35	2.58 ± 0.55	1.27 ± 1.36	0.10 ± 0.11
L307-26K	Unable to collect sample						
L307-26L	ND	ND	1.70 ± 0.26	1.79 ± 0.40	3.49 ± 0.66	2.00 ± 1.70	0.12 ± 0.08
L307-26M	ND	ND	1.82 ± 0.37	2.39 ± 0.46	4.21 ± 0.83	ND	0.23 ± 0.12
L307-26N	ND	ND	2.08 ± 0.35	1.89 ± 0.49	3.97 ± 0.84	0.91 ± 1.02	0.12 ± 0.08
L307-26O	ND	ND	1.58 ± 0.25	2.47 ± 0.46	4.05 ± 0.71	ND	ND
L307-27A	Unable to collect sample						
L307-27B	Unable to collect sample						
L307-27C	ND	ND	0.90 ± 0.24	1.22 ± 0.38	2.12 ± 0.62	ND	ND
L307-27D	ND	ND	1.49 ± 0.27	1.69 ± 0.41	3.18 ± 0.68	ND	0.16 ± 0.05

Table 4: Gamma Spectroscopy *Phase I and II* Results of Soil Samples Collected From the L-307 Waste Tank Pit Site

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-27E	ND	ND	1.38 ± 0.22	1.64 ± 0.46	3.02 ± 0.68	0.54 ± 1.23	0.20 ± 0.11
L307-27F	ND	ND	0.87 ± 0.21	0.97 ± 0.23	1.84 ± 0.44	0.73 ± 0.85	0.10 ± 0.05
L307-27G	ND	ND	1.18 ± 0.28	1.34 ± 0.30	2.52 ± 0.58	ND	0.09 ± 0.05
L307-27H	ND	ND	1.39 ± 0.22	1.70 ± 0.40	3.09 ± 0.62	ND	0.15 ± 0.09
L307-27I	ND	ND	0.81 ± 0.16	0.94 ± 0.23	1.75 ± 0.39	0.95 ± 0.97	0.07 ± 0.06
L307-27J	ND	ND	1.39 ± 0.26	1.75 ± 0.42	3.14 ± 0.68	1.10 ± 1.25	ND
L307-27K	ND	ND	1.21 ± 0.25	1.28 ± 0.29	2.49 ± 0.54	1.53 ± 1.44	0.09 ± 0.06
L307-27L	ND	ND	1.60 ± 0.29	1.96 ± 0.46	3.56 ± 0.75	ND	0.13 ± 0.10
L307-27M	ND	ND	1.75 ± 0.29	1.85 ± 0.39	3.60 ± 0.68	ND	0.10 ± 0.06
L307-27N	Unable to collect sample						
L307-27O	Unable to collect sample						

Notes: 1. ND means not detected.

2. Average Minimum Detectable Activities (MDAs):

U-238 = 1.58 pCi/g (63 keV peak)

U-235 = 0.14 pCi/g (186 keV peak)

Cs-137 = 0.13 pCi/g (662 keV peak)

Co-60 = 0.16 pCi/g (1173 keV peak)

Th-228 = 0.21 pCi/g (238 keV peak)

Th-232 = 0.43 pCi/g (911 keV peak)

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-28J	ND	ND	1.67 ± 0.25	1.66 ± 0.37	3.33 ± 0.62	ND	0.10 ± 0.06
L307-28K	ND	ND	1.66 ± 0.25	2.01 ± 0.41	3.67 ± 0.66	0.88 ± 1.32	0.16 ± 0.08
L307-28L	ND	ND	1.81 ± 0.41	2.09 ± 0.41	3.90 ± 0.82	ND	0.15 ± 0.08
L307-28M	ND	ND	0.72 ± 0.26	1.43 ± 0.28	2.15 ± 0.54	ND	0.08 ± 0.04
L307-28N	ND	ND	2.19 ± 0.37	1.81 ± 0.36	4.00 ± 0.73	ND	0.08 ± 0.07
L307-28O	ND	ND	1.95 ± 0.31	2.03 ± 0.44	3.98 ± 0.75	1.09 ± 1.40	0.12 ± 0.08
L307-28P	ND	ND	2.13 ± 0.33	1.99 ± 0.41	4.12 ± 0.74	2.13 ± 1.60	0.17 ± 0.08
L307-28Q	ND	ND	2.07 ± 0.35	2.47 ± 0.57	4.54 ± 0.92	ND	0.19 ± 0.11
L307-28R	ND	ND	1.90 ± 0.32	2.42 ± 0.51	4.32 ± 0.32	ND	ND
L307-28S	ND	ND	1.97 ± 0.33	1.65 ± 0.34	3.62 ± 0.67	ND	0.16 ± 0.06
Phase III							
L307-29J	0.49 ± 0.13	0.17 ± 0.09	1.67 ± 0.40	2.07 ± 0.45	3.74 ± 0.85	ND	0.14 ± 0.07
L307-29K	0.28 ± 0.07	0.14 ± 0.08	1.48 ± 0.30	1.64 ± 0.34	3.12 ± 0.64	ND	0.09 ± 0.06
L307-29L	0.21 ± 0.07	0.08 ± 0.08	1.52 ± 0.25	1.49 ± 0.33	3.01 ± 0.58	0.84 ± 1.16	0.08 ± 0.06
L307-29M	0.07 ± 0.04	ND	1.62 ± 0.33	1.54 ± 0.32	3.16 ± 0.65	ND	0.14 ± 0.07

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-29N	0.06 ± 0.05	ND	1.76 ± 0.28	1.91 ± 0.40	3.67 ± 0.68	ND	0.16 ± 0.08
L307-29O	0.13 ± 0.07	ND	1.95 ± 0.42	2.10 ± 0.46	4.05 ± 0.88	ND	0.11 ± 0.09
L307-29P	0.09 ± 0.05	ND	1.49 ± 0.24	1.73 ± 0.35	3.22 ± 0.59	ND	0.14 ± 0.06
L307-29Q	0.13 ± 0.10	ND	2.19 ± 0.40	2.05 ± 0.45	4.24 ± 0.85	ND	0.14 ± 0.08
L307-29R	0.03 ± 0.05	ND	1.89 ± 0.32	1.84 ± 0.37	3.73 ± 0.69	ND	0.13 ± 0.06
L307-29S	ND	ND	1.73 ± 0.29	1.98 ± 0.43	3.71 ± 0.72	ND	0.15 ± 0.09
Separator							
L307-30J	ND	ND	2.26 ± 0.46	2.76 ± 0.58	5.02 ± 1.04	0.92 ± 0.95	0.13 ± 0.10
L307-30K	ND	ND	1.83 ± 0.29	2.36 ± 0.58	4.19 ± 0.87	0.95 ± 1.41	0.23 ± 0.15
L307-30L	ND	ND	1.63 ± 0.31	2.57 ± 0.51	4.20 ± 0.82	0.99 ± 1.05	0.25 ± 0.11
L307-30M	ND	ND	2.09 ± 0.32	2.81 ± 0.60	4.90 ± 0.92	1.39 ± 1.38	0.15 ± 0.10
L307-30N	ND	ND	2.02 ± 0.31	2.36 ± 0.49	4.38 ± 0.80	ND	0.15 ± 0.09
L307-30O	ND	ND	1.92 ± 0.30	2.89 ± 0.68	4.81 ± 0.98	1.68 ± 1.56	0.10 ± 0.11
L307-30P	ND	ND	1.55 ± 0.72	1.61 ± 0.35	3.16 ± 1.07	ND	0.12 ± 0.08
L307-30Q	ND	ND	1.66 ± 0.34	1.60 ± 0.33	3.26 ± 0.67	1.46 ± 1.44	0.14 ± 0.06

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-30R	ND	ND	2.11 ± 0.35	1.94 ± 0.38	4.05 ± 0.73	1.28 ± 1.54	0.25 ± 0.10
L307-30S	ND	ND	2.04 ± 0.46	2.64 ± 0.59	4.68 ± 1.05	1.61 ± 1.49	0.15 ± 0.13
L307-31J	ND	ND	1.86 ± 0.43	2.71 ± 0.51	4.57 ± 0.94	ND	0.17 ± 0.10
L307-31K	ND	ND	1.56 ± 0.23	1.62 ± 0.32	3.18 ± 0.55	1.24 ± 1.11	0.13 ± 0.06
L307-31L	ND	ND	1.67 ± 0.34	1.75 ± 0.35	3.42 ± 0.69	0.79 ± 1.01	0.14 ± 0.07
L307-31M	ND	ND	1.70 ± 0.40	1.85 ± 0.35	3.55 ± 0.75	0.70 ± 0.73	0.18 ± 0.07
L307-31N	ND	ND	1.82 ± 0.29	2.35 ± 0.50	4.17 ± 0.79	ND	0.25 ± 0.13
L307-31O	ND	ND	1.62 ± 0.24	1.57 ± 0.32	3.19 ± 0.56	0.86 ± 0.99	0.15 ± 0.07
L307-31P	ND	ND	2.27 ± 0.35	2.82 ± 0.56	5.09 ± 0.91	ND	0.17 ± 0.10
L307-31Q	ND	ND	1.81 ± 0.32	2.60 ± 0.57	4.41 ± 0.89	1.33 ± 1.49	0.21 ± 0.13
L307-31R	ND	ND	1.91 ± 0.91	1.96 ± 0.35	3.87 ± 1.26	ND	0.15 ± 0.07
L307-31S	ND	ND	1.83 ± 0.42	1.66 ± 0.36	3.49 ± 0.78	1.50 ± 1.22	0.19 ± 0.09

Table 5: Gamma Spectroscopy Results *Phase III* of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface

Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-32J	0.58 ± 0.11	ND	1.50 ± 0.25	1.59 ± 0.33	3.09 ± 0.58	ND	0.15 ± 0.08
L307-32K	1.54 ± 0.21	ND	1.80 ± 0.28	2.18 ± 0.46	3.98 ± 0.74	ND	0.21 ± 0.11
L307-32L	0.94 ± 0.14	ND	1.35 ± 0.30	1.56 ± 0.32	2.91 ± 0.62	ND	0.11 ± 0.07
L307-32M	0.77 ± 0.13	0.05 ± 0.05	1.43 ± 0.22	1.72 ± 0.38	3.15 ± 0.60	ND	0.07 ± 0.07
L307-32N	0.59 ± 0.13	ND	1.38 ± 0.31	1.54 ± 0.37	2.92 ± 0.68	ND	0.18 ± 0.10
L307-32O	0.46 ± 0.13	0.03 ± 0.08	1.61 ± 0.25	1.92 ± 0.50	3.53 ± 0.75	0.51 ± 0.85	0.05 ± 0.12
L307-32P	0.45 ± 0.11	ND	1.50 ± 0.38	1.78 ± 0.39	3.28 ± 0.77	0.57 ± 0.86	0.14 ± 0.09
L307-32Q	0.07 ± 0.08	ND	1.62 ± 0.48	2.35 ± 0.48	3.97 ± 0.96	ND	0.15 ± 0.05
L307-32R	ND	ND	1.84 ± 0.31	2.13 ± 0.48	3.97 ± 0.79	ND	0.14 ± 0.12
L307-32S	ND	ND	1.62 ± 0.34	1.59 ± 0.33	3.21 ± 0.67	ND	0.17 ± 0.08
L307-33J	2.72 ± 0.33	ND	1.37 ± 0.36	1.34 ± 0.32	2.71 ± 0.68	ND	0.12 ± 0.07
L307-33K	2.78 ± 0.34	ND	1.40 ± 0.22	1.59 ± 0.35	2.99 ± 0.57	ND	0.10 ± 0.08
L307-33L	1.69 ± 0.22	ND	1.45 ± 0.24	1.36 ± 0.31	2.81 ± 0.55	ND	0.09 ± 0.07
L307-33M	1.66 ± 0.21	0.08 ± 0.05	1.45 ± 0.24	1.32 ± 0.35	2.77 ± 0.59	1.16 ± 1.11	0.23 ± 0.09

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-33N	0.60 ± 0.13	ND	1.51 ± 0.24	1.91 ± 0.47	3.42 ± 0.71	0.84 ± 1.10	0.10 ± 0.07
L307-33O	0.61 ± 0.10	ND	1.56 ± 0.24	1.63 ± 0.33	3.19 ± 0.57	ND	0.11 ± 0.06
L307-33P	0.32 ± 0.11	ND	1.66 ± 0.26	1.78 ± 0.43	3.44 ± 0.69	0.95 ± 1.25	0.19 ± 0.14
L307-33Q	0.34 ± 0.09	ND	1.89 ± 0.30	1.55 ± 0.32	3.44 ± 0.62	1.36 ± 1.17	0.14 ± 0.08
L307-33R	0.34 ± 0.10	ND	1.81 ± 0.35	1.76 ± 0.40	3.57 ± 0.75	0.55 ± 0.96	0.14 ± 0.07
L307-33S	0.76 ± 0.12	ND	1.58 ± 0.24	1.76 ± 0.37	3.34 ± 0.61	1.07 ± 1.06	0.15 ± 0.08
L307-34J	0.12 ± 0.06	ND	1.66 ± 0.26	1.80 ± 0.42	3.46 ± 0.68	ND	0.12 ± 0.12
L307-34K	0.09 ± 0.06	ND	1.57 ± 0.25	1.94 ± 0.41	3.51 ± 0.66	1.83 ± 1.42	0.12 ± 0.09
L307-34L	0.10 ± 0.07	ND	1.39 ± 0.25	1.75 ± 0.30	3.14 ± 0.55	ND	0.13 ± 0.07
L307-34M	0.06 ± 0.07	ND	1.73 ± 0.39	2.40 ± 0.52	4.13 ± 0.91	1.31 ± 1.38	0.20 ± 0.10
L307-34N	0.06 ± 0.04	ND	1.40 ± 0.21	1.49 ± 0.32	2.89 ± 0.53	0.68 ± 0.79	0.13 ± 0.08
L307-34O	0.06 ± 0.05	ND	1.49 ± 0.32	1.87 ± 0.45	3.36 ± 0.77	ND	0.17 ± 0.09
L307-34P	0.04 ± 0.05	ND	1.82 ± 0.29	1.66 ± 0.35	3.48 ± 0.64	ND	0.15 ± 0.06
L307-34Q	ND	ND	1.50 ± 0.23	1.82 ± 0.39	3.32 ± 0.62	ND	0.12 ± 0.05

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-34R	ND	ND	1.54 ± 0.23	1.74 ± 0.33	3.28 ± 0.56	ND	0.20 ± 0.08
L307-34S	ND	ND	1.47 ± 0.28	1.46 ± 0.33	2.93 ± 0.61	1.21 ± 1.10	0.14 ± 0.06
L307-35J	0.34 ± 0.08	0.06 ± 0.05	1.29 ± 0.20	1.43 ± 0.33	2.72 ± 0.53	0.91 ± 0.99	0.11 ± 0.05
L307-35K	0.57 ± 0.12	ND	1.96 ± 0.70	1.94 ± 0.51	3.90 ± 1.21	ND	0.14 ± 0.09
L307-35L	0.68 ± 0.12	0.12 ± 0.07	1.34 ± 0.21	1.36 ± 0.30	2.70 ± 0.51	1.13 ± 1.03	0.14 ± 0.06
L307-35M	0.15 ± 0.08	ND	2.10 ± 0.41	2.05 ± 0.48	4.15 ± 0.89	2.47 ± 3.11	ND
L307-35N	0.18 ± 0.11	0.04 ± 0.07	1.62 ± 0.40	1.60 ± 0.51	3.22 ± 0.91	ND	0.14 ± 0.12
L307-35O	0.25 ± 0.10	(Cs-134; 0.01 ± 0.01)	1.88 ± 0.34	1.95 ± 0.56	3.83 ± 0.90	ND	0.13 ± 0.13
L307-35P	0.91 ± 0.17	0.25 ± 0.12	1.76 ± 0.32	1.33 ± 0.36	3.09 ± 0.68	1.73 ± 1.70	0.07 ± 0.07
L307-35Q	0.17 ± 0.06	ND	1.67 ± 0.27	1.77 ± 0.38	3.44 ± 0.65	ND	0.13 ± 0.06
L307-35R	0.16 ± 0.07	ND	1.90 ± 0.42	1.97 ± 0.43	3.87 ± 0.85	ND	0.11 ± 0.13
L307-35S	ND	ND	1.76 ± 0.39	2.36 ± 0.58	4.12 ± 0.97	ND	0.30 ± 0.13

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-36J	0.26 ± 0.10	ND	1.56 ± 0.25	1.89 ± 0.45	3.45 ± 0.70	0.20 ± 1.13	0.19 ± 0.11
L307-36K	0.09 ± 0.05	ND	1.50 ± 0.35	1.77 ± 0.37	3.27 ± 0.72	ND	0.17 ± 0.09
L307-36L	0.05 ± 0.05	ND	1.43 ± 0.36	1.60 ± 0.33	3.03 ± 0.69	ND	0.13 ± 0.07
L307-36M	ND	ND	1.60 ± 0.28	2.19 ± 0.54	3.79 ± 0.82	ND	0.15 ± 0.13
L307-36N	ND	ND	1.67 ± 0.39	1.54 ± 0.35	3.21 ± 0.74	ND	0.14 ± 0.06
L307-36O	ND	ND	1.71 ± 0.32	1.56 ± 0.33	3.27 ± 0.65	1.05 ± 1.13	0.10 ± 0.06
L307-36P	ND	ND	2.05 ± 0.34	2.07 ± 0.46	4.12 ± 0.80	1.60 ± 1.42	0.11 ± 0.08
L307-36Q	0.02 ± 0.05	ND	1.57 ± 0.24	1.63 ± 0.38	3.20 ± 0.62	ND	0.19 ± 0.07
L307-36R	ND	ND	1.82 ± 0.57	2.15 ± 0.49	3.97 ± 1.06	ND	0.16 ± 0.08
L307-36S	ND	ND	1.79 ± 0.31	2.39 ± 0.51	4.18 ± 0.82	ND	0.28 ± 0.11
L307-37J	0.14 ± 0.05	ND	1.47 ± 0.23	1.42 ± 0.31	2.89 ± 0.54	1.30 ± 1.24	0.16 ± 0.08
L307-37K	0.19 ± 0.07	ND	1.47 ± 0.24	1.93 ± 0.41	3.40 ± 0.65	ND	0.13 ± 0.09
L307-37L	0.09 ± 0.08	ND	1.82 ± 0.32	1.73 ± 0.43	3.55 ± 0.75	ND	0.10 ± 0.12
L307-37M	0.07 ± 0.04	ND	1.67 ± 0.31	1.74 ± 0.36	3.41 ± 0.67	1.21 ± 1.04	0.14 ± 0.07

Table 5: Gamma Spectroscopy Results <i>Phase III</i> of L-307 Pit Soil Samples from 10 to 20 Feet Below the Surface							
Radionuclide	¹³⁷ Cs (661 keV)	⁶⁰ Co (1173 keV)	²²⁸ Th (238 keV ²¹² Pb)	²³² Th (911 keV ²²⁸ Ac)	(Total) Th ²²⁸ Th + ²³² Th	²³⁸ U 63.3 (92.7) keV (²³⁴ Th)	²³⁵ U (144) 186 keV
Sample ID	<i>Radionuclide Concentrations (pCi/g) - Results ± 2σ - 30 Minute Counts - Backgrounds Not Subtracted</i>						
L307-37N	ND	ND	1.76 ± 0.33	1.92 ± 0.41	3.68 ± 0.74	ND	0.13 ± 0.09
L307-37O	ND	ND	1.67 ± 0.37	1.71 ± 0.37	3.38 ± 0.74	ND	0.15 ± 0.07
L307-37P	ND	ND	1.53 ± 0.34	1.63 ± 0.32	3.16 ± 0.66	2.55 ± 2.09	0.15 ± 0.07
L307-37Q	0.02 ± 0.03	ND	1.55 ± 0.31	1.68 ± 0.35	3.23 ± 0.66	0.99 ± 1.13	0.15 ± 0.08
L307-37R	ND	ND	1.66 ± 0.38	1.94 ± 0.40	3.60 ± 0.78	0.56 ± 0.98	0.20 ± 0.08
L307-37S	ND	ND	1.56 ± 0.26	2.05 ± 0.52	3.61 ± 0.78	ND	0.16 ± 0.10

- Notes: 1. ND means not detected.
2. Average Minimum Detectable Activities (MDAs):
U-238 = 1.58 pCi/g (63 keV peak)
U-235 = 0.14 pCi/g (186 keV peak)
Cs-137 = 0.13 pCi/g (662 keV peak)

- Co-60 = 0.16 pCi/g (1173 keV peak)
Th-228 = 0.21 pCi/g (238 keV peak)
Th-232 = 0.43 pCi/g (911 keV peak)

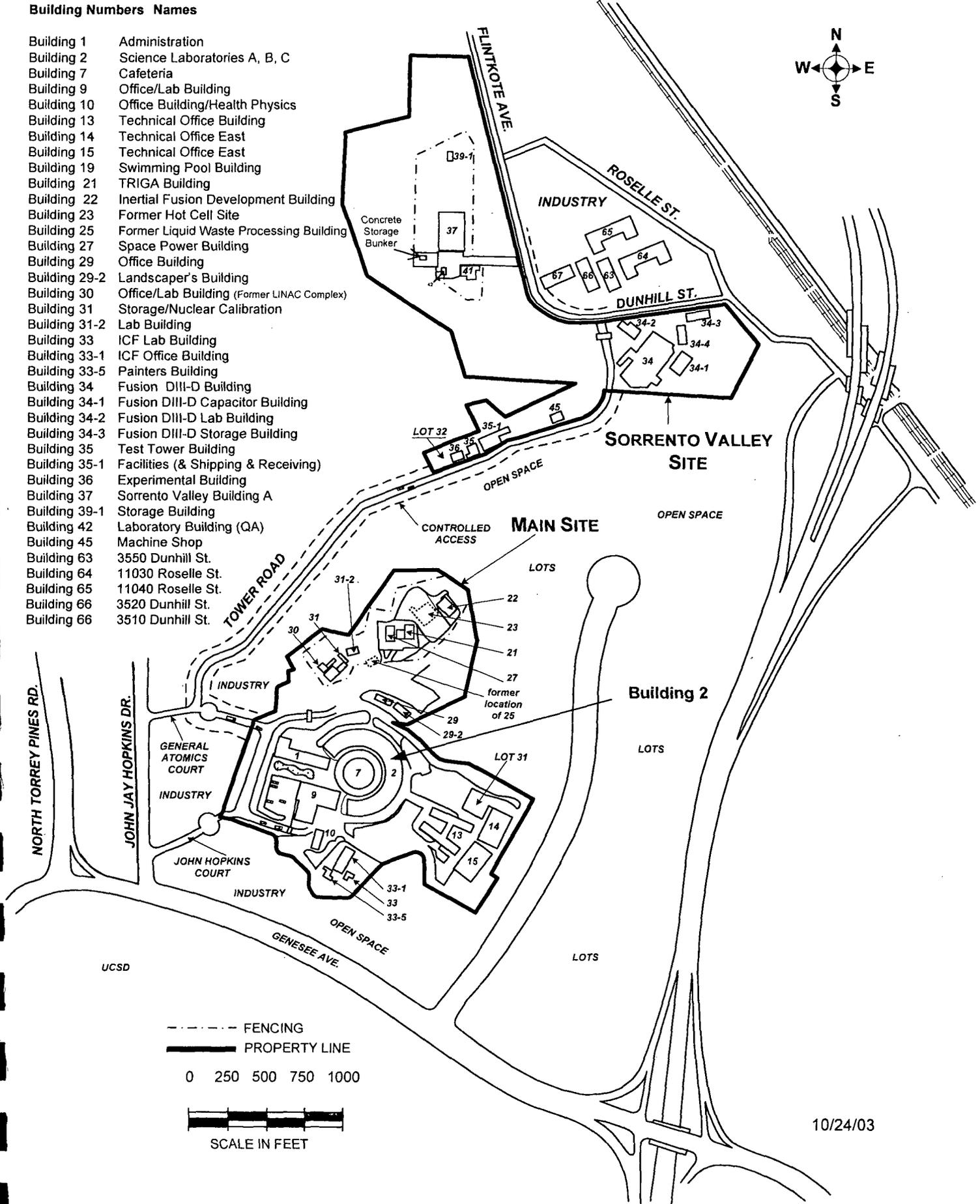
Table 6: Soil Sample Strontium-90 Analysis Performed by Severn Trent Laboratories			
Sample No.	Sample Description	Sr-90 Results (pCi/g)	Minimum Detectable Concentration (pCi/g)
Phase I and II Soil Samples			
1	Composite of 34 soil samples, sample locations 1 through 17 at A level (0 -1.5') and 1 thru 17 at E level (4'-5')	0.57 ± 0.62	0.99
2	Composite of 20 soil samples, sample locations 18 through 27 at A level (0 -1.5') and 1 thru 17 at E level (4'-5')	-0.46 ± 0.83	1.4
3	Composite of 34 soil samples, sample locations 1 through 17 at J level (10' -11') and 1 thru 17 at O level (15'-16')	1.61 ± 0.77	1.1
4	Composite of 20 soil samples, sample locations 18 though 27 at J level (10' -11') and 1 thru 17 at O level (15'-16')	2.41 ± 0.75	0.80
5	Composite of 68 soil samples, sample locations 1 through 17 at A level (0 -1.5'), E level (4'-5'), J level (10'-11'), and, O level (15'-16')	0.10 ± 0.54	0.91
6	Composite of 68 soil samples, sample locations 18 through 27 at A level (0 -1.5'), E level (4'-5'), J level (10'-11'), and, O level (15'-16')	-0.13 ± 0.57	1.0
7	Sample 16K	0.21 ± 0.63	1.1
8	Sample 7N	14.9 ± 3.2	1.1
9	Sample 17M	0.39 ± 0.77	1.3

Table 6: Soil Sample Strontium-90 Analysis Performed by Severn Trent Laboratories			
Sample No.	Sample Description	Sr-90 Results (pCi/g)	Minimum Detectable Concentration (pCi/g)
Phase II and III Soil Samples			
1	Sample ID: 33K	1.33 ± 0.47	0.56
2	Sample ID: 37K	0.12 ± 0.30	0.50
3	Sample ID: 28K	-0.08 ± 0.36	0.62
4	Sample ID: 33J	0.41 ± 0.35	0.55
5	Sample ID: 33L	1.56 ± 0.55	0.67
6	Sample ID: 32K	0.52 ± 0.40	0.62
7	Sample ID: 13K	0.15 ± 0.41	0.69
8	Sample ID: 14K	0.00 ± 0.00	0.5
9	Sample ID: 30K	0.09 ± 0.33	0.57
10	Sample ID: 7N (recount)	0.87 ± 0.40	0.55
11	Sample ID: 26N	0.02 ± 0.37	0.63
12	Sample ID: 23K	-0.10 ± 0.31	0.53

Figure 1: GA's Main Site and Sorrento Valley Site

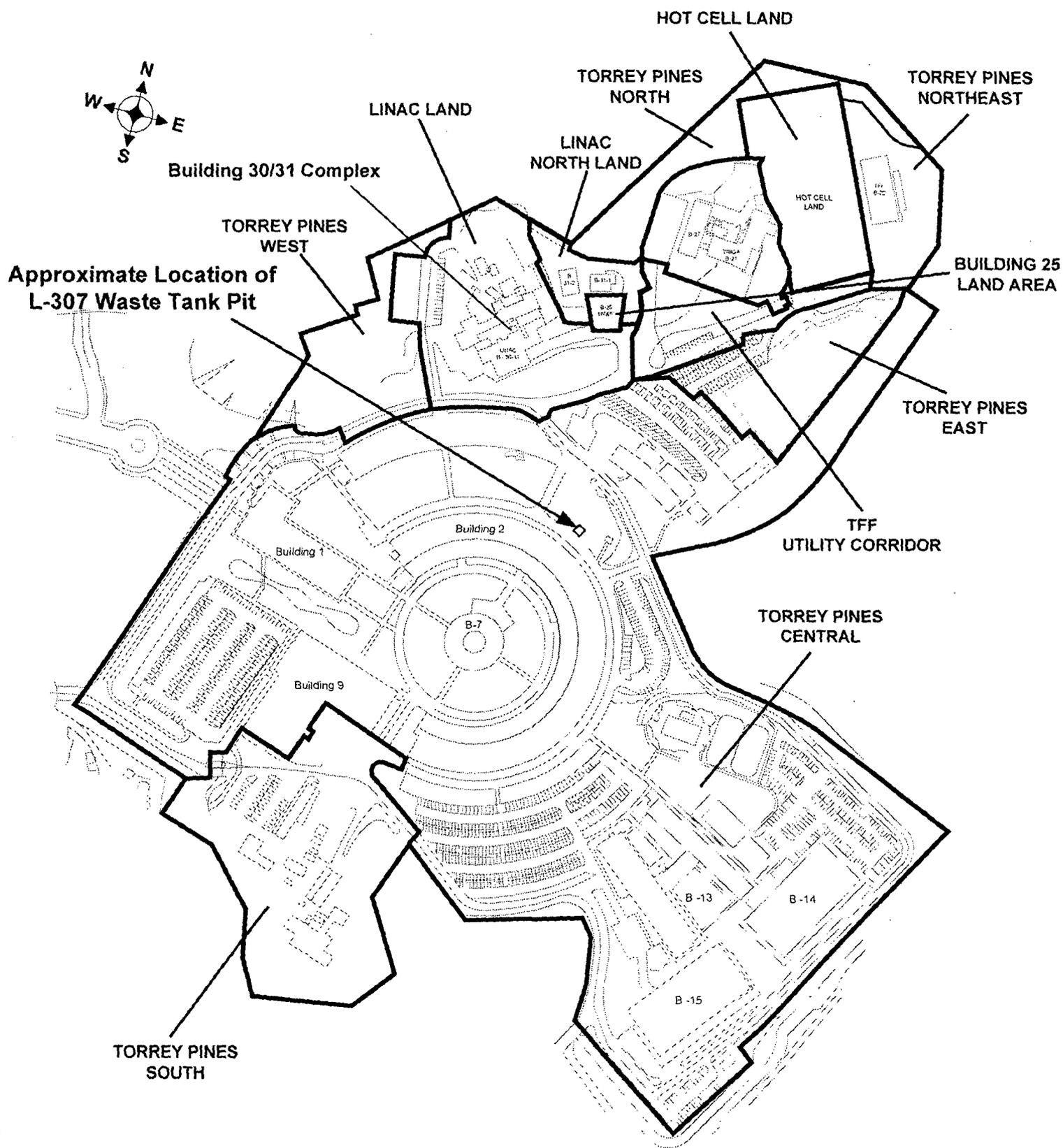
Building Numbers Names

- Building 1 Administration
- Building 2 Science Laboratories A, B, C
- Building 7 Cafeteria
- Building 9 Office/Lab Building
- Building 10 Office Building/Health Physics
- Building 13 Technical Office Building
- Building 14 Technical Office East
- Building 15 Technical Office East
- Building 19 Swimming Pool Building
- Building 21 TRIGA Building
- Building 22 Inertial Fusion Development Building
- Building 23 Former Hot Cell Site
- Building 25 Former Liquid Waste Processing Building
- Building 27 Space Power Building
- Building 29 Office Building
- Building 29-2 Landscaper's Building
- Building 30 Office/Lab Building (Former LINAC Complex)
- Building 31 Storage/Nuclear Calibration
- Building 31-2 Lab Building
- Building 33 ICF Lab Building
- Building 33-1 ICF Office Building
- Building 33-5 Painters Building
- Building 34 Fusion DIII-D Building
- Building 34-1 Fusion DIII-D Capacitor Building
- Building 34-2 Fusion DIII-D Lab Building
- Building 34-3 Fusion DIII-D Storage Building
- Building 35 Test Tower Building
- Building 35-1 Facilities (& Shipping & Receiving)
- Building 36 Experimental Building
- Building 37 Sorrento Valley Building A
- Building 39-1 Storage Building
- Building 42 Laboratory Building (QA)
- Building 45 Machine Shop
- Building 63 3550 Dunhill St.
- Building 64 11030 Roselle St.
- Building 65 11040 Roselle St.
- Building 66 3520 Dunhill St.
- Building 66 3510 Dunhill St.

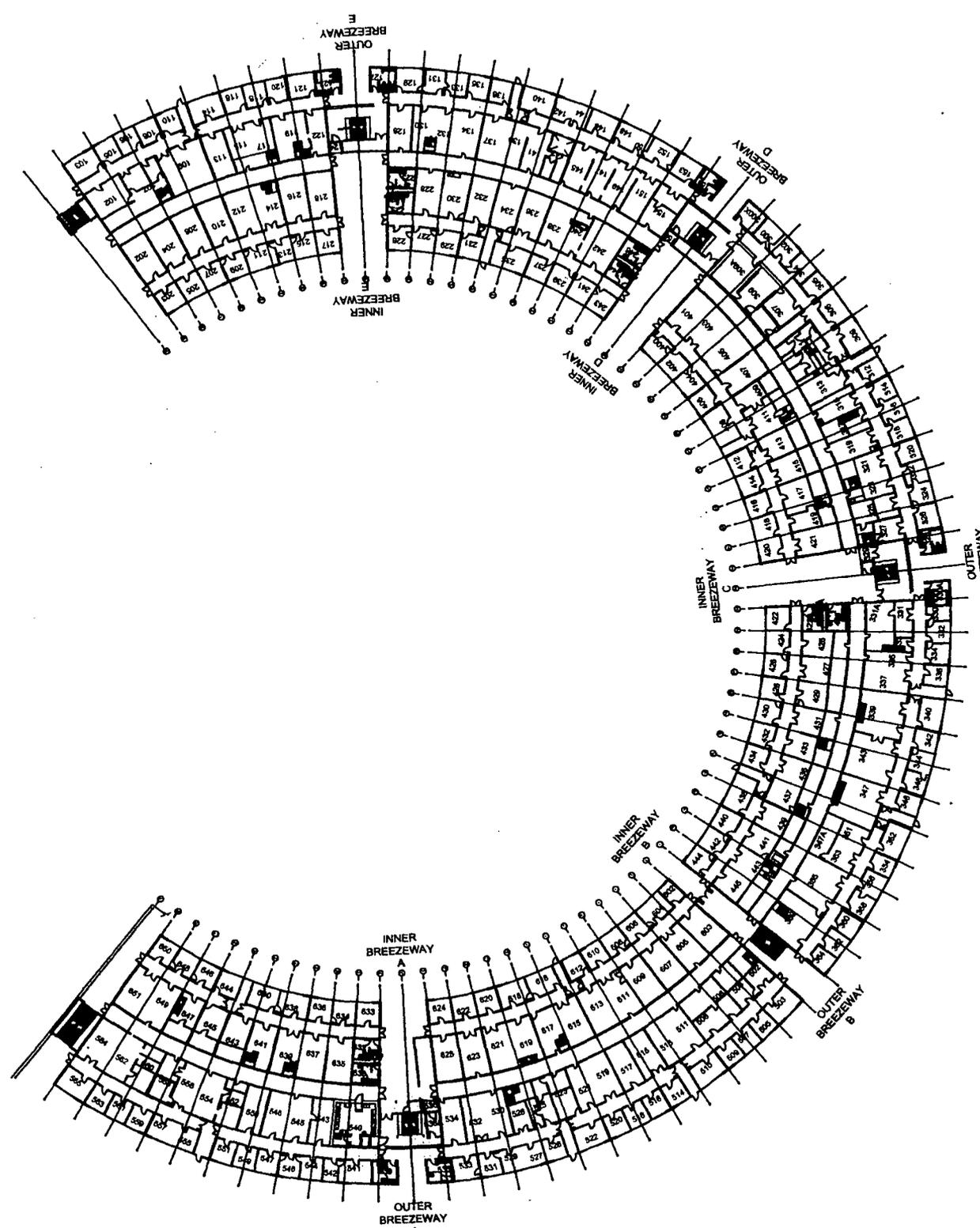


10/24/03

Figure 2: Torrey Pines (Main) Site



VACANT



NO SCALE

Figure 3: GA's Building 2

Figure 4: Former Location of L-307 Tank

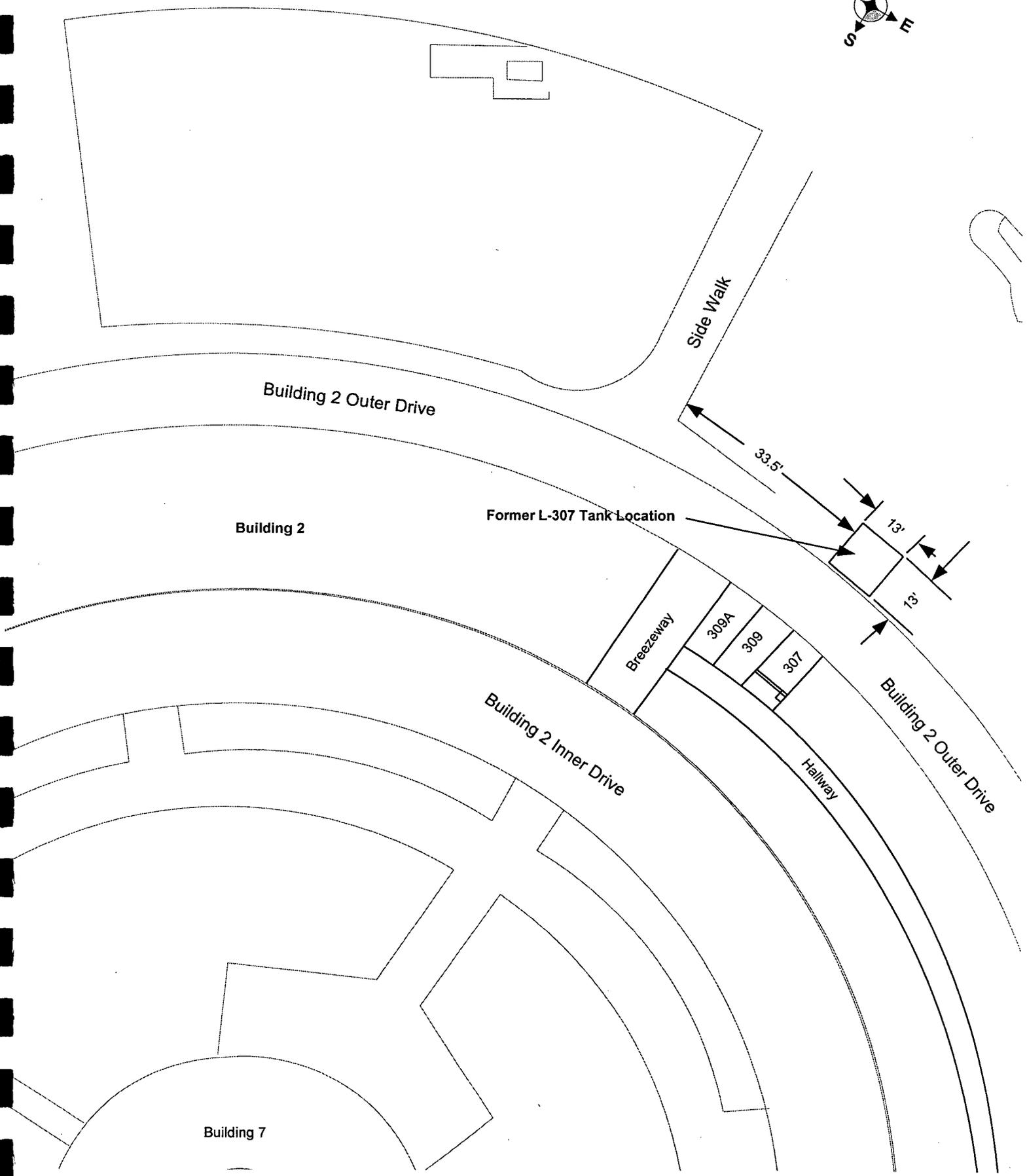


Figure 5: L-307 Waste Tank Pit Location and Extended Work Area

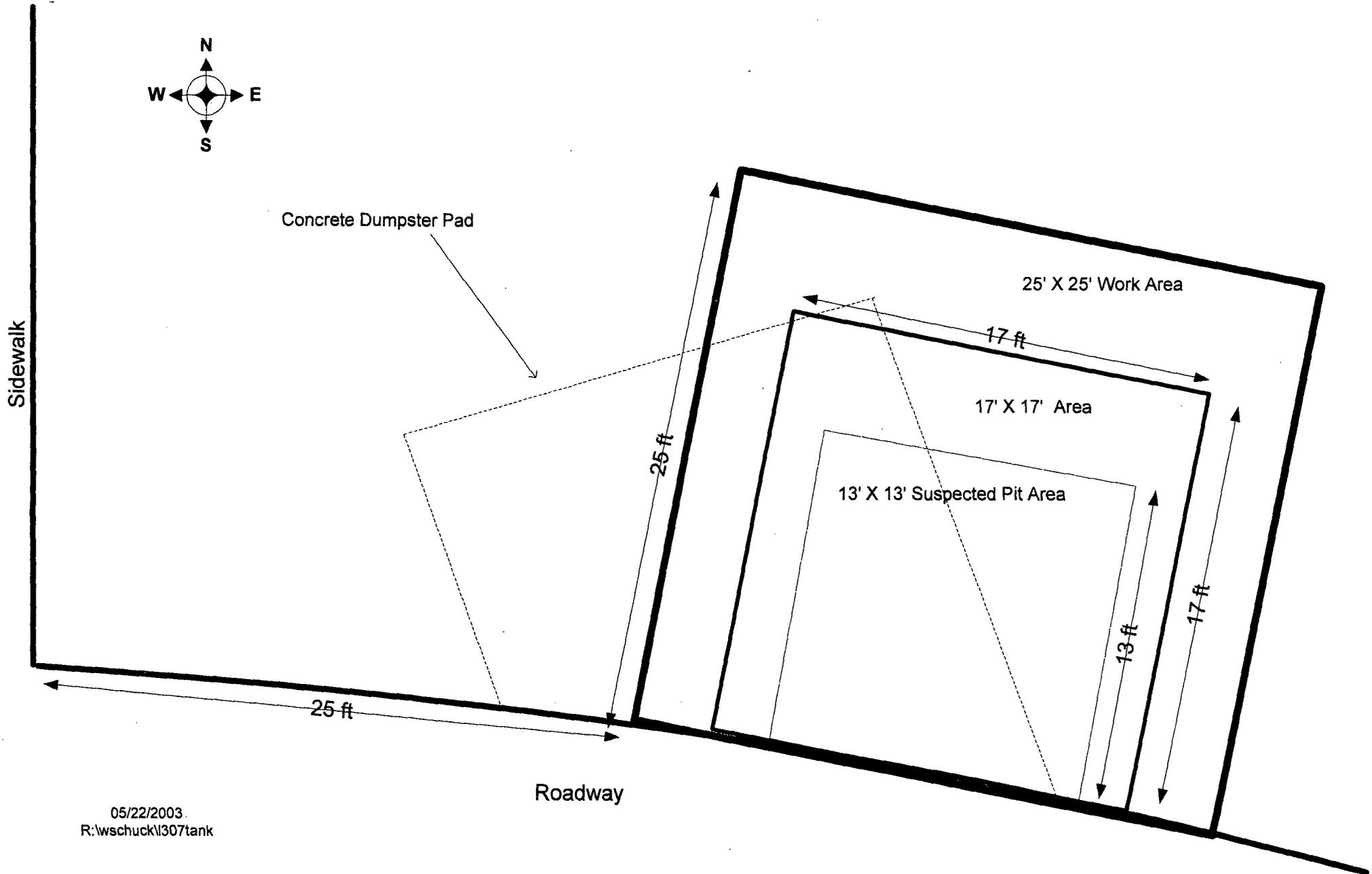


Figure 6: L-307 Waste Tank Pit Site Phase I Soil Sample Locations

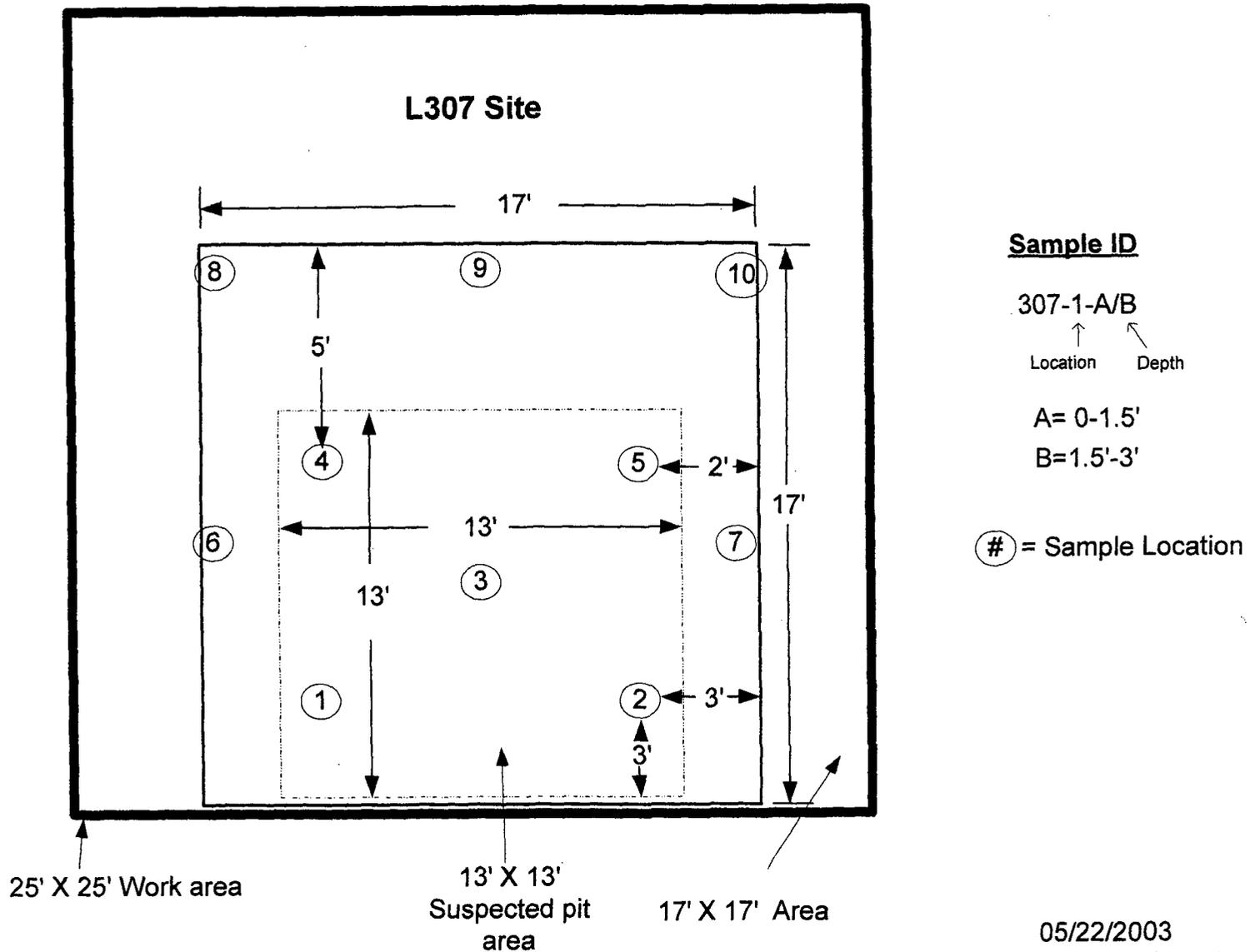


Figure 7: L-307 Waste Tank Pit Site Revised Phase I Soil Sample Locations

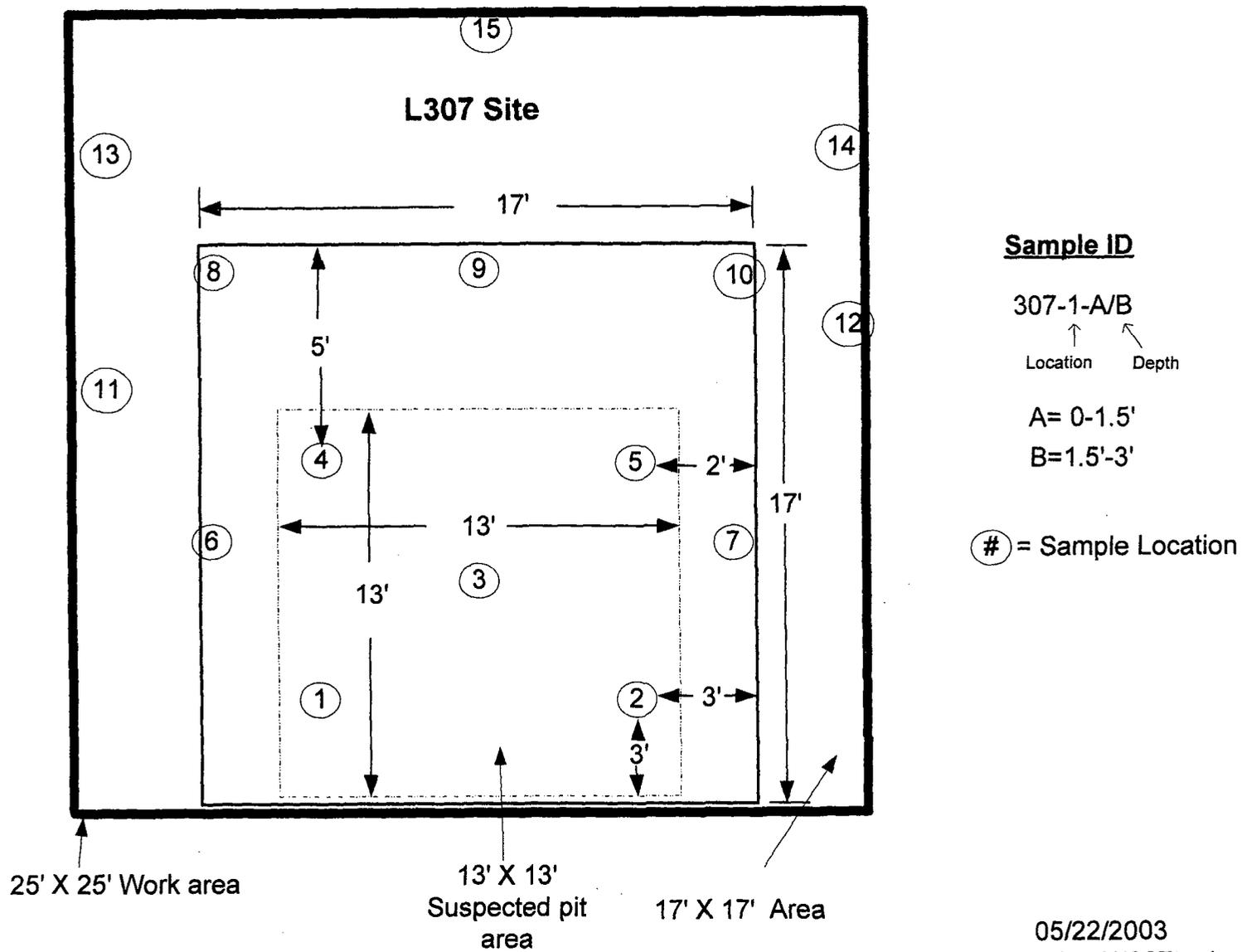
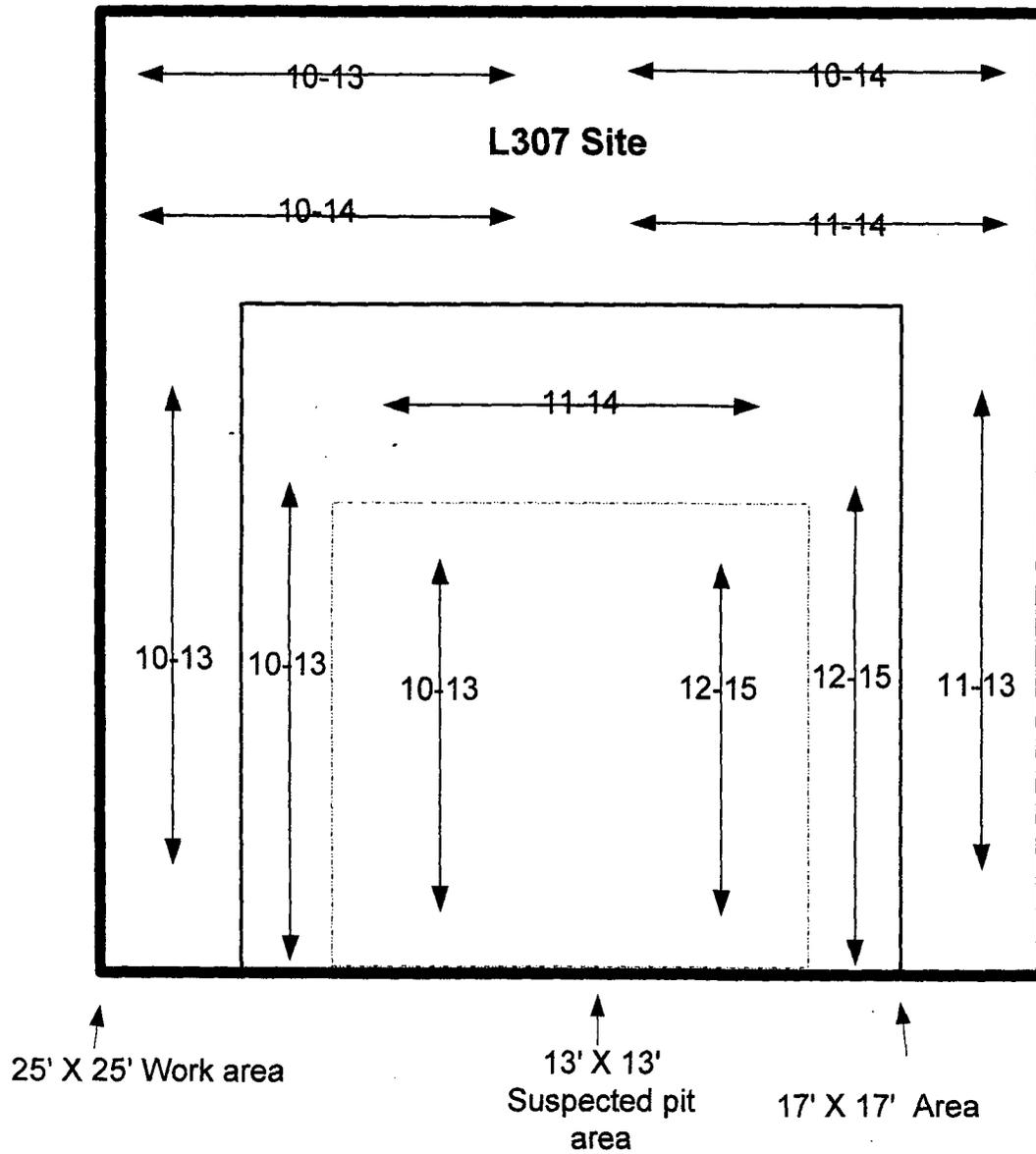


Figure 8: L-307 Waste Tank Pit Site Phase I Exposure Rate Surface Scan Results



Instrument	
Model	= Ludlum 3
Serial #	= 153311
Cal due date	= 10-09-03
Probe	= 2" x 2" gamma
Probe Serial #	= 155594
Bkgd soil	= 12 - 19 microR/hr

XX-XX Exposure rate survey measurements in $\mu\text{R/hr}$.
 100% of the area surveyed within 1" of the surface.

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Figure 9: L-307 Waste Tank Pit Site Phase II Soil Sample Locations and Depths

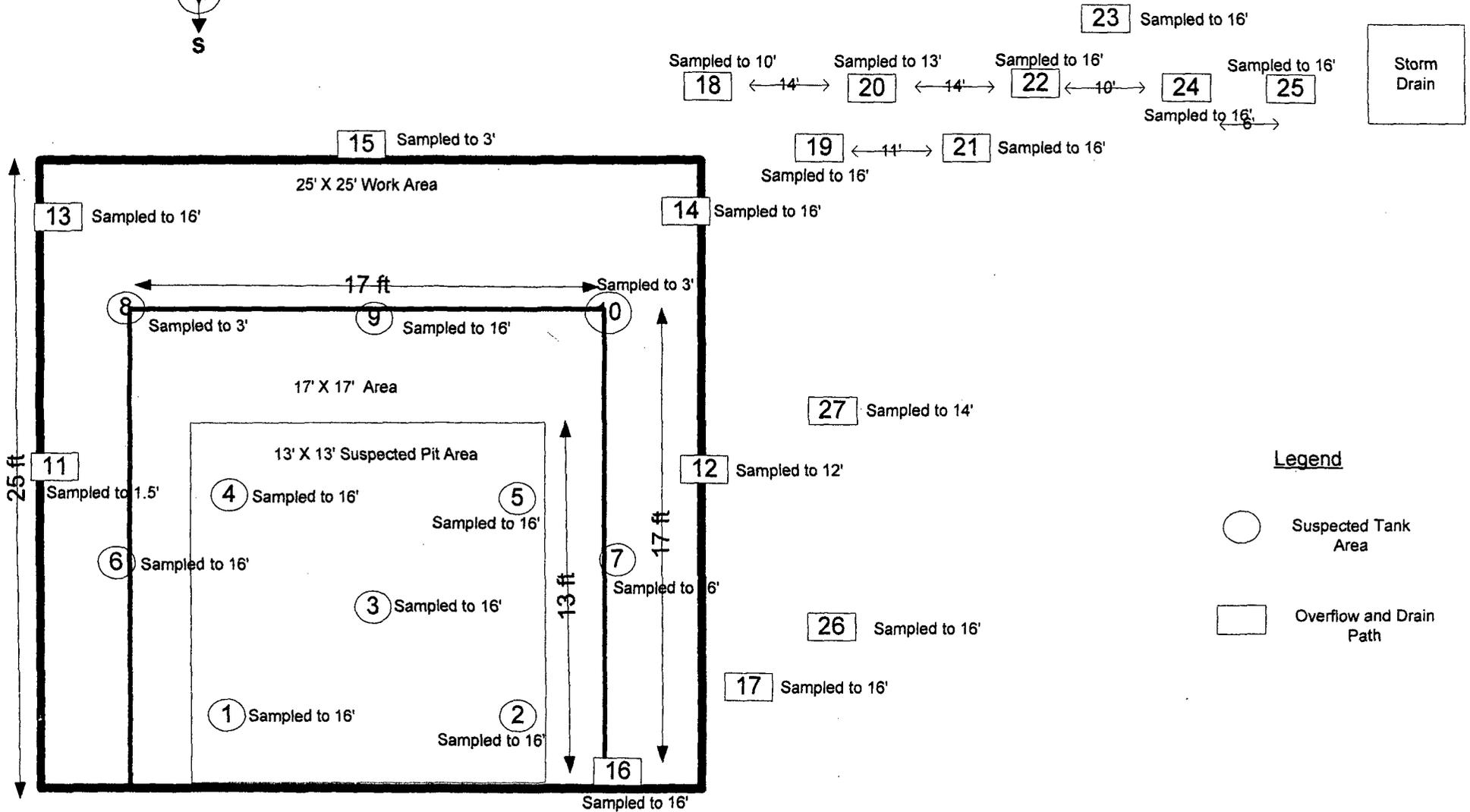
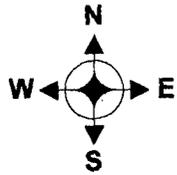
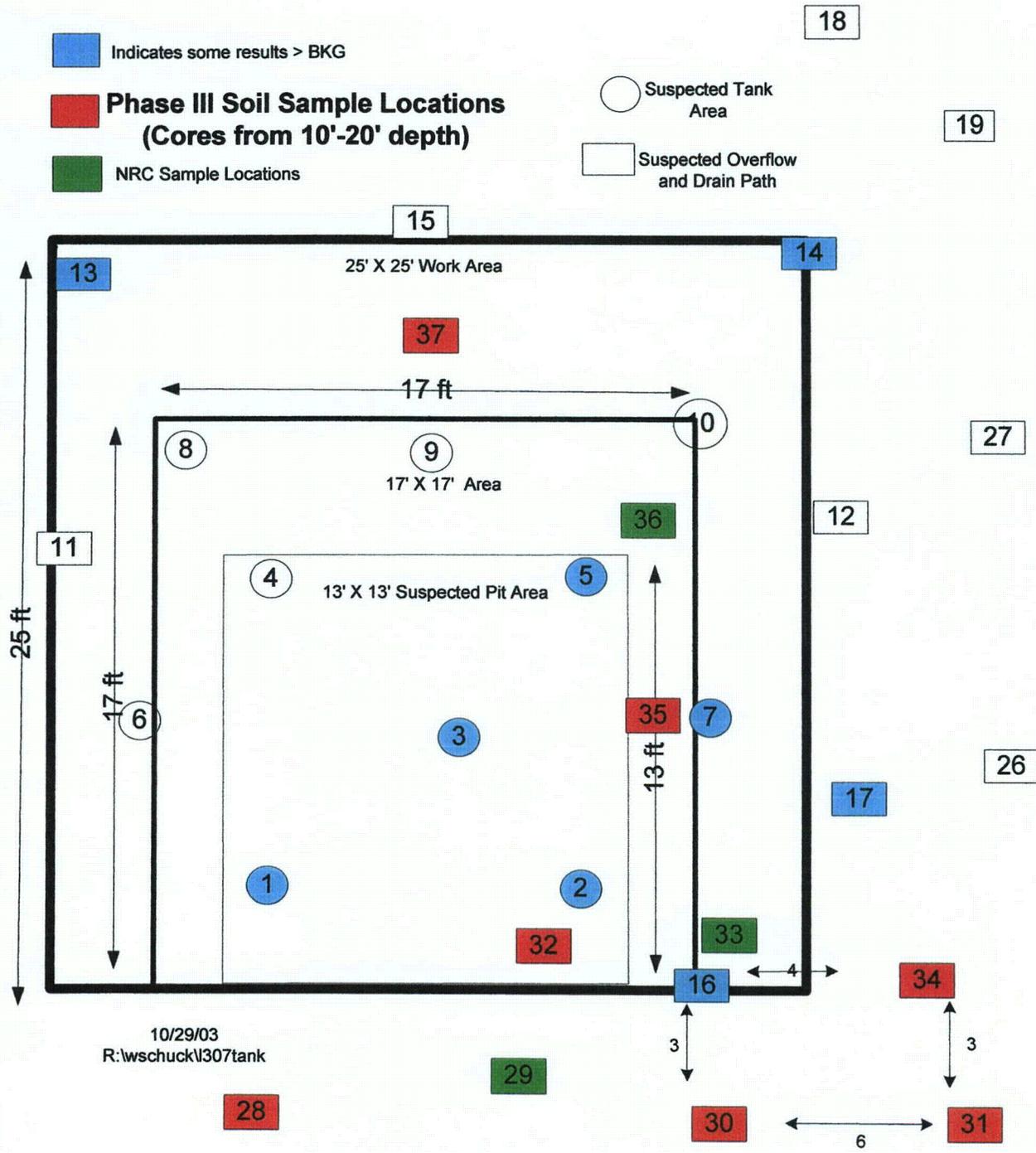
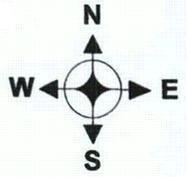


Figure 10: L-307 Phase III Soil Sample Locations





FINAL RADIOLOGICAL SURVEY REPORT

FOR THE L-307 TANK PIT SITE

Appendix A

L-307 Tank Pit Site Survey Plans



GENERAL ATOMICS

INTERNAL CORRESPONDENCE

From: Laura Q. Gonzales *LQ*

In Reply

Refer To: LQG:2003:67

To: Distribution

Date: May 22, 2003

Subject: Issuance of L307 Site Phase 1 Characterization Plan

Attached is a copy of the Phase 1 Characterization Plan for the L307 Site. After the Plan has been implemented, GA will have characterized (1) the top 3' of soil in the suspected pit location and (2) the top 3' of soil around the suspected 3' of soil.

As noted in the Plan, GA needs Facilities support in removing the dumpster and most of the concrete pad located in the general area before we can begin the survey.

If you have any questions on the Plan, please feel free to call me at x2758 or Bill LaBonte at x2959. I have assigned Will Schuck as the Lead Technician for this project.

cc: Keith Asmussen
Bob Noren
Bill LaBonte
Will Schuck
Mary Scanlan
Ruben Develasco
Scott Cowan
Dick Stowell
Greg Sayer
Alan Lewis

As of May 22, 2003

Prepared by Laura Gonzales, Keith Asmussen, Bill LaBonte and Will Schuck

Former L-307 Tank Site - Phase 1 Characterization Plan

Summary and Description of Problem

On June 28, 1984, GA excavated an underground liquid waste storage tank located near Laboratory 307 (L-307) of Building 2 (north of outer circle drive). This reinforced concrete tank was used in the past to store liquid waste primarily containing Cs-137, Co-60 and Sr-90 generated in association with research labs in Building 2, primarily Lab-307. The tank was later disposed of as radioactive waste. Upon tank removal, it was observed that a leak had occurred along the north wall, approximately 2 ½ feet from the bottom. The pit, called the "L-307 pit" was ~13'x13'x15' (deep). Although contaminated soil was excavated along the north pit wall (1-4' deep), residual contamination (Sr-90, Cs-137 and Co-60) in excess of the approved soil release criteria needed to meet the "Option 1" release (no restrictions) remained in the pit walls.

GA requested that the NRC approve the backfilling of the L-307 pit with "clean" soil on November 30, 1984¹. GA obtained approval from NRC to backfill the pit with "clean" soil on December 5, 1984². The pit was backfilled on February 25, 1985. An official "release to unrestricted use" was not obtained at that time.

However, documents reviewed to date (April 30, 2003) indicate that soil removed during the excavation was used to backfill the pit.³ Therefore, the soil was not "clean" as in "background clean" but was contaminated. It is still unclear as to how contaminated the soil was that was placed back into the pit. It is also unclear if the top 4' of soil (required to be in place) was also "background clean" soil.

Therefore, this Plan was developed to Characterize the top 3' of soil in an area 25'x25' wide.

Some characterization (scanning only) of the top 3' of soil going north of the former pit site former drainage area) from the tank pit site is also included in this Plan. After results of the scanning are obtained, a soil sample plan for this "drainage" area will be developed.

¹Letter dated November 30, 1984 from W. R. Mowry (signed by F.O. Bold) to William T. Crow (NRC Headquarters), "Request for Approval to Backfill L-307 Pit" with Final Report: L-307 Pit at GA Site".

²Memo dated 12/5/84 (FOB:84:148) from R. J. Nirschl (for F.O. Bold) to R. H. Dalry, "L-307 Pit Backfill".

³Memo dated February 26, 1984 (LRQ:85:044) from L.R. Quintana to F.O. Bold, "Ge(Li) Scan Results on L-307 Soil Samples Collected 2/19/85.

Phase I Plan

1. Remove the concrete, dumpster and grass (to bare soil) beginning 25' from the walkway going east up to 50' and from the road going north 25' (this will clear an area 25' x 25'). See Figure 1.
2. Mark the centerline of where the tank is believed to be located and go out 8.5' in each direction and out perpendicular to the road 17'; this gives a 17'x17' area of interest.
3. Scan the entire 25' x 25' area using a microR meter (surface scans) - 100% of area.
4. Scan the entire 25' x 25' area using a beta floor monitor - 100% of the area. Also scan 10% of the area using a geiger counter (for comparison with measurements taken in 1984).
5. Sample the top 3' of soil in the 15 locations shown in Figure 2.

Collect composite samples every 1.5' depth (for a total of 30 soil samples).

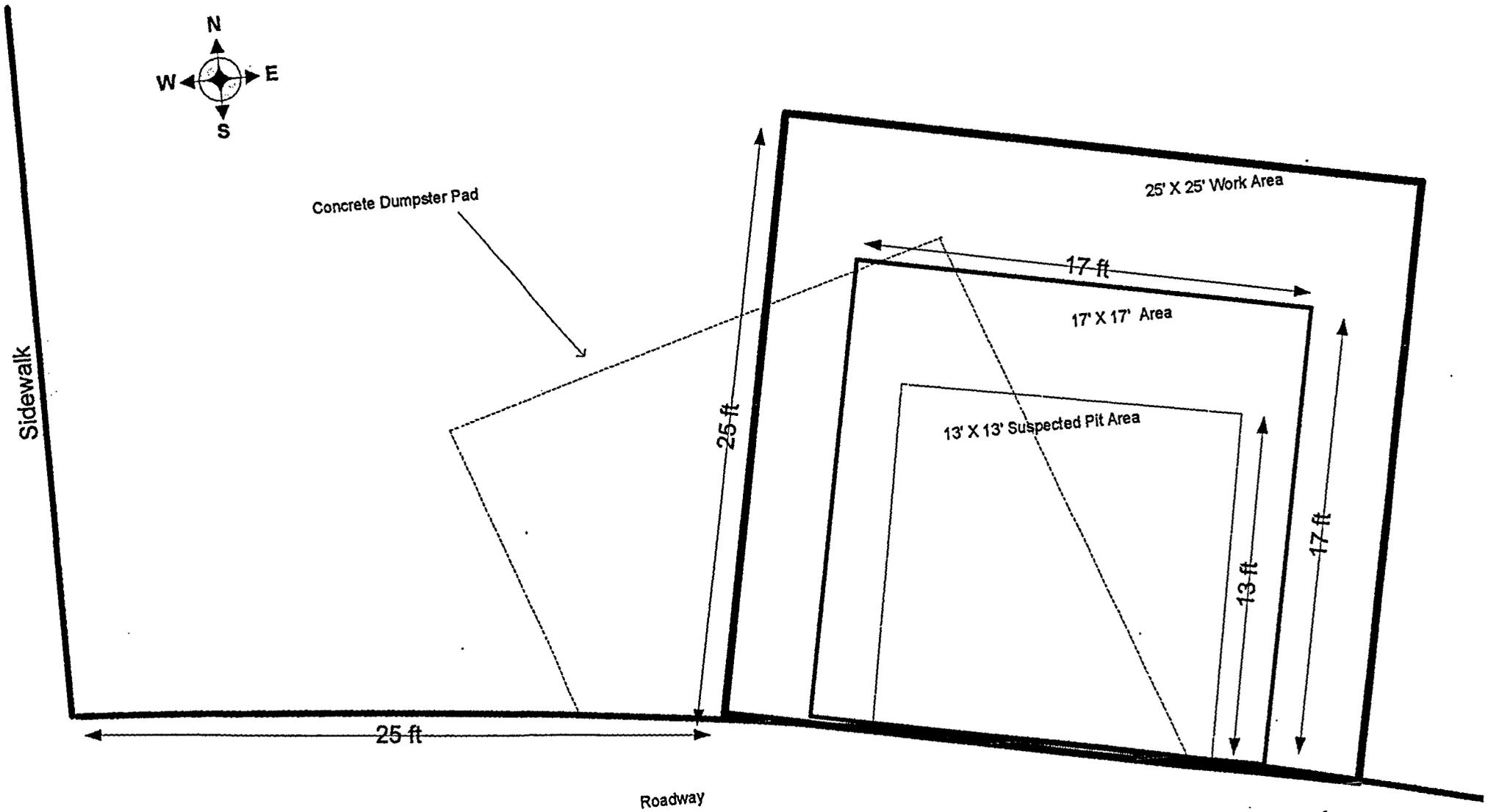
Sample locations #1-5 will provide information on the soil concentrations in the top 3' of backfill soil. (Plan A)

Sample locations #6-10 will give GA an idea of what remained in the top 3' of soil around the pit site. (Plan B)

Note: [ID numbers to be identified as follows: 307-1-A (for 307, sample location #1, sample A will be 0-1.5', B will be used for the same sample location but 1.5'-3' deep; sample location C will be used for the next depth].

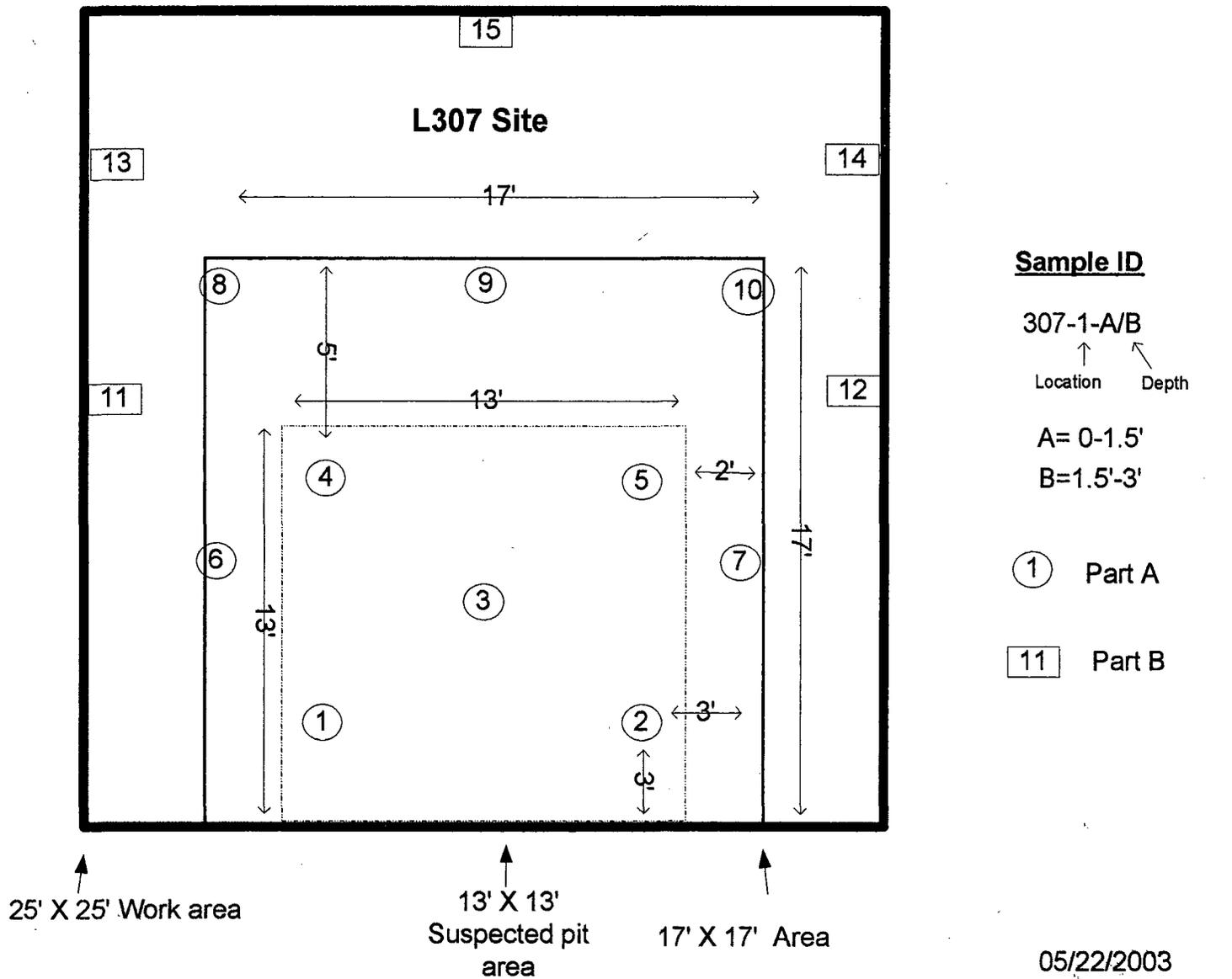
6. Soil sample plan to be developed for the area north of the tank pit (drainage area) after scanning results are obtained.

Figure 1: L307 Phase I Characterization



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Figure 2: L307 Phase I Soil Sample Locations



As of July 16, 2003

Prepared by Laura Gonzales and Will Schuck

Former L-307 Tank Site - Revised Characterization Plan

Summary and Description of Problem

On June 28, 1984, GA excavated an underground liquid waste storage tank located near Laboratory 307 (L-307) of Building 2 (north of outer circle drive). This reinforced concrete tank was used in the past to store liquid waste primarily containing Cs-137, Co-60 and Sr-90 generated in association with research labs in Building 2, primarily Lab-307. The tank was later disposed of as radioactive waste. Upon tank removal, it was observed that a leak had occurred along the north wall, approximately 2 ½ feet from the bottom. The pit, called the "L-307 pit" was ~13'x13'x15' (deep). Although contaminated soil was excavated along the north pit wall (1-4' deep), residual contamination (Sr-90, Cs-137 and Co-60) in excess of the approved soil release criteria needed to meet the "Option 1" release (no restrictions) remained in the pit walls.

GA requested that the NRC approve the backfilling of the L-307 pit with "clean" soil on November 30, 1984¹. GA obtained approval from NRC to backfill the pit with "clean" soil on December 5, 1984². The pit was backfilled on February 25, 1985. An official "release to unrestricted use" was not obtained at that time.

However, documents reviewed to date (April 30, 2003) indicate that soil removed during the excavation was used to backfill the pit.³ Therefore, the soil was not "clean" as in "background clean" but was contaminated. It is still unclear as to how contaminated the soil was that was placed back into the pit. It is also unclear if the top 4' of soil (required to be in place) was also "background clean" soil.

Therefore, this Revised Plan was developed to Characterize the top 3' of soil in an area 25'x25' wide.

Some characterization (scanning only) of the top 3' of soil going north of the former pit site former drainage area) from the tank pit site is also included in this Plan. After results of the scanning are obtained, a soil sample plan for this "drainage" area will be developed.

¹Letter dated November 30, 1984 from W. R. Mowry (signed by F.O. Bold) to William T. Crow (NRC Headquarters), "Request for Approval to Backfill L-307 Pit" with Final Report: L-307 Pit at GA Site".

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Phase I Plan

1. Remove the concrete, dumpster and grass (to bare soil) beginning 25' from the walkway going east up to 50' and from the road going north 25' (this will clear an area 25' x 25'). See Figure 1.
2. Mark the centerline of where the tank is believed to be located and go out 8.5' in each direction and out perpendicular to the road 17'; this gives a 17'x17' area of interest.
3. Scan the entire 25' x 25' area using a microR meter (surface scans) - 100% of area.
4. Sample the top 3' of soil in the 15 locations shown in Figure 2.

Collect composite samples every 1.5' depth (for a total of 30 soil samples).

Sample locations #1-5 will provide information on the soil concentrations in the top 3' of backfill soil. (Plan A)

Sample locations #6-10 will give GA an idea of what remained in the top 3' of soil around the pit site. (Plan B)

Sample locations #11-15 will give GA indication of any residual activity from past tank overflows.

Note: [ID numbers to be identified as follows: 307-1-A (for 307, sample location #1, sample A will be 0-1.5', B will be used for the same sample location but 1.5'-3' deep; sample location C will be used for the next depth].

5. Soil sample plan to be developed for the area north of the tank pit (drainage area) after scanning results are obtained.

Revision

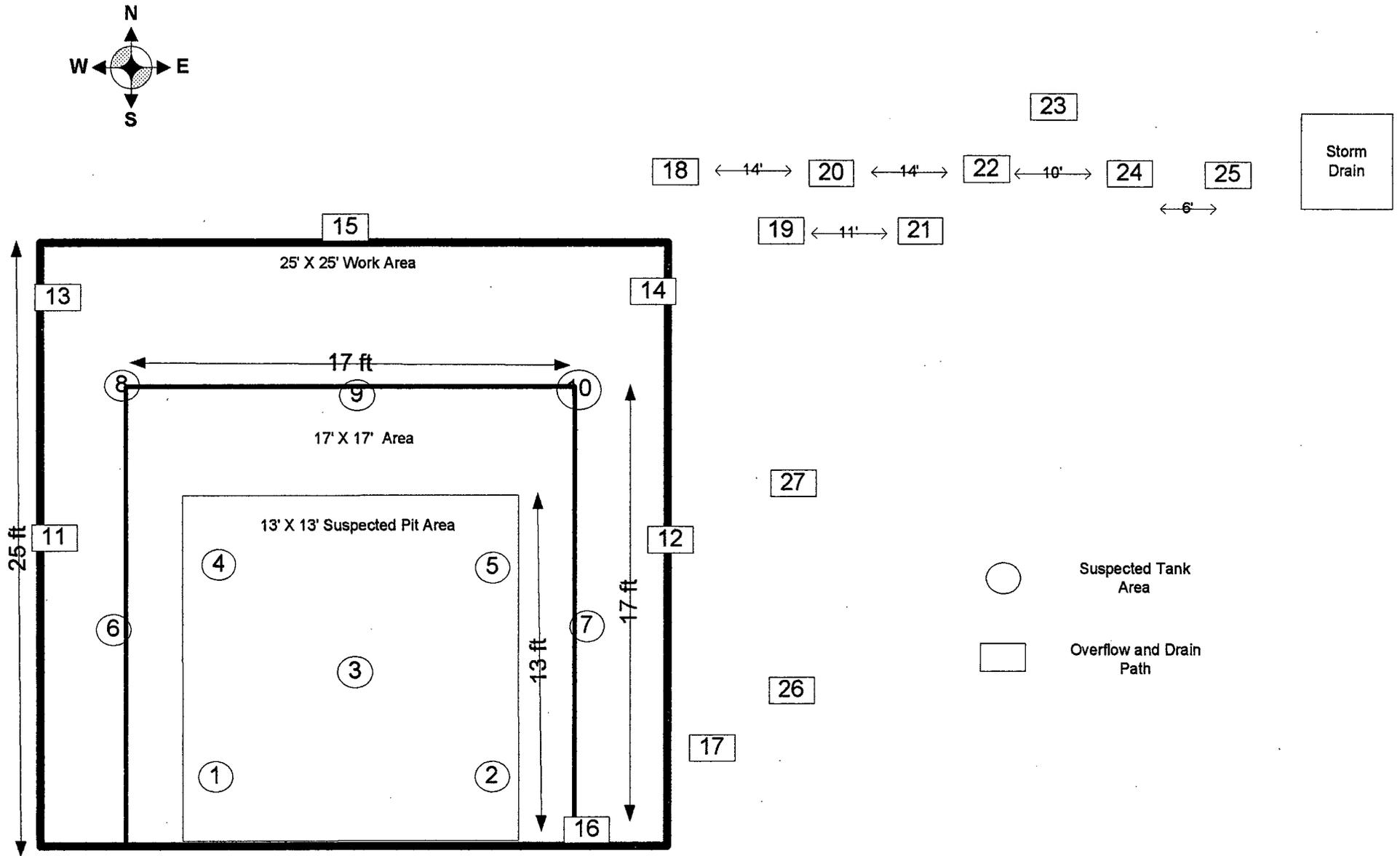
No residual activity has been detected as of the 3-6 ft depth of the samples. To expedite the characterization of the site a contractor will be brought in to core the area. This will give us a 3-dimensional view of the area and allow a more specific removal of any residual activity.

Phase II Plan

1. Contractor shall core 20 sample locations to the depth of 15ft from the present grade. 5 in the believed tank area. 5 at the tank boundary. 10 in the overflow area and drainage path. Per figure 3

2. Composite samples will be taken at 1ft intervals.
3. All samples will be analyzed on site, with approximately 20 samples sent off-site for Sr-90 analysis as indicated by the on-site analysis
4. Upon the completion of the sample analysis, a remediation plan will be prepared.

Figure 1: L-307 Phase II Core Locations



L307 Phase III

1. Core soil samples taken from 23 locations. 10 locations indicated levels > Bkg
 - a. Locations #2, #7, and #16 indicated activity to the bottom of the sample.
 - b. Locations #2 and #7 did not indicate decrease in activity levels as depth increased.
 - c. Location #16 had highest levels and did not have any samples bounding it to south or east.
 - d. Locations #10 and #15 not previously sampled due to accessibility issues with coring equipment

2. Propose to take 9 additional core samples.
 - a. 1 sample adjacent to locations #2 and #7 down to 20 ft to show bounding of the activity
 - b. 1 sample at location #10 after area is prepared for equipment.
 - c. 1 Sample between #15 and #9 to show a boundary
 - d. 5 samples to bound #16. 2 east, 2 south, 1 to the southeast.

3. Options for processing
 - a. Process all samples from 0-15' and 0-20' for resamples #2 and #7. Total of 145 samples
 - b. Discard top 10' of dirt (most activity found >10') sample every foot. Total of 55 samples
 - c. Process all of #16 bounding samples, 15-20 of the #2 and #7 resamples, all of #10 and #15 samples. Total of 115 samples.
 - d. Process #16 bounding samples relative to activity found in the location(bottom 6'), process 10-20' at locations #2 and #7, process all of #10 and #15. Total of 80 samples.

Figure 1: L307 Phase III

