Umetco Minerals Corporation

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May 11, 2005

Mr. Richard Weller, Project Manger
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
Mail Stop T-8-A-33
Two White Flint North, 11545 Rockville Pike
Rockville, Maryland 20852-2738

Re: Final Status Survey Report, Addendum 2

Reference: Materials License SUA-648, Docket No. 40-0299

Dear Mr. Weller:

Enclosed please find two (2) copies of Addendum 2, Final Status Survey Report, Gas Hills, Wyoming Site dated March, 2005.

This report is the second addendum to Umetco's Final Status Survey Report (FSSR), submitted to the U.S. Nuclear Regulatory Commission (NRC) on October 27, 2003. This Addendum addresses the A-9 Repository exposure survey and status of the A-9 Haul Road as discussed in NRC's letter to Umetco dated September 27, 2004.

Umetco will submit one additional addendum to document the gamma exposure survey for the GHP No. 2 reclamation cover once construction is completed in the fall of 2005.

If you have any questions or comments concerning this request, please contact me at (970) 256-8889 or by e-mail at gieckte@dow.com.

Sincerely,

Thomas E. Gieck
Remediation Leader

Enclosures: As Stated

cc: Mr. Mark Moxley WYDEQ w/enclosures

BCC: D. Moore
R. Garver
T. Gieck w/enclosures
E. Ley w/enclosures
S. Schierman w/enclosures
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Final Status Survey Report
Gas Hills, Wyoming Site

Addendum 2

Umetco Minerals Corporation
May 2005

FINAL STATUS SURVEY REPORT

Addendum 2

Gas Hills, Wyoming Site

Umetco Minerals Corporation
2754 Compass Drive, Suite 280
Grand Junction, Colorado 81506

May 2005

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Definition of Terms

Acronym	Definition
11e.(2)	11e.(2) byproduct material, defined under 10 CFR 40 Appendix A – tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.
AGTI	Above-Grade Tailings Impoundment (primary source of windblown contamination)
ALARA	As Low As Reasonably Achievable
ATV	All-Terrain Vehicle
BLM	Bureau of Land Management
cm	centimeter
cpm	counts per minute
cu yds	cubic yards
DOE	Department of Energy

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Definition of Terms (continued)

Acronym	Definition
dpm	disintegration per minute
EPA	Environmental Protection Agency
FSSP	Final Status Survey Plan
GIS	Geographic Information System
GPS	Global Positioning System
LC	License Condition
m / m^2	meter / square meter
NA	Non Applicable
NORM	Naturally Occurring Radioactive Minerals
NRC	U. S. Nuclear Regulatory Commission
pCi/g	picoCuries per gram
PIC	Pressurized Ionization Chamber
QA/QC	Quality Assurance/Quality Control
Ra-226	Radium-226
RMGPS	Radiological Measurement Global Positioning System
Th-230	Thorium-230
UCC	Union Carbide Corporation
Umetco	Umetco Minerals Corporation
UMTRCA	Uranium mill Tailings Radiation Control Act
U-nat	Natural Uranium

1 Introduction

1.1 *Background and Scope*

This report constitutes the second addendum to the report entitled *Final Status Survey Report* (FSSR), submitted to the U.S. Nuclear Regulatory Commission (NRC) by Umetco Minerals Corporation (UMETCO) on October 27, 2003. Items addressed in this submittal will document the A-9 Repository exposure survey and status of Susquehanna Haul Road not under a designed repository cover. Umetco will submit one additional addendum upon completion of reclamation work for the following areas:

- Addendum 3 will document the exposure survey for the *GHP-2* and *C-18 Repositories.* Reclamation of these repositories is scheduled to be completed in the fall of 2005. Addendum 3 is scheduled for submittal in August of 2006.

Figure 1.1 shows the site plan and location map reflecting the status of Final Status Survey efforts for all areas on the site.

2 A-9 Repository Exposure Survey

2.1 *Overview*

10 CFR 40, Appendix A, Criterion 6(1) requires demonstration that direct gamma exposure from tailings or waste be reduced to background levels. To demonstrate compliance with this requirement, gamma exposure surveys will be made over all areas of the site that are to be covered for long term stabilization. These areas include the AGTI, Heap Leach, GHP-2 and C-18. The site–wide background of 30 μR/hr has been established for the site repositories to demonstrate that gamma exposure levels for the tailings repositories meet 10 CFR 40, Criterion 6(1).

The primary approach used in the final status survey was the use of a real-time data collection technique or Global Positioning System (GPS). The GPS, a receiver which receives satellite transmissions to determine land surface coordinates (northing, easting, and elevation) was used in conjunction with a gamma detector, thereby allowing real-time measurements of surface gamma readings for exposure rate determination.

2.2 *Final Status Survey Approach*

The Final Status Survey Plan requires (1-meter high bare) gamma exposure surveys to be made over the completed earthen cover prior to placing rock (riprap) erosion protection materials. Surveys will be made using a vehicle mounted or backpack global positioning system (GPS) designed to simultaneously collect external gamma radiation measurements and location coordinates. The density of gamma exposure readings will be one reading per acre.

Radiological Measurement Global Positioning System (RMGPS) scintillation exposure rate scans will be conducted with the detector at one-meter above the repository cover surface; the density of the gamma exposure readings will be one reading per acre. Scans will be conducted on approximately parallel offsetting traverses of the cover approximately 10 meters apart while moving along the traverse at a rate not to exceed 0.5 meters per second. Exposures will generally

be conducted with a bare detector. However, if indications of shine from adjacent non-subject sources are observed (i.e. NORM/Mine Spoils), shadow-shielding or similar "collimation" methods may be utilized.

2.3 *Penetrating Radiation Surveys of Repositories*

Direct gamma radiation exposure rate for the A-9 were determined by conducting RMGPS scans over the completed earthen cover prior to placing riprap erosion protection materials, pursuant to Umetco procedure number R-17. Because the A-9 is a below grade repository indications of shine from adjacent NORM materials on the south, east and west boundaries of the A-9 were observed. As allotted for in the Final Status Survey Plan, collimated methods were utilized to determine the radiation exposure rate of the A-9. Because of shine, two RMGPS scintillation exposure rate scans were conducted of the A-9: one with a bare detector one-meter above the repository cover surface, and one with a collimated detector one-meter above the repository cover surface. Calibration of the radiation survey instruments were conducted utilizing a Pressurized Ionization Chamber (PIC) for bare and collimated detector at 1-meter. Scans were conducted utilizing an ATV on approximately parallel offsetting traverses of the cover approximately 10 meters apart, while moving along the traverse at a rate not exceeding 0.5 meters per second.

Results of the gamma radiation exposure surveys for the A9 are as follows:

- Bare detector 33 µR/hr @ 1-meter
- Collimated detector 28 µR/hr @ 1-meter

Gamma radiation exposure survey RMGPS coverage and gamma exposure levels are shown on (Plate 1) for bare detector and (Plate 2) for collimated detector surveys. It is important to note that exposure readings increased as measurements approached the North and South evaporation pond mine spoils to the west of the A-9 and the A-9 and C-18 mine pit highwalls to the east and south of the A-9 repository (see Plate1and Plate 2).

2.4 *Surface Soil Sampling and Analysis*

2.4.1 Sample Collection and Preparation

Cover materials utilized as frost protection for the A-9 are continuously gamma surveyed and the last two feet are soil sampled to demonstrate materials utilized are 10 pCi/g or less for Ra-226 content. Soil samples were collected from the A-9 cover at a minimum of one test per 5000 cubic yards of placed frost protection material from the final two, one-foot material lifts. Each repository is divided into 315 to 350 foot grids with up to five sample locations collected from each grid for each 1 foot lift. Each sample collected from within the grid is blended to create one (1) sample composite representative of the cover materials placed within that individual grid. This is the same protocol utilized for placement of frost material for the Above Grade and Heap Leach.

For the A-9 there were 23 grid locations that were sampled to demonstrate placed cover materials were 10 pCi/g or less for Ra-226 content. Results of the A-9 soil sampling are illustrated in Figures 2.1 and 2.2.

2.4.2 Sample Results

Composite grid samples from the A-9 were analyzed utilizing outside and onsite laboratories for Ra-226 content. Composite grid samples were analyzed for Ra-226 in the manner described below and a subset were sent to a contract laboratory for confirmatory analysis.

The onsite laboratory was used for analysis of a portion of composite grid samples for two primary reasons. First, previous comparisons with outside laboratory results and periodic analysis of external reference materials (e.g., blind duplicates) indicated that the onsite data met or exceed data quality objectives and that results were within standard margin of error terms on known reference materials.

Upon completion of sample preparation, approximately 1000-gram aliquot of the pulverized (-200 mesh) composite sample was placed into a marinelli beaker, sealed and counted for 30 minutes in Umetco's gamma spectrometer after allowing 21 days for ingrowth to occur. Samples sent to the outside or contract laboratory were counted utilizing a gamma spectrometer allowing 21 days for sample ingrowth. Both laboratories use the 609 keV, Bi-214 peak to identify Ra-226 content.

2.5 *NESHAPS Results*

Radon emissions from uranium mill tailings are regulated by the NRC under generally applicable standards set by the Environmental Protection Agency (EPA). Applicable regulations are specified in 10 CFR Part 40, Criterion 6 and applicable technical procedures in 40 CFR Part 61, Appendix B. Radon-222 emissions from uranium mill tailings are limited to an average of 20 picoCuries per meter squared per second ($pCi/m^2/sec$) for each region. Radon sampling and analytical method used was in conformance with 40 CFR, Part 61, Appendix B, Method 115.

Each charged canister was placed directly onto the surface (open face down) and exposed to the surface for 24 hours. Radon absorbed onto the charcoal and subsequent radioactive decay of the entrained radon produce lead-214 and bismuth-214. These radon progeny isotopes emit a characteristic gamma photons that can be detected through gamma spectroscopy. NESHAPS sampling utilizing this same protocol was performed for the Above Grade and Heap Leach.

Location of the NESHAPS sampling for the A-9 are shown in Figure 2.3.

2.6 *Summary and Conclusions*

Data from soils sampling of cover materials placed on the A-9 and results from NESHAPS sampling are included as supplemental information to demonstrate elevated gamma exposure levels observed during the gamma exposure bare detector survey of the A-9, are due to shine from bordering NORM/mine spoils associated with the North and South evaporation ponds, A-9 and C-18 mine pit highwalls. This shine observed at the A-9 is due in part to the topography of the A-9 being a below grade repository.

Gamma exposure bare detector levels observed for the Above Grade and Heap Leach were 27 µR/hr utilizing the same 10 pCi/g guideline for cover placement. Soil samples from the final two one-foot material lifts (0-1 and 1-2 foot) show cover materials meet the 10 pCi/g guideline for Ra-226 activity of cover materials. This is reflective of the last two feet of cover placement at

the A-9; however, during cover placement activities continuous gamma surveys were conducted of all materials placed as cover materials to ensure material met the 10 pCi/g guideline for Ra-226 activity. The same practice of continuous gamma surveys of cover materials was employed for the Heap and Above Grade. In reviewing gamma exposure data from these repositories, indications of shine were also observed as measurements approached the edge of the repositories and areas of mine spoils. These effects were not as significant in affecting the overall pile averages however, as both the Above Grade and Heap Leach are above grade repositories.

NESHAPS sampling for the each of the Repositories show that all meet the 20 $pCi/m^2/sec$ standard and the repositories are similar in radon flux release rates. If the elevated readings were due to the materials placed in the A-9 rather than shine, seeing significant differences in the radon flux rates between the repositories would be expected. Listed below are the radon flux rates for each of the repositories:

- A-9 3.5 $pCi/m^2/sec$
- Above Grade 1.4 $pCi/ m^2/sec$
- Heap Leach 1.1 $pCi/ m^2/sec$

Based on the above information, Umetco considerers the elevated gamma measurements observed from the bare detector to be shine and not a representative exposure measurement of the A-9. Section 6 of the Final Status Survey Plan allows for use of collimated readings for exposure if shine from adjacent non-subject sources are observed. Umetco proposes to utilize the collimated 1 meter readings as the gamma exposure measurement method for the A-9.

Based on this information Umetco considers the final status survey activities complete for the A-9. The average exposure rate measured over this area is 28 μR/hr, thereby satisfying the 30 μR/hr criterion (Plate 2).

3 Susquehanna Haul Road

3.1 *Overview*

The NRC concluded that the proposed plan presented in Umetco's application met the requirements of Appendix A to 10 CFR Part 40 for reclamation of the A-9 Repository (A-9) and therefore recommended authorization to receive and dispose of Riverton waste (Susquehanna Tailings) in the A-9 Repository on October 7, 1987.

Approximately 1,793,801 cubic yards of Susquehanna tailings from the Riverton processing site were hauled and placed in the A-9 Repository during 1988 and 1989. Trucks hauling the tailings materials arrived at the Umetco site in a strong tight package. Packages followed the designated haul route for disposal of the Susquehanna tailings in the A-9. Upon disposal of tailings in the A-9 trucks traveled up a designated haul road to the decontamination pad prior to departure from the Umetco site.

The portion of the road in question of contamination from tailings materials is from the A-9 disposal cell to the decontamination pad as shown in Figure 3.1. At present the only section of this roadway not contained within a NRC approved disposal cell, is a section approximately 722 feet in length between the Heap Leach and the A-9 Repository as depicted in red on Figure 3.2.

3.2 *Final Status Survey Approach*

The final Status Survey Plan calls investigation into the presence of byproduct material contamination from where haul trucks would leave the A-9 Repository to the decontamination facilities. The portion of the haul road to the decontamination facility not under the footprint of the Heap or GHP-2 disposal cells is the area addressed in this submittal. (see Figure 3.2)

The sampling methodology used to determine the presence or absence of Susquehanna Tailings along this 722 foot section of roadway is as follows. First the road location and elevation were determined from aerial photos taken during the time frame disposal activities took place at the A-9. Once the road location was established a 10 meter grid was placed over the center of the roadway. Five soil sampling locations were selected within the 10 meter grid, and excavation to the 1990 road elevations took place. Excavation consisted of the removal of approximately 1 to 7 feet of material to sample roadway elevation horizons utilized during disposal of the Susquehanna tailings in the A-9. Soil sampling was conducted as specified in Umetco Procedure E-17 Repository Soil Sampling Strategy.

3.3 *Surface Soil Sampling and Analysis*

3.3.1 Sample Collection and Preparation

A total of 22 grids were placed over the center of the Susquehanna Haul Road. Five sample locations were selected from within each grid to form a composite sample for each grid. Gamma measurements, visual observations and photographs were collected from each of the five sample locations. When sample locations reached elevation horizons as indicated during the 1990 aerial photo a sample was collected from that location. In addition to the soil samples, gamma measurements and visual observation were made to help establish if byproduct materials were present. This process was followed for all five sample locations in each of the 22 grids sampled (Figure 3.3).

Once sample preparation was completed samples were sent to the contract laboratory for analysis. A total of 22 grid composite soil samples were sent to the laboratory and analyzed for Unat, Ra-226 and Th-230.

3.3.2 Sample Results

Visual observation and gamma measurements conducted during excavation and sampling of the grids did not identify any materials that appeared to be Susquehanna Tailings materials.

Laboratory results for the 22 grids collected from the Susquehanna haul road are shown in the following table (Table 3.1):

Table 3.1 Soil Sampling Results for Susquehanna Haul Road

Location Code	Location	Ra-226 (pCi/g)	Th-230 (pCi/g)	U-nat (pCi/g)
SEQG1	Grid 1 (Susquehanna haul road)	20.8	14.4	34.5
SEQG2	Grid 2 (Susquehanna haul road)	44.1	41.4	28.8
SEQG3	Grid 3 (Susquehanna haul road)	45.8	35.3	30.2
SEQG4	Grid 4 (Susquehanna haul road)	43.6	33	28.2
SEQG5	Grid 5 (Susquehanna haul road)	44.7	33.4	26.5
SEQG6	Grid 6 (Susquehanna haul road)	38.1	29.5	26.3
SEQG7	Grid 7 (Susquehanna haul road)	49.9	34.7	34.4
SEQG8	Grid 8 (Susquehanna haul road)	28.1	20.8	24.9
SEQG9	Grid 9 (Susquehanna haul road)	32.9	25.2	33.6
SEQG10	Grid 10 (Susquehanna haul road)	21.7	17.7	26.5
SEQG11	Grid 11 (Susquehanna haul road)	29.1	24.8	30.3
SEQG12	Grid 12 (Susquehanna haul road)	28.4	21.1	31.9
SEQG13	Grid 13 (Susquehanna haul road)	23	19.4	33.0
SEQG14	Grid 14 (Susquehanna haul road)	26.8	21.7	37.5
SEQG15	Grid 15 (Susquehanna haul road)	27.5	19.9	40.7
SEQG16	Grid 16 (Susquehanna haul road)	19.4	19.2	39.7
SEQG17	Grid 17 (Susquehanna haul road)	23.5	21.3	35.8
SEQG18	Grid 18 (Susquehanna haul road)	27.3	24.6	38.9
SEQG19	Grid 19 (Susquehanna haul road)	28.1	19.3	35.3
SEQG20	Grid 20 (Susquehanna haul road)	23.9	17.4	31.8
SEQG21	Grid 21 (Susquehanna haul road)	35.7	25.4	29.3
SEQG22	Grid 22 (Susquehanna haul road)	20.2	14.7	25.2

Samples were collected in August 2004 and were analyzed by ACZ Laboratories.
U-nat originally reported in mass units (mg/kg), was converted to activity by multiplying the mass value by 0.677.

3.4 *Summary and Conclusions*

To determine if contamination of the Susquehanna Haul Road from tailings materials placed in the A-9 pit occurred, Umetco relied on visual observations, soil sampling results, and historical practices that were conducted at the site.

First, since the haul road is in close proximity to the North Evaporation Pond and A-9 mine pit, it is probable that low level ore (mine spoils) were utilized to construct this roadway. Antidotal information from site personnel present during operations indicated it was common practice to utilize mine spoils for construction of roadways.

Susquehanna Tailings characterization reports indicate Ra-226 levels were at 343 pCi/g. Th-230 levels were not measured but assumed to be in equilibrium with Ra-226 levels. The U-238 content of the tailings materials were at 25 pCi/g (MSRD, 1982). The ratio of Ra-226/U-238 for the tailing materials is 13.7.

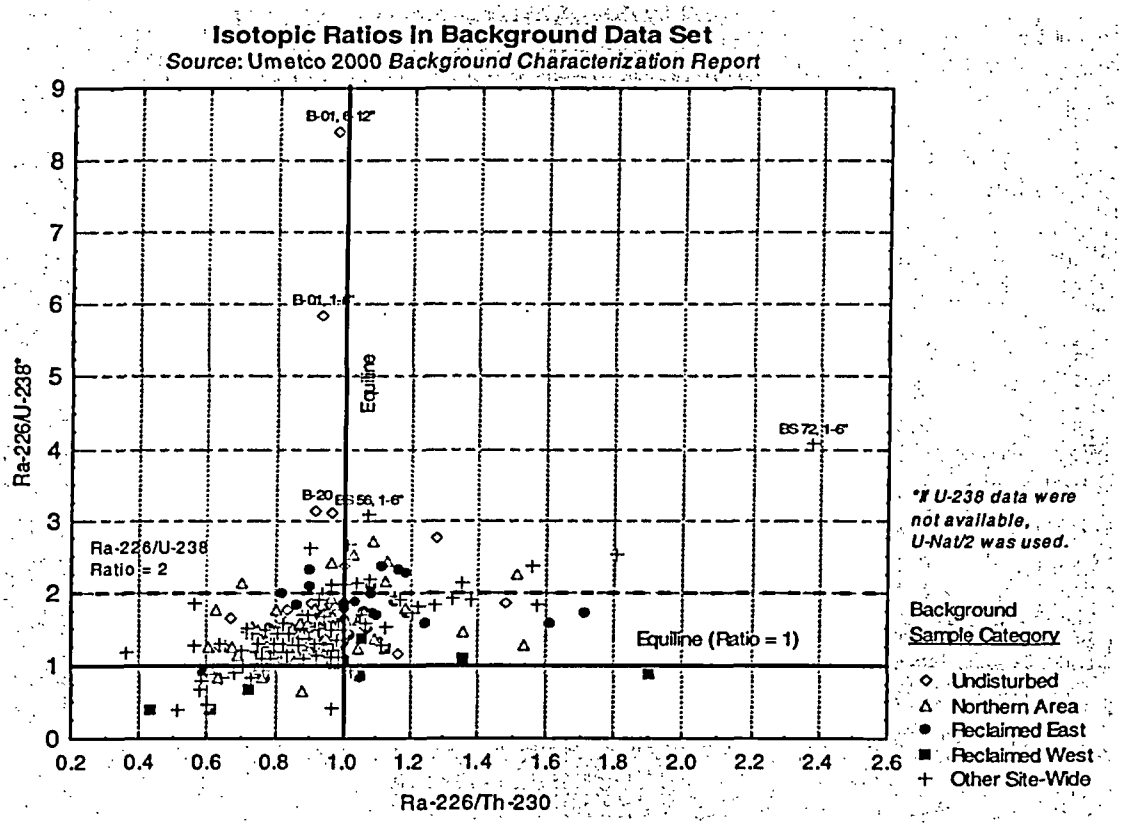
No materials were encountered during sampling either by visual or elevated gamma measurement that appeared to be indicative of tailings materials. When excavation of the process waterline occurred, areas where tailings were present were identifiable visually and by elevated meter readings (70,000 cpm). Tailings materials would not be expected to be found in the quantity observed at the process water line so Umetco looked at identification of this material utilizing Ra-226/0.5*Unat Ratio's as a method to determine the presence or absence of tailing

materials. If tailings were present on the Susquehanna Haul road a disproportional ratio of Ra-226 to U-238 would be expected.

The ratio of Unat, Ra-226 and Th-230 utilized to determine the presence of byproduct material from the disposal of the Susquehanna Uranium mill tailing in the A-9 tailings cell, however, indicates the materials are in disequilibrium with a average Ra-226/U-nat ration of 2.01. (See Figure 3.3)

The disequilibrium apparent along the Susquehanna Haul Road, where Ra-226/0.5*U-nat ranges from 0.98 to 3.37 with an average of 2.01, is not considered indicative of mill tailings impacts as this ratio is well within the range of ratios calculated for the approved background data set. As discussed in Section 3.1 of Umetco's *Background Characterization Report* (Umetco, 2000), although using Ra-226/U-238 ratios to identify milling-related impacts is recommended by the NRC and has been applied at other sites, such evaluation has not yielded compelling results at the Gas Hills. This finding is demonstrated graphically in Figure 3.10 of the *Background Characterization Report* and in the following plot:

Table 3.2



Note: For samples analyzed for total U-nat and lacking isotopic data for U-238, the U-238 component was estimated by dividing the U-nat value by 2. This approach assumes that the U-nat source term is represented as percent activity by 49.2% U-238, 49.2% U-234 and 1.6% U-235.

If uranium mill tailing were present from spillage during the Susquehanna Tailing disposal in the A-9 disposal cell, one would expect the Th-230 and Ra-226 concentrations to be elevated while the U-nat would be depleted. If the Susquehanna Haulage road were contaminated from tailings materials one would expect the ratio to be more disproportional than what sampling of this roadway indicates.

The ratios observed from the Susquehanna haul road are consistent with ratios observed from low-level ore (mine spoils) identified at the B-5 Pit mine area, North and South Evaporation Ponds and similar ratios discussed in the Final Background Characterization Report Section 3 and Tables 3.3 through 3.8. The radiological investigation of the section of the Susquehanna Haul road not currently under the confines of a designed repository indicates any spillage that may have occurred is indistinguishable from the low-grade ore utilized to construct the roadway, and soils more closely resemble the characteristics of low-grade ore/mine spoils (i.e., NORM material) rather than tailings sands. Cleanup of the Susquehanna Haul Road is considered to be complete.

4 Remaining Final Status Survey Activities to be Completed

4.1 *Addenadum 3*

Umetco anticipates reclamation areas included in Addendum 3 of the FSSR will be completed during the 2005 construction season. Addendum 3 will consist of the following:

- **C-18 Deep burial Repository Exposure Survey**
- **GHP-2 Exposure Survey**

5 References

US Nuclear Regulatory Commission (NRC) 1994. Title 10, Code of Federal Regulation, "Energy" January 1, 1994.

US Nuclear Regulatory Commission (NRC) 1996. NRC Staff Comments on Umetco's Draft Report on Background Land Conditions at Gas Hills Uranium Project and Radiological Investigations Programs, September 20, 1996.

US Nuclear Regulatory Commission (NRC) 1997. NRC Staff Comments on Umetco's Response and Revised Report on Background Land Conditions, December 12, 1997.

US Nuclear Regulatory Commission (NRC) 1996b NRC letter approving revisions to License Condition 58 re: Design for Enhancement of the Previously Approved Reclamation Plan for the A-9 Repository for Material License SUA-648, Amendment 42, December 9, 1999.

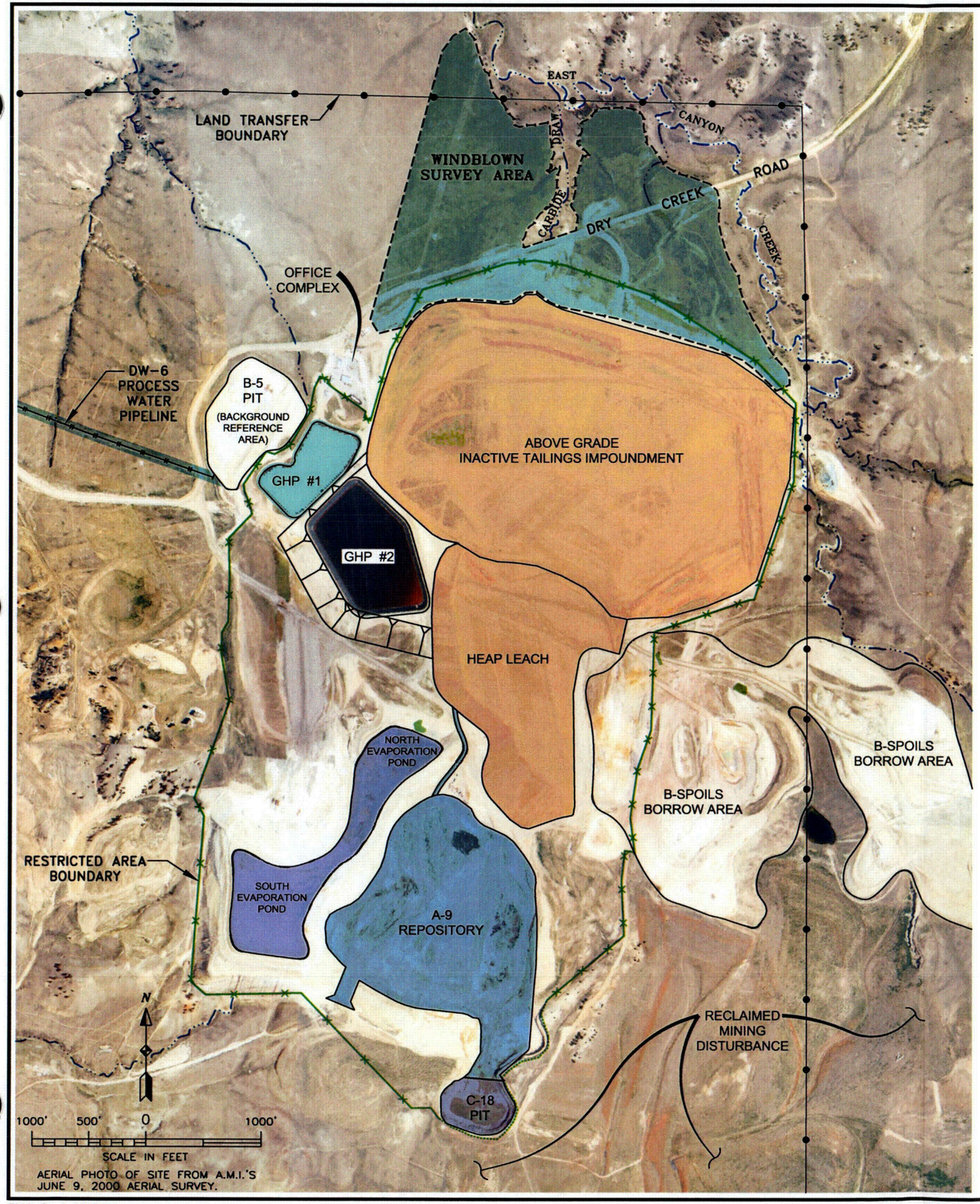
Umetco Minerals Corporation 2000a. Final Status Survey Plan, Gas Hills, Wyoming Site, September 2000.

Umetco Minerals Corporation 2000b. Final Background Characterization Report, Gas Hills, Wyoming Site, September 2000.

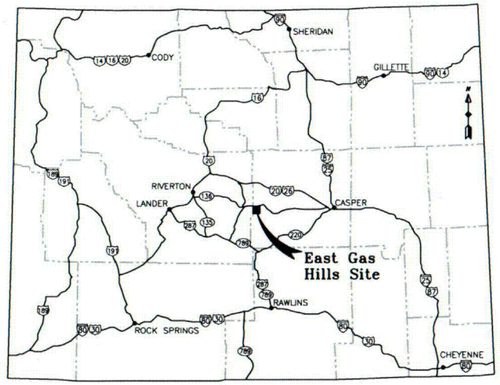
Umetco Minerals Corporation 2004. Final Status Survey Report, Gas Hills, Wyoming Site, Addendum 1.

US Environmental Protection Agency (EPA) 1994. Title 40, Code of Federal Regulations, Environment, January 1, 1994.

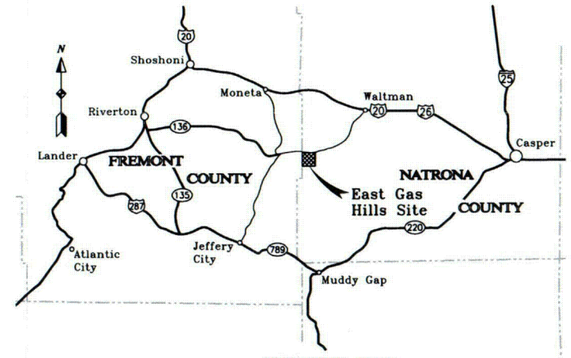
US Department of Energy (DOE) 1987. Remedial Action at Riverton Uranium Mill Tailing Site, Riverton, Wyoming DOE/EA-0254.



AERIAL PHOTO OF SITE FROM A.M.I.'S JUNE 9, 2000 AERIAL SURVEY.



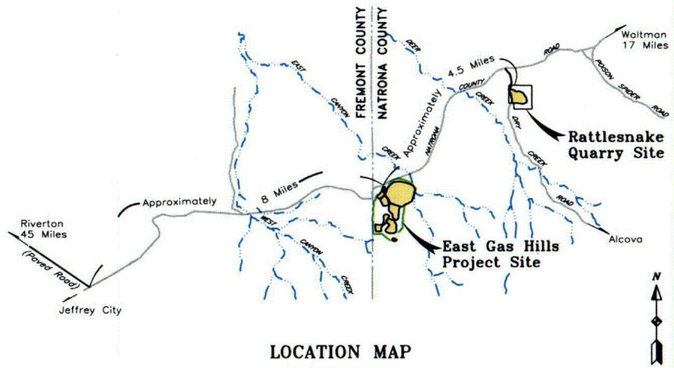
STATE OF WYOMING
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

LEGEND:

- WINDBLOWN STUDY AREA BOUNDARY
- 2002 FINAL STATUS SURVEY AREA COMPLETE (NRC Letter 9/27/04)
  - WINDBLOWN SURVEY AREA, APPROXIMATELY 111 ACRES
  - GHP-1 – APPROXIMATELY 9 ACRES (POND WAS DRAINED AND LINER REMOVED IN AUGUST 2000)
  - DW-6 PROCESS WATER PIPELINE, SURVEY AREA APPROXIMATELY 3 MILES IN LENGTH
- 2001 EXPOSURE RATE SURVEY AREA COMPLETE (NRC Letter 9/27/04)
- THE A-9 REPOSITORY GAMMA SURVEY AND A-9 HAUL ROAD VERIFICATION PROVIDED IN ADDENDUM 2 TO FSSR.
- THE GHP No. 2 GAMMA SURVEY WILL BE SUBMITTED UPON COMPLETION OF THE GHP No. 2 RECLAMATION COVER AS ADDENDUM 3 TO THE FSSR.
- TRASH PITS CLEANUP COMPLETE (NRC Letter 9/27/04) FORMER TRASH PITS, EXCAVATED IN JULY AND AUGUST 2000. THE TRASH, WHICH CONSISTED MOSTLY OF SCRAP METAL AND REFUSE, WAS REMOVED AND HAULED TO THE A-9.
- OTHER AREAS ADDRESSED UNDER THE RECLAMATION PLAN. THE EXPOSURE RATE SURVEY FOR THE C-18 PIT WILL BE PERFORMED UPON COMPLETION OF THE C-18 BACKFILL. THE RECLAMATION PLAN FOR THE NORTH AND SOUTH EVAPORATION PONDS (SMI 1998) WAS APPROVED BY THE NRC IN 1999. NO COVER OR POST-EXCAVATION RADIOLOGICAL SURVEY WAS REQUIRED FOR THIS AREA (NRC 1999).
- LAND TRANSFER BOUNDARY
- RESTRICTED AREA BOUNDARY
- DW-6 PROCESS WATER PIPELINE
- FEATURE BOUNDARIES
- DRAINAGEWAYS



LOCATION MAP
NOT TO SCALE

LEGAL DESCRIPTION OF LONG TERM CARE BOUNDARY:

LONG TERM CARE BOUNDARY INCLUDES ALL OF SECTION 15, THE NORTH HALF OF SECTION 22, THE NORTHEAST QUARTER OF SECTION 21, THE EAST HALF OF SECTION 16, THE SOUTHEAST QUARTER OF SECTION 9 AND THE SOUTH HALF OF SECTION 10, ALL LOCATED IN TOWNSHIP 33 NORTH, RANGE 89 WEST OF THE SIXTH PRINCIPAL MERIDIAN. SAID LAND CONTAINS 1920 APPROXIMATELY ACRES.

UMETCO MINERALS CORPORATION

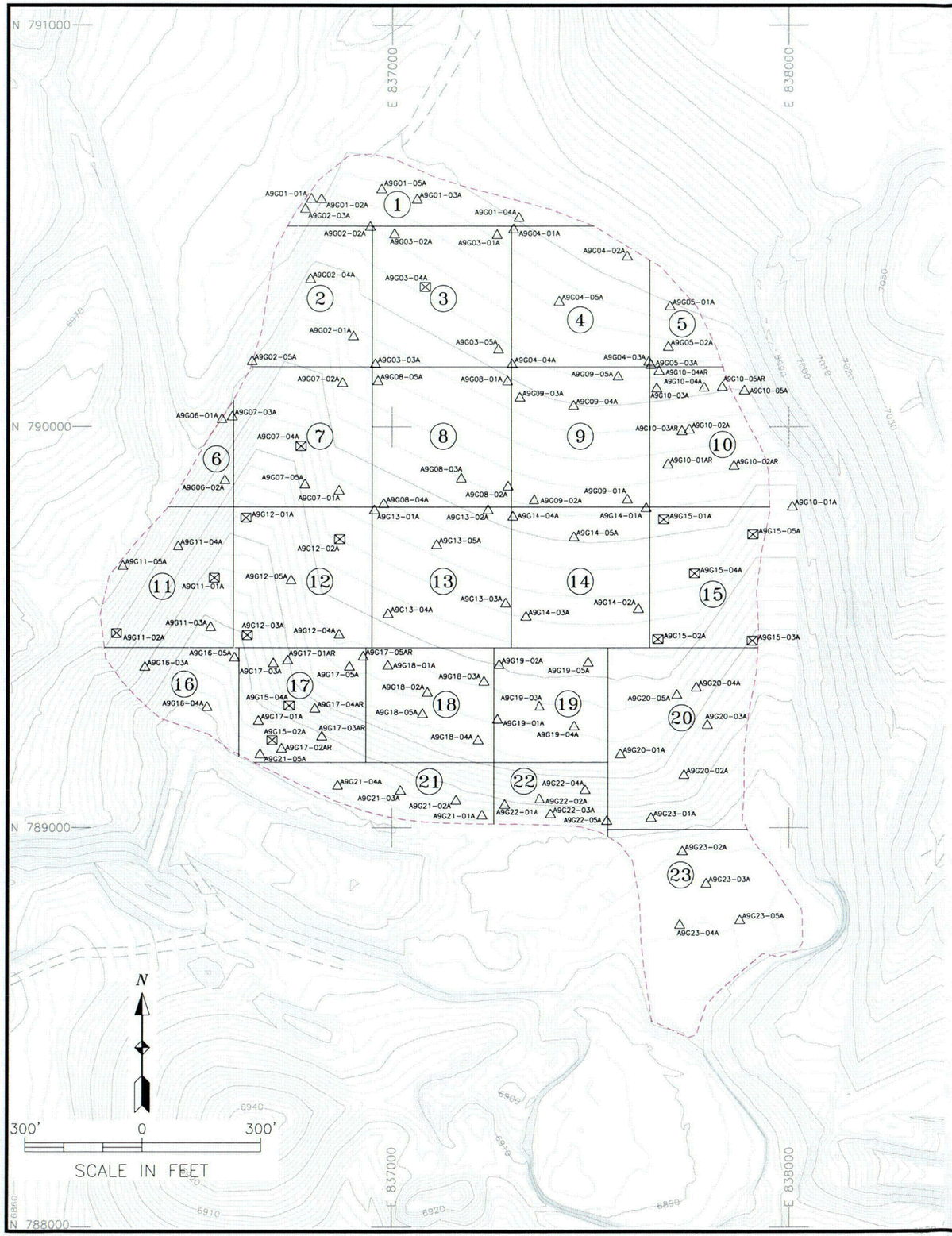
SITE PLAN AND LOCATION MAP

GAS HILLS, WYOMING

MAY, 2005 FIGURE 1.1

FSSR-Fig-1-2005.dwg

C01



Location	Ra-226 pCi/g	±	Analytical Date
A9G1A	3.74	0.73	9/12/2002
A9G2A	5.78	0.84	9/12/2002
A9G3A	5.8	1.1	10/30/2001
A9G4A	6.4	1.2	10/30/2001
A9G5A	6.36	0.95	9/12/2002
A9G6A	7.07	1.01	9/12/2002
A9G7A	5.25	0.82	9/12/2002
A9G8A	8.9	1.7	10/30/2001
A9G9A	8.4	1.5	10/30/2001
A9G10A	6.9	0.32	3/7/2005
A9G11A	9.4	0.42	3/7/2005
A9G12A	9.57	0.43	3/2/2005
A9G13A	8.8	1.6	10/30/2001
A9G14A	8.2	1.5	10/30/2001
A9G15A	7.73	0.38	3/9/2005
A9G16A	9.2	0.35	2/24/2004
A9G17A	4.94	0.41	7/20/2004
A9G18A	10.3	0.47	3/2/2005
A9G19A	9.45	0.4	2/25/2004
A9G20A	9.97	0.5	2/25/2004
A9G21A	8.38	0.4	2/25/2004
A9G22A	6.58	0.3	2/26/2004
A9G23A	10.45	0.47	3/23/2004

LEGEND

△A9G08-01A INDIVIDUAL SOIL SAMPLE LOCATIONS "R" INDICATES RESAMPLED AND RETESTED

⊠A9G15-01A INDIVIDUAL SOIL SAMPLE APPROXIMATE LOCATIONS (LOCATION NOT SURVEYED)

(8) SECTION NUMBER

UMETCO MINERALS CORPORATION

A-9 REPOSITORY

SOIL SAMPLE LOCATIONS

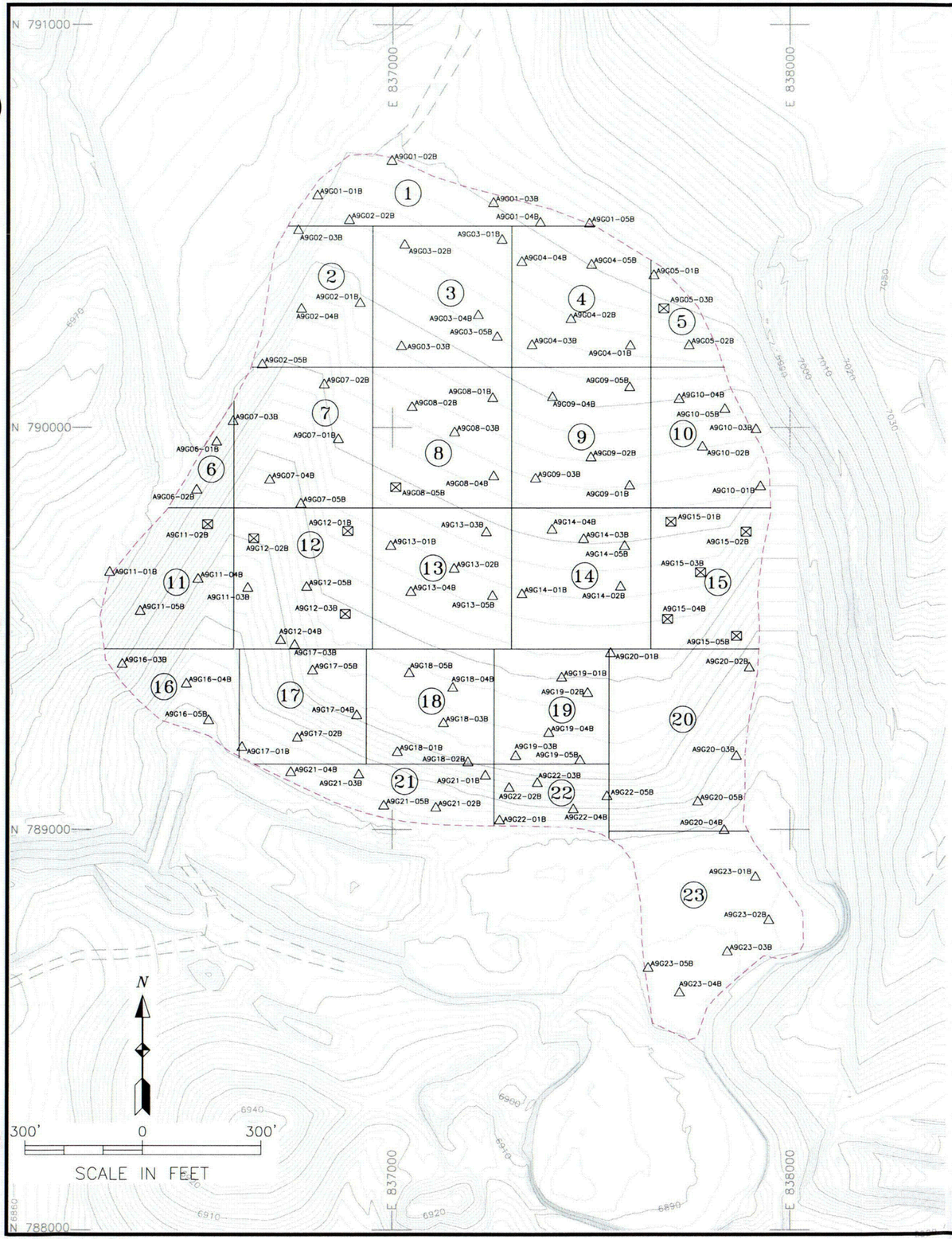
0 TO 1 FOOT DEPTH

GAS HILLS, WYOMING

MAY, 2005 FIGURE 2.1

A-9 Samples 0 to 1.dwg

C02



Location	Ra-226 pCi/g	±	Analytical Date
A9G1B	4.7	0.8	9/9/2002
A9G2B	6.41	1.04	9/12/2002
A9G3B	7.7	1.4	10/30/2001
A9G4B	7.74	1.3	10/30/2001
A9G5B	6.2	0.88	9/12/2002
A9G6B	7.26	1.1	9/12/2002
A9G7B	6.7	0.98	9/12/2002
A9G8B	7.9	1.4	10/30/2001
A9G9B	8.3	1.5	10/30/2001
A9G10B	6.63	0.34	6/7/2002
A9G11B	9.85	0.44	3/2/2005
A9G12B	9.52	0.46	3/2/2005
A9G13B	7.6	1.4	10/30/2001
A9G14B	8	1.5	10/30/2001
A9G15B	6.36	0.32	2/24/2004
A9G16B	8.57	0.3	2/24/2004
A9G17B	8.45	0.3	2/24/2004
A9G18B	10.3	0.6	2/24/2004
A9G19B	9	0.4	2/25/2004
A9G20B	8.2	0.35	2/25/2004
A9G21B	6.58	0.3	2/26/2004
A9G22B	7.4	0.4	2/23/2004
A9G23B	9.5	0.4	3/27/2004

LEGEND

△A9G08-01B INDIVIDUAL SOIL SAMPLE LOCATIONS

⊠A9G15-01B INDIVIDUAL SOIL SAMPLE APPROXIMATE LOCATIONS (LOCATION NOT SURVEYED)

(8) SECTION NUMBER

UMETCO MINERALS CORPORATION

A-9 REPOSITORY
SOIL SAMPLE LOCATIONS
1 TO 2 FOOT DEPTH

GAS HILLS, WYOMING

MAY, 2005 FIGURE 2.2

A-9 Samples 1 to 2.dwg

C03

LEGEND

2003 FINAL CONTOUR

A-9 REPOSITORY LIMITS

AN-001 — A-9 CANISTER LOCATION
AN-001 THRU AN-045
DEPLOYED -> 5/27/02
RETRIEVED -> 5/28/02

AN-046 — A-9 CANISTER LOCATION
AN-046 THRU AN-100
DEPLOYED -> 8/13/03
RETRIEVED -> 8/14/03

N

100' 0 100'

SCALE IN FEET
CONTOUR INTERVAL : 2'

UMETCO MINERALS CORPORATION

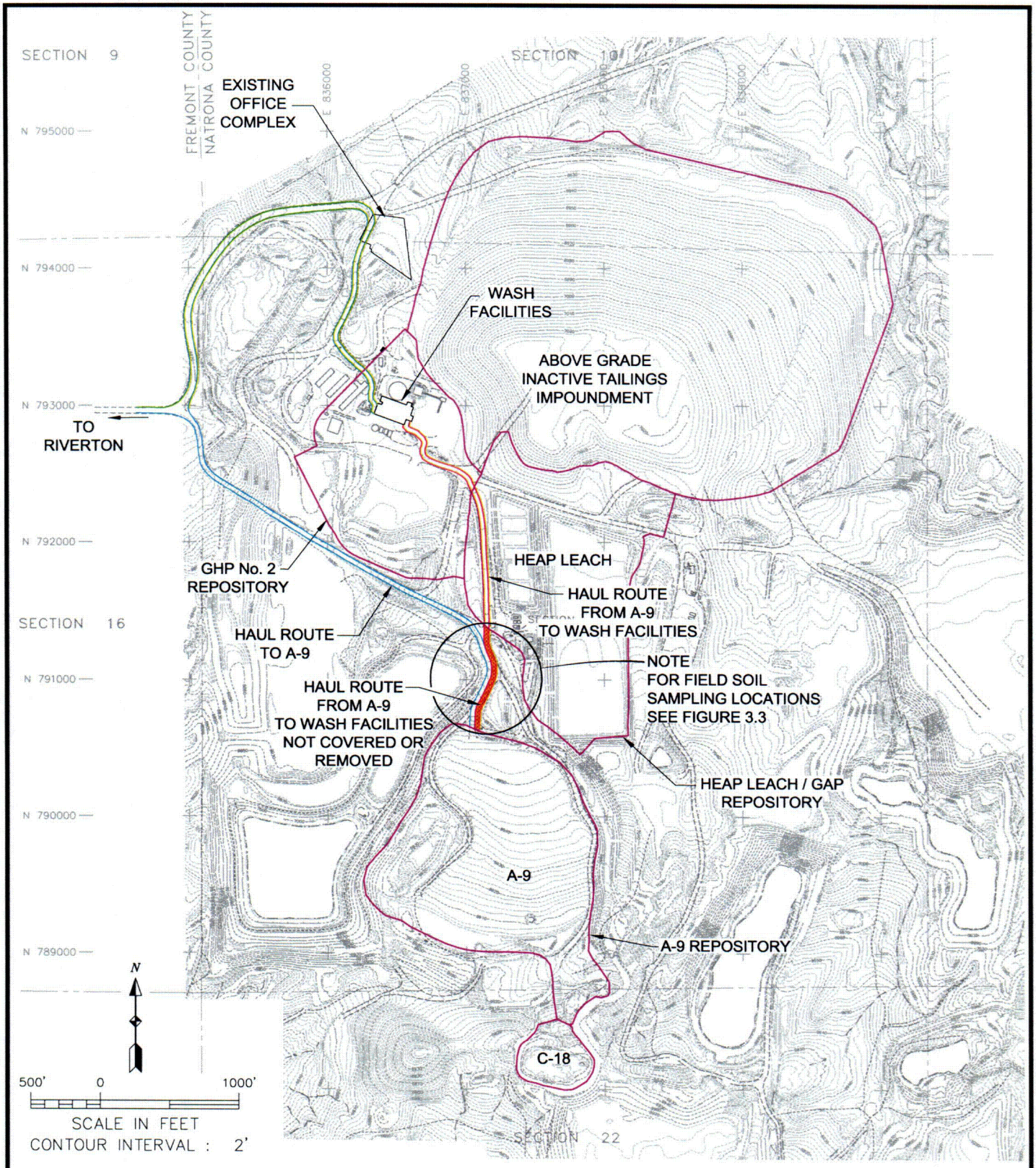
2002/2003 NESHAPS SAMPLE LOCATIONS

GAS HILLS, WYOMING

MAY, 2005 FIGURE 2.3

A9-2003-NESHAPS Loc.dwg

C04



LEGEND – SUSQUEHANNA TAILINGS HAUL ROUTES

- From Riverton to the A–9 Repository
- From the A–9 Repository to the Wash Facilities
- Return Route from the Wash Facilities to Riverton
- Haul Route from the A–9 Repository to the Wash Facilities not under a Reclamation Cover
- Limits of Repository Reclamation Cover

UMETCO MINERALS CORPORATION

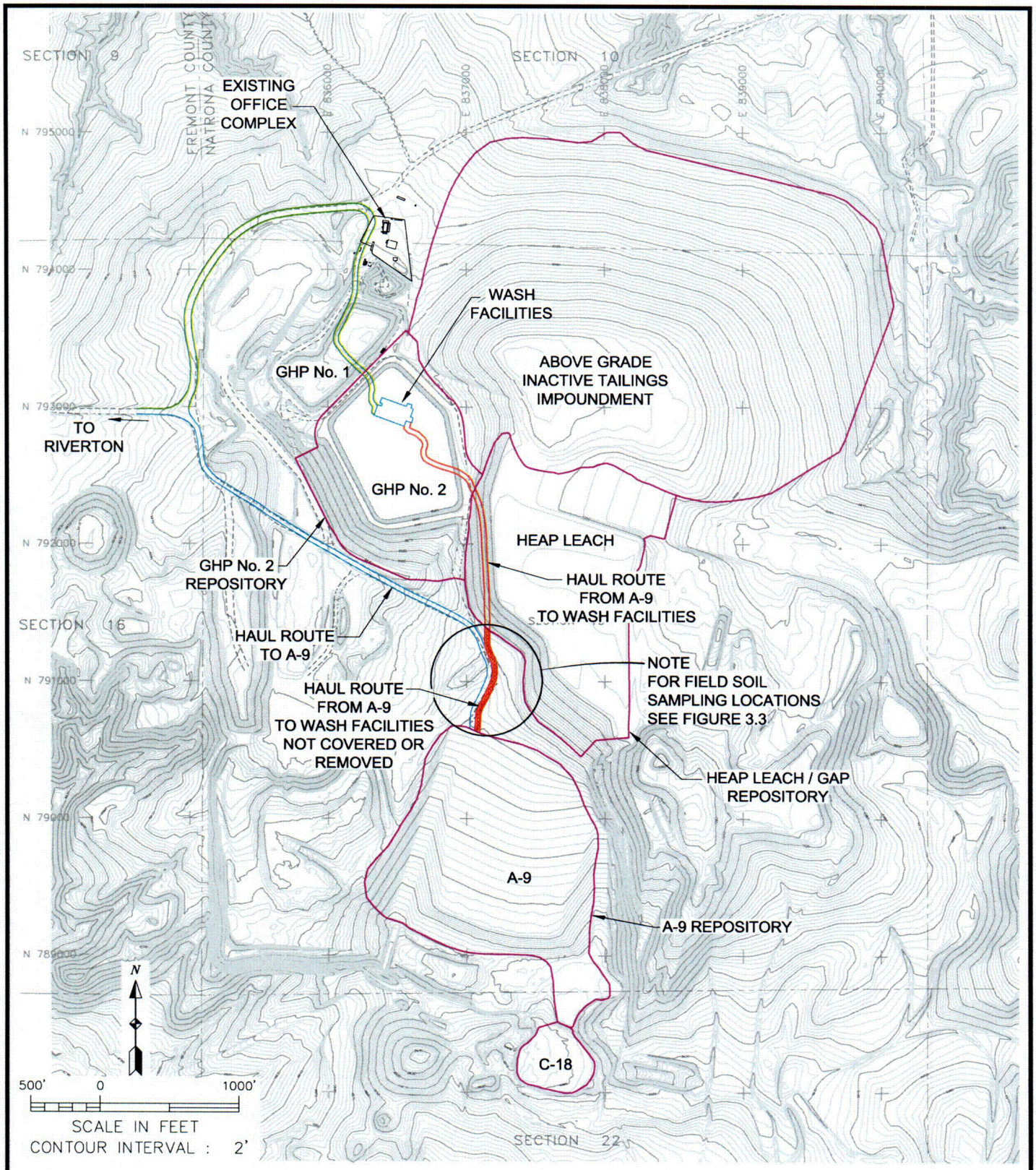
SUSQUEHANNA TAILINGS HAUL ROUTES 1990 CONDITIONS

GAS HILLS, WYOMING

MAY, 2005 FIGURE 3.1

1990–Route.dwg

C05



LEGEND – SUSQUEHANNA TAILINGS HAUL ROUTES

- From Riverton to the A–9 Repository
- From the A–9 Repository to the Wash Facilities
- Return Route from the Wash Facilities to Riverton
- Haul Route from the A–9 Repository to the Wash Facilities not under a Reclamation Cover
- Limits of Repository Reclamation Cover

UMETCO MINERALS CORPORATION

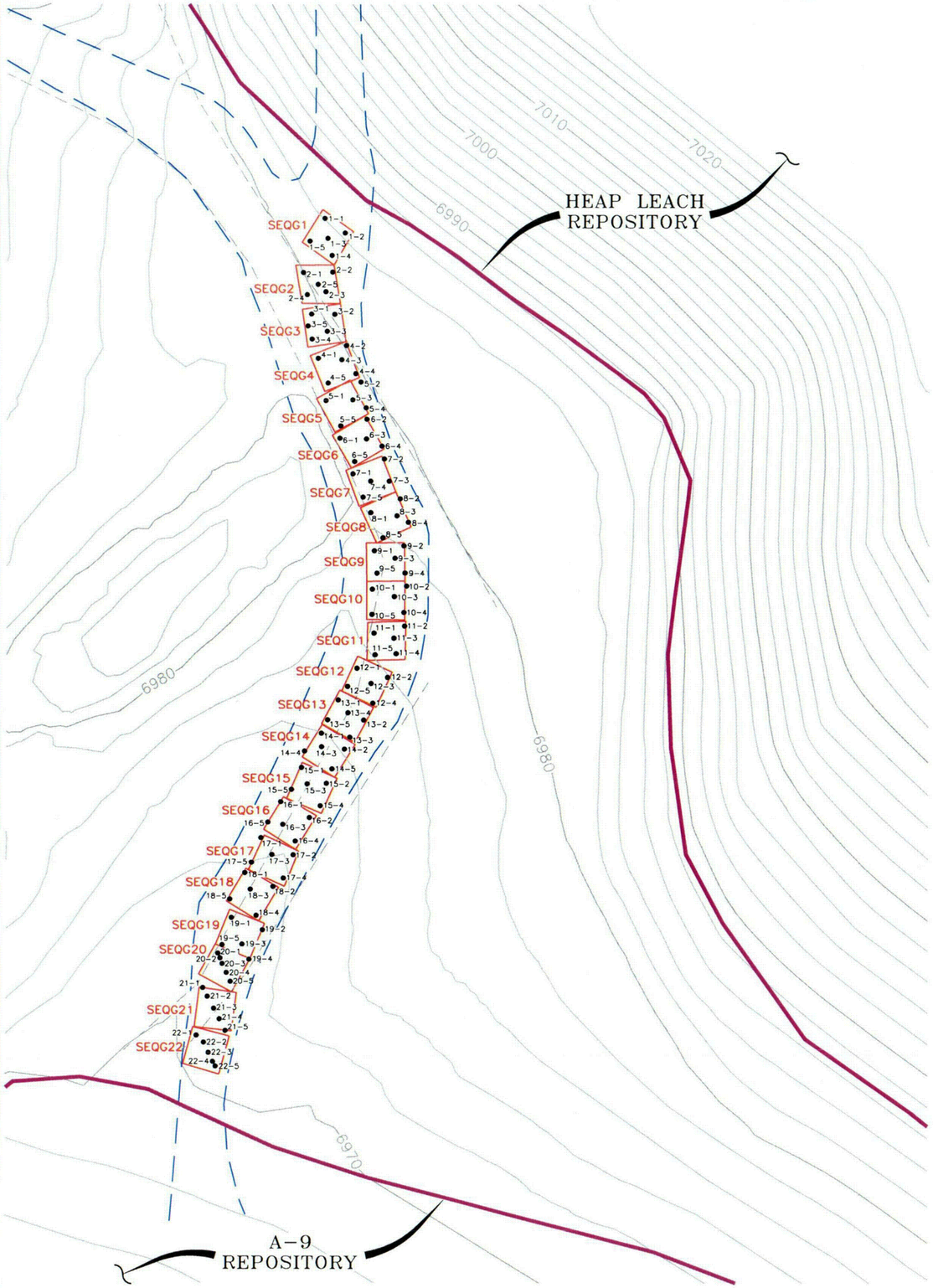
SUSQUEHANNA TAILINGS HAUL ROUTES 2004 CONDITIONS

GAS HILLS, WYOMING

MAY, 2005 FIGURE 3.2

2004–Route.dwg

C06



Grid Id	Date	Unat pCi/g	Ra-226 pCi/g	Th-230 pCi/g	Ratio Ra-226 to U-238	Comments
SEQG1	9/8/2004	34.46	20.8	14.4	1.21	Soil samples collected from 1.6 feet below present ground surface
SEQG2	9/8/2004	28.84	44.1	41.4	3.06	Soil samples collected from 1.6 feet below present ground surface
SEQG3	9/8/2004	30.19	45.8	35.3	3.03	Soil samples collected from 1.6 feet below present ground surface
SEQG4	9/8/2004	28.16	43.6	33	3.10	Soil samples collected from 1.77 feet below present ground surface
SEQG5	9/8/2004	26.54	44.7	33.4	3.37	Soil samples collected from 1.93 feet below present ground surface.
SEQG6	9/8/2004	26.34	38.1	29.5	2.89	Soil samples collected from 1.82 feet below present ground surface.
SEQG7	9/8/2004	34.39	49.9	34.7	2.90	Soil samples collected from 1.25 feet below present ground surface.
SEQG8	9/8/2004	24.85	28.1	20.8	2.26	Soil samples collected from 1.09 feet below present ground surface.
SEQG9	9/8/2004	33.58	32.9	25.2	1.96	Soil samples collected from 1.75 feet below present ground surface.
SEQG10	9/8/2004	26.54	21.7	17.7	1.64	Soil samples collected from 2.02 feet below present ground surface.
SEQG11	9/8/2004	30.26	29.1	24.8	1.92	Soil samples collected from 2.24 feet below present ground surface.
SEQG12	9/8/2004	31.95	28.4	21.1	1.78	Soil samples collected from 2.4 feet below present ground surface.
SEQG13	9/8/2004	32.97	23	19.4	1.40	Soil samples collected from 2.42 feet below present ground surface.
SEQG14	9/8/2004	37.51	26.8	21.7	1.43	Soil samples collected from 2.17 feet below present ground surface.
SEQG15	9/8/2004	40.69	27.5	19.9	1.35	Soil samples collected from 3.15 feet below present ground surface.
SEQG16	9/8/2004	39.74	19.4	19.2	0.98	Soil samples collected from 3.67 feet below present ground surface.
SEQG17	9/8/2004	35.81	23.5	21.3	1.31	Soil samples collected from 4.18 feet below present ground surface.
SEQG18	9/8/2004	38.86	27.3	24.6	1.41	Soil samples collected from 4.59 feet below present ground surface.
SEQG19	9/8/2004	35.27	28.1	19.3	1.59	Soil samples collected from 5.17 feet below present ground surface.
SEQG20	9/8/2004	31.82	23.9	17.4	1.50	Soil samples collected from 5.34 feet below present ground surface.
SEQG21	9/8/2004	29.25	35.7	25.4	2.44	Soil samples collected from 5.26 feet below present ground surface.
SEQG22	9/8/2004	25.18	20.2	14.7	1.60	Soil samples collected from 7.0 feet below present ground surface.

Notes

- Unat reported in mg/Kg and is converted to activity (pCi/g) by multiplying the mass value by 0.677.
- The Ratio of Ra-226 to U-238 is calculated by dividing the value of Ra-226 by 0.5 times the value of U-nat.
  Ratio = Ra-226/(0.5 x U-nat)
- Grids are a composite of five samples collected within a 10 meter square grid.
- Grid was placed over center line of haul road utilized for Susquehanna Materials disposed of in the A-9.
- Soil samples were collected from elevation of Susquehanna haul road based on aerial photos during corresponding usage.
- Samples results reported for Unat are from re-run results received January 20, 2005.
- Locations of soil samples shown were located by civil survey on July 19, 2004 and July 20, 2004.
- Locations of soil samples 1-1, 1-2, 1-3, 1-4, 1-5, 2-5, and 7-4 are approximate.

Legend

- 1990 Haul Road
- 7000 2004 Ground Surface
- 2004 Roadways
- Limits of Repository Reclamation Cover
- SEQG12 10m 10m Sampling Grid
- 12-2 Soil Sample Location

N

SCALE: 1" = 100'

UMETCO MINERALS CORPORATION

SUSQUEHANNA TAILINGS
HAUL ROAD
FIELD SAMPLING LOCATIONS
GAS HILLS, WYOMING

MAY, 2005 FIGURE 3.3

Susquehanna-survey.dwg

C07

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THAT CAN BE VIEWED AT THE RECORD TITLED:

"ONE-METER GAMMA EXPOSURE RATES FOR THE A9-PIT AREA" EAST GAS HILLS, WYOMING PLATE 1, MAY 2005

WITHIN THIS PACKAGE.....

D-01

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THAT CAN BE VIEWED AT THE RECORD TITLED:

"ONE-METER SHIELDED GAMMA EXPOSURE RATES FOR THE A-9-PIT AREA" EAST GAS HILLS, WYOMING PLATE 2, MAY 2005

WITHIN THIS PACKAGE.....

D-02