WESTERN NUCLEAR, INC.

UNION PLAZA SUITE 300, 200 UNION BOULEVARD, LAKEWOOD, COLORADO 80228
TELECOPIER (303) 989-8993 TELEPHONE (303) 989-8675

November 13, 1998

Mr. Joseph J. Holonich, Chief
High Level Waste & Uranium Recovery Projects Branch - MS-T-7-9-J
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20555-0001

Attn: Mr. Robert Carlson, Project Manager

Re: DOCKET NO. 40-1162, LICENSE NO. SUA-56, RADON FLUX SAMPLING DATA

Dear Mr. Holonich:

Surface tailing reclamation at the Western Nuclear, Inc. [WNI] Split Rock Site near Jeffrey City, Wyoming commenced in 1994 and was completed in December 1997. Beginning with 1995, radon flux performance sampling was conducted within each of the areas over which radon barrier had been placed during the preceding calendar year. Preliminary radon flux data were submitted to NRC via WNI dated September 15, 1998. Final report data for testing conducted during 1998 were received by WNI from the analytical laboratory via letter dated October 3, 1998. In accordance with 10 CFR 40, Appendix A, Criterion 6(4), please find attached all radon flux performance testing data and supporting information.

Should you have any questions, please contact us at your earliest convenience.

Sincerely,

Stephanie J. Baker
Manager of Environmental Services
SJB/tic nrc\rnflux98.nov

w/enclosures

cc: L. Corte, Esq.
JRG
LLM [SMI]
H. Shaver, Esq.

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C PDR

NMSS

Radon Flux Measurements - Areas 2A, 2B, and 1C

CHARCOAL CANISTERS SET ON 9/10/96, REMOVED ON 9/11/96 AND COUNTED ON 9/12/96.

	E 7,600	E 7,800	E 8,000	E 8,200	E 8,400	E 8,600	E 8,800	E 9,000	E 9,200	E 9,400	E 9,600	E 9,800
N 7,800												69 <0.5
N 7,600											65 <0.5	68 <0.5
N 7,400										58 3.1	64 1.9	67 <0.5
N 7,200									50 <0.5	57 <0.5	63 <0.5	66 <0.5
N 7,000								41 <0.5	49 <0.5	56 <0.5	62 <0.5	
N 6,800							34 <0.5	40 <0.5	48 <0.5	55 <0.5	61 <0.5	
N 6,600			14 <0.5			27 <0.5	33 <0.5	39 <0.5	47 1.4	54 <0.5	60 <0.5	
N 6,400			13 <0.5	18 <0.5	22 <0.5	26 <0.5	32 <0.5	38 <0.5	46 0.6	53 <0.5	59 <0.5	
N 6,200		8 <0.5	12 <0.5	17 <0.5	21 <0.5	25 <0.5	31 <0.5	37 <0.5	45 <0.5	52 <0.5		
N 6,000	3 <0.5	7 <0.5	11 <0.5	16 <0.5	20 <0.5	24 <0.5	30 <0.5	36 <0.5	44 <0.5	51 <0.5		
N 5,800	2 <0.5	6 <0.5	10 <0.5	15 <0.5	19 <0.5	23 <0.5	29 <0.5	35 <0.5	43 <0.5			
N 5,600	1 <0.5	5 <0.5	9 <0.5									
N 5,400		4 <0.5										

2 <0.5

Location # — Radon Flux in pCi/m^{2}s

Minimum Measurement = < 0.5 pCi/m^{2}s

Maximum Measurement = 3.1 pCi/m^{2}s

Average Radon Flux = 0.57 pCi/m^{2}s

Radon Flux Measurements - Areas 3A and 3B

CHARCOAL CANISTERS SET ON 8/12/95, REMOVED ON 8/22/95 AND COUNTED ON 8/23/95.

	E 8,100	E 8,300	E 8,500	E 8,700	E 8,900	E 9,100	E 9,300	E 9,500	E 9,700	E 9,900	E 10,100	E 10,300
N 8,900		3 <0.5	12 <0.5	13 <0.5	18 <0.5	32 0.5						
N 8,700	1 <0.5	4 <0.5	11 <0.5	14 <0.5	19 <0.5	31 <0.5	33 <0.5	44 <0.5				
N 8,500	2 <0.5	5 <0.5	10 <0.5	15 <0.5	20 <0.5	30 <0.5	34 <0.5	43 <0.5	45 <0.5	52 <0.5	55 <0.5	56 <0.5
N 8,300		6 <0.5	9 <0.5	16 <0.5	21 <0.5	29 <0.5	35 <0.5	42 <0.5	46 <0.5	51 <0.5	54 <0.5	
N 8,100		7 <0.5	8 <0.5	17 <0.5	22 <0.5	28 <0.5	36 <0.5	41 <0.5	47 <0.5	50 <0.5	53 <0.5	
N 7,900					23 <0.5	27 <0.5	37 <0.5	40 <0.5	48 <0.5	49 <0.5		
N 7,700					24 <0.5	26 <0.5	38 <0.5	57 <0.5				
N 7,500						25 <0.5	39 13.3					

2 <0.5

Location # — Radon Flux in pCi/m^{2}s

Minimum Measurement = < 0.5 pCi/m^{2}s
Maximum Measurement = 13.3 pCi/m^{2}s
Average Radon Flux = 0.73 pCi/m^{2}s

Radon Flux Measurements - Areas 1A and 1B (Sheet 1 of 2)

CHARCOAL CANISTERS SET ON 9/10/97, REMOVED ON 9/11/97 AND COUNTED ON 9/12/97.

	E 9,933	E 10,093	E 10,254	E 10,413	E 10,573	E 10,733	E 10,893	E 11,053	E 11,213	E 11,373	E 11,533	E 11,693	E 11,853	E 12,013	E 12,173	E 12,333
N 7,845		90 <0.5	91 <0.5	92 <0.5	93 <0.5	94 <0.5	95 <0.5	96 <0.5	97 <0.5	98 <0.5	99 <0.5	100 <0.5		89 <0.5		
N 7,685	73 <0.5	74 0.9	75 <0.5	76 0.5	77 <0.5	78 <0.5	79 <0.5	80 <0.5	81 <0.5	82 <0.5	83 <0.5	84 0.7	85 <0.5	86 <0.5	87 0.5	88 <0.5
N 7,525	58 <0.5	59 0.5	60 <0.5	61 <0.5	62 <0.5	63 <0.5	64 <0.5	65 1.8	66 0.7	67 1.0	68 0.5	69 <0.5	70 27.7	71 0.7	72 <0.5	
N 7,365	43 0.6	44 0.7	45 0.5	46 <0.5	47 <0.5	48 0.9	49 <0.5	50 0.9	51 0.8	52 1.0	53 0.5	54 <0.5	55 0.6	56 <0.5	57 1.1	
N 7,205	29 0.5	30 1.0	31 0.7	32 0.8	33 <0.5	34 <0.5	35 <0.5	36 1.0	37 1.3	38 6.0	39 29.9	40 17.8	41 1.5	42 <0.5		
N 7,045	16 1.0	17 0.9	18 0.8	19 1.0	20 0.8	21 0.5	22 0.8	23 3.4	24 3.0	25 0.5	26 0.8	27 22.9	28 1.1			
N 6,885	5 <0.5	6 <0.5	7 <0.5	8 <0.5	9 1.0	10 <0.5	11 0.5	12 0.5	13 0.6	14 <0.5	15 <0.5					
N 6,725						4 0.9	1 <0.5	2 <0.5	3 0.5							

2 <0.5

Location # — Radon Flux in pCi/m^{2}s

Minimum Measurement = < 0.5 pCi/m^{2}s
Maximum Measurement = 29.9 pCi/m^{2}s
Average Radon Flux = 1.68 pCi/m^{2}s

Radon Flux Measurements - Areas 1A and 1B (Sheet 2 of 2)

CHARCOAL CANISTERS SET ON 7/15/98, REMOVED ON 7/16/98 AND COUNTED ON 7/17/98.

	E 10,310	E 10,450	E 10,650	E 10,840	E 11,040	E 11,230	E 11,430	E 11,620	E 11,820	E 12,010	E 12,210	E 12,400	E 12,600	E 12,800	E 13,000	E 13,200	E 13,380
N 8,700				49 0.6	50 <0.5	51 <0.5	52 <0.5	53 <0.5	54 <0.5	55 <0.5	56 <0.5	57 <0.5	58 <0.5	59 <0.5	48 <0.5		
N 8,500		33 <0.5	34 <0.5	35 <0.5	36 <0.5	37 <0.5	38 <0.5	39 <0.5	40 <0.5	41 <0.5	42 <0.5	42 <0.5	44 <0.5	45 <0.5		46 <0.5	47 <
N 8,300	19 <0.5		20 <0.5	21 <0.5	22 <0.5	23 <0.5	24 <0.5	25 <0.5	26 <0.5	27 <0.5	28 <0.5	29 <0.5	30 <0.5	31 <0.5	32 <0.5		
N 8,150	5 <0.5	6 <0.5	7 <0.5	8 <0.5	9 <0.5	10 <0.5	11 <0.5	12 <0.5	13 <0.5	14 <0.5	15 <0.5	16 <0.5	17 <0.5	18 <0.5			
N 7,950										1 <0.5	2 <0.5	3 <0.5	4 <0.5				

5 <0.5

Location # — Radon Flux in pCi/m^{2}s

Minimum Measurement = < 0.5 pCi/m^{2}s
Maximum Measurement = 0.6 pCi/m^{2}s
Average Radon Flux = 0.53 pCi/m^{2}s

WESTERN NUCLEAR, INC.
SPLIT ROCK MILL SITE
JEFFREY CITY, WYOMING
307-544-2291

MEMORANDUM

TO: Lou Miller
FROM: Trinidad Herrera, Safety Director/Radiation Safety Officer
DATE: November 4, 1998
SUBJECT: NESHAPS

Enclosed are the stuff Elaine Brummett requested except for site precipitation records for the day before sampling, which we don't have. However, we always waited at least one day (24 hours) after any precipitation occurrence before we began placing the canisters. Generally we sampled in late August - early September when the weather conditions were usually dry. Except of course for the 1998 sampling that was conducted in July.

ENERGY LABORATORIES, INC. - CASPER, WYOMING

STANDARD OPERATING PROCEDURES

RADON FLUX MEASUREMENT
EPA METHOD 115
LARGE AREA ACTIVATED CHARCOAL COLLECTORS (LAACC)

Approved By:

Originator Sheryl Gerling 4-6-98 *Date*

Technical Reviewer (if applicable) David Blaida 4-6-98 *Date*

ELI Quality Assurance Director [illegible] 4-6-98 *Date*

ELI Laboratory Manager L.A. Gerling 4-6-98 *Date*

Distribution of Official Copies:

ELI Laboratory Manager
ELI Quality Assurance Director
All ELI Staff

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide a general description of the placement, handling, subsequent analytical measurement, and calculation of radon flux measured from Large Area Activated Charcoal Canister (LAACC), also known as EPA Method 115, per 40 Code of Federal Regulations (CFR), *Part 61, Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration*, December 15, 1989. In addition to the published EPA Method 115, technical information was also taken from EPA's publication 520/5-85-029, *Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida*.

Radon flux measurements are performed on uranium mill tailings, phosphogypsum stacks, or on any solids (soil, waste, etc.) in which radon flux measurements are required. The majority of radon flux measurements have been for conventional uranium milling operations.

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2.0 SUMMARY

The method used to measure radon flux involves adsorption of radon on activated charcoal in a large area collector (LAACC); diagram located in Section 7.0 Attachments. The collector is placed onto the surface of the material to be measured and is allowed to collect radon for a period of 24 hours. The charcoal is transferred into steel pre-numbered cans then transported to the laboratory for analysis and calculation of radon flux. The radon collected on the charcoal is measured by gamma spectroscopy or equivalent equipment (multi or single channel analyzers). In addition to EPA's Method 115 document, publication EPA 520/5-85-029, *Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida, January 1986*, and EPA 520/1-89-009, *Indoor Radon and Radon Decay Product Measurement Protocols*, provides the basic information on design, measurement, and theory related to radon flux measurement and analysis. Partial copies of the publications have been attached in Section 6.0 References.

3.0 NOTES AND PRECAUTIONS

The following areas should be addressed before sampling:

< timing of collection (24 hours sampling or quarterly annual collection),

< regions within the tailings impoundment (quantity and area),

< personnel responsible for placement of collectors,

< EPA notification of intent to proceed with collection,

< current topographical map of tailings impoundments to be sampled,

< sample point locations to be marked in the field prior to collector placement, and

< location of any background samples such as up wind of the impoundment (undisturbed areas) as a point of comparison or field duplicate samples.

Safety precautions that should be observed while performing radon flux measurement in the field and analysis in the laboratory are as follows:

In the field

< Observe all site specific hazard conditions,
< Make sure all paperwork is secured from environmental conditions, and
< Do not open or compromise trip blank charcoal canisters.

In the laboratory

< Observe all laboratory safety procedures as specified in the Chemical Hygiene Plan and/or by the Standard Operating Procedure for the equipment or method.

4.0 DEFINITIONS

None.

5.0 MATERIALS AND PROCEDURES

5.1 Materials

The collector consists of a PVC end cap with handle, screened spacer pads, charcoal distribution grid, screened retainer pad, and a steel-retaining rod. Approximately 180 grams of activated charcoal is spread in the distribution grid. The retainer pad is placed over the charcoal and held in place by the retaining rod. Refer to the diagram of construction located in Section 6.0 References.

5.2 Procedure for Measurement and Calculation of Radon Flux from Uranium Mill Tailings Piles

The following describes the monitoring methods which must be used in determining the ^{222}Rn emissions from underground uranium mines, uranium mill tailings piles, phosphogypsum stacks, and other piles of waste material emitting radon.

The loading process should be done in an enclosed area so adverse wind conditions do not disturb the charcoal (blow it away). To allow for a quick transfer of charcoal into the collectors prior to deployment, LAACC units should be loaded by two or more people. The collectors are loaded with the charcoal by removing the retaining rod and pad, placing the pre-weighed (pre-measured) charcoal into the charcoal support grid, and replacing the pad and rod. The collectors are transported to the field by vehicle and deployed. The LAACC unit, charcoal canister, and tailings grid location should be recorded. Teams of two or more people should begin deployment immediately upon the charcoal transfer. Minimize the time a loaded collector is allowed to sit in ambient atmosphere. Care must be taken to minimize confusion and order of LAACC units and charcoal cans. An organized method of transfer and a large working area assist in minimizing any errors in LAACC/canister mismatching.

The pre-numbered collectors are deployed by carefully positioning the end cap on a flat surface of the material to be measured with soils or tailings used to seal the edge, at the predetermined location. It is imperative that a complete seal is obtained between the collector and the material to be measured. A shovel or a hand trowel may be used to

scoop the material around the edge of the collector, being careful not to scoop material into the vent hole. The location identification, LAACC number, and the set time should be recorded.

After approximately 24 hours (minor time overruns are acceptable) of exposure, the collectors are picked up and the time retrieved is recorded. If any other conditions are observed (such as a broken seal, wind blown conditions, etc.), they should also be recorded. The transfer of the charcoal should begin immediately upon retrieval. The LAACCs are transported to the enclosed work area where a team of two or more personnel are responsible for transferring the charcoal carefully back into the appropriate pre-numbered cans. The time between retrieval and transferring the exposed charcoal should be held to a minimum, however, site and field conditions contribute to the timeliness of the transfer.

The activated charcoal is removed from the collector by removing the retaining rod and pad from the collector and dumping the charcoal into a large funnel which empties into the pre-numbered steel alloy can. The can's lid is placed and a wrap of electrical tape is applied to the can seam to eliminate any charcoal loss due to lid removal or introduction of air and/or radon into the can. The tape also assists in creating a closed system to allow for the radon collected to equilibrate for four (4) hours before counting to allow the ingrowth of the radon daughters.

The cans are transported to the laboratory where they are counted and recorded. The following information pertains to the calculation that will be made to ascertain the radon flux for each specific LAACC location. Due to the near 100% efficiency of the activated charcoal to adsorb and retain radon and its associated particulate daughters from the atmosphere in the LAACC units, no can sealing or seal testing is required. This method of collection and transportation is endorsed by EPA via EPA 402-R-92-004, EPA 402-R-92-004, *Indoor Radon and Radon Decay Products Measurement Device Protocols,* July 1992, and EPA 520/5-87-005, *EERF Standard Operating Procedure for Rn-222 Measurement Using Charcoal Canisters,* June 1987.

5.2.1 Frequency of Flux Measurement

A single set of radon flux measurements may be made, or if the owner or operator chooses, measurements that are more frequent may be made over a one-year period. These measurements may involve quarterly, monthly, or weekly intervals. All radon measurements shall be made as described in paragraphs 5.2.2 through 5.2.6 except that for measurements made over a one-year period, the requirement of paragraph 5.2.4(c) shall not apply. The mean radon flux from the pile shall be the arithmetic mean of the mean radon flux for each measurement period. The weather conditions, moisture content of the tailings and area of the pile covered by water existing at the time of the measurement shall be chosen so as to provide measurements representative of the long term radon flux from the pile and shall be subject to EPA review and approval.

5.2.2 Distribution of Flux Measurements

The distribution and number of radon flux measurements required on a pile will depend on the clearly defined areas of the pile (called regions) that can have significantly different radon fluxes due to surface conditions. The mean radon flux shall be determined for each individual region of the pile. Regions that shall be considered for operating mill-tailing piles are:

< water covered areas;
< water saturated areas (beaches);
< dry top surface areas; and
< sides, except where earthen material is used in dam construction.

For mill tailings after closure the pile shall be considered to consist of only one region.

5.2.3 Number of Radon Flux Measurements

Radon flux measurements shall be made within each region of the pile, except for those areas covered with water. Measurements shall be made at regularly spaced locations across the surface of the region, realizing that surface roughness will prohibit measurements in some areas of a region. The minimum number of flux measurements considered necessary to determine a representative mean radon flux value for each type of region on an operating pile is:

< water saturated area - no measurements required as radon flux is assumed to be zero;

< water saturated beaches - 100 radon flux measurements;

< loose and dry top surface - 100 radon flux measurements; and

< sides - 100 radon flux measurements, except where earthen materials are used in dam construction.

For mill tailings pile after closure which consists of only one region, minimum of 100 measurements are required.

5.2.3.1 Trip and field blanks

ELI prepares a minimum of 10% trip blanks to be sent to the field with the LAACC testing equipment and measurement charcoal containers. The trip blanks travel with the charcoal cans that will be used in the LAACC devices. The trip blanks stay with the unopened charcoal cans

while in storage prior to transfer and deployment. The trip blanks stay in the work area upon deployment of the devices to the field for actual measurement. They are intended to provide information regarding the integrity of the shipping and handling of the measuring equipment to and from the field from the laboratory.

5.2.3.2 Background and field duplicate measurements

Due to the non-homogeneous nature of tailings piles, it is recommended that some duplicate measurements be made in the field. Set two LAACC devices in the field adjacent to each other. In addition to field duplicates, it is recommended that some LAACC devices are deployed in areas of known background conditions (undisturbed field conditions). This data will complement the radon flux measurements as determined on the tailings pile.

5.2.4 Restrictions to Radon Flux Measurements

The following restrictions are placed on making radon flux measurements:

a. measurements shall not be initiated within 24 hours of a rainfall;

b. if a rainfall occurs during the 24 hour measurements period, the measurement is invalid if the seal around the lip of the collector is surrounded by water; and

c. measurements shall not be performed if the ambient temperature is below 35EF or if the ground is frozen. A min/max thermometer may be used if no meteorological data is available.

5.2.5 Areas of Pile Regions

The approximate area of each region of the pile shall be determined in units of square meters.

5.2.6 Radon Flux Measurements

Measuring radon flux involves the adsorption of radon on activated charcoal in a large-area collector. The radon collector is placed on the surface of the pile area to be measured and allowed to collect for a period of 24 hours. The radon collected on the charcoal is measured by gamma-ray spectroscopy. The detailed measurement procedure provided in Appendix A of EPA 520/5-85-0029(1) shall be used to measure the radon flux on uranium mill tailings, *except the surface of the tailings shall not be penetrated by the lip of the*

radon collector as directed in the procedure, rather the collector shall be carefully positioned on a flat surface with soil or tailings used to seal the edge.

5.2.7 Calculations

The mean radon flux for reach region on the pile and for the total pile shall be calculated and reported as follows:

a. The individual radon flux calculations shall be made as provided in Appendix A EPA 86 (1). The mean radon flux for each region of the pile shall be calculated by summing all individual flux measurements for the region and dividing by the total number of flux measurements for the region.

b. The mean radon flux for the total uranium mill tailings pile shall be calculated as follows:

$$J_S = \frac{J_1 A_1 + \ldots J_2 A_2 \ldots J_i A_i}{A_t}$$

where:

J_S	=	mean flux for the total pile (pCi/m^2-s),
J_1	=	mean flux measured in region i (pCi/m^2-s),
A_1	=	area of region i (m^2), and
A_t	=	total area of pile (m^2).

5.3 Quality Assurance

ELI is an EPA certified and listed laboratory through the Radon Measurement Proficiency (RMP) Program. Laboratory certification has been maintained in the areas for determination of radiochemical, inorganics, organics, and bacteriological constituents in drinking waters. ELI has been actively participating in EPA's Radon Proficiency Program since its inception for determination of radon concentrations in homes and structures. ELI has two staff members presently accepted by the U. S. Nuclear Regulatory Commission (NRC) as Radiation Safety Officers and have performed radiation surveys for uranium operations since 1980. These surveys include alpha, beta, and gamma emitting radionuclides in air, soil/surface, and water for determination of employee occupational exposure awhile working at mine sites.

5.3.1 Sampling Procedures

Records of field activities and laboratory measurements shall be maintained. The following information shall be recorded for each charcoal canister measurement:

- site,
- name of pile,
- sample location,
- sample ID number,
- date and time on,
- date and time off, and
- observations of meteorological conditions and comments.

Records shall include all applicable information associated with determining the sample measurement, calculations, observations, and comments.

5.3.2 Sample Custody

Custodial control of all charcoal samples exposed in the field shall be maintained in accordance with EPA chain of custody field procedures. A control record shall document all custody changes that occur between the field and laboratory personnel.

5.3.3 Calibration Procedures and Frequency

ELI has two multi-channel gamma spectrometers available at its Casper facility. The radioactivity of two standard charcoal sources, each containing a carefully determined quantity of Radium-226 (^{226}Ra) uniformly distributed through ~180 grams of activated charcoal shall be measured. An efficiency factor is computed by dividing the average measured radioactivity of the two standard charcoal sources, minus the background, in cpm by the known radioactivity of the sources in dpm. The same two standard charcoal sources shall be made, at a minimum, at the beginning and at the end of each day's counting as a check of the radioactivity counting equipment. A background count using unexposed charcoal should be made, at a minimum, at the beginning and at the end of each counting day to check for inadvertent contamination of the detector or other changes affecting the background. The unexposed charcoal comprising the blank is changed with each new batch of charcoal used.

5.3.4 Internal Quality Control Checks and Frequency

The charcoal from every tenth exposed canister shall be recounted. Five percent of the samples analyzed shall be blanks (charcoal having no radioactivity added).

5.3.5 Data Precision, Accuracy, and Completeness

The precision, accuracy, and completeness of measurements and analyses shall be within the following limits for samples measuring greater than 1.0 pCi/m^2-s.

< Precision: 10%

< Accuracy: 10%

< Completeness: At least 85% of the measurements must yield usable results

ELI has performed a method detection limit (MDL) study using EPA's standard MDL definition and procedure. In addition, the following precision calculation is utilized at the laboratory at a 90% (2-sigma) confidence level:

$$\frac{2 \times \sqrt{SampleCount + BackgroundCount}}{SampleCount - BackgroundCount}$$

5.4 Reporting

The results of the individual flux measurements, the approximate locations on the pile, and the mean radon flux for each region and the mean radon flux for the total stack shall be included in the emission test report. Any conditions or unusual event that occurred during the measurements that could significantly affect the results should be reported.

ELI will provide the company with a report that will include a minimum of the following:

< number and laboratory ID of collectors placed;

< date and time of collectors placed, retrieved, and charcoal counted;

< map of location of collectors (provided by company);

< radon flux calculations for each detector, region, and total tailings impoundments;

< spectrum print out for each detector, if requested; and

< quality assurance data will be provided upon request. This data will consist of duplicates, blanks, standards, and geometry verification.

6.0 REFERENCES

6.1 EPA Method 115, per 40 Code of Federal Regulations (CFR), *Part 61, Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration*, December 15, 1989.

6.2 EPA's publication 520/5-85-029, *Radon Flux Measurements on Gardinier and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida.*

6.3 EPA publication 520/1-89-009, *Indoor Radon and Radon Decay Product Measurement Protocols,* updated and made into two documents;

6.4 EPA 402-R-92-004, *Indoor Radon and Radon Decay Products Measurement Device Protocols,* July 1992, and

6.5 EPA 402-R-92-003, *Protocols For Radon and Radon Decay Product Measurements In Homes,* June 1993.

6.6 EPA 520/5-87-005, *EERF Standard Operating Procedure for Rn-222 Measurement Using Charcoal Canisters,* June 1987.

6.7. Copies of ELI's Quality Assurance and certifications are available upon request.

7.0 ATTACHMENTS

7.1 Diagram of LAACC device

7.2 Chain of Custody

7.3 Field Notes Form

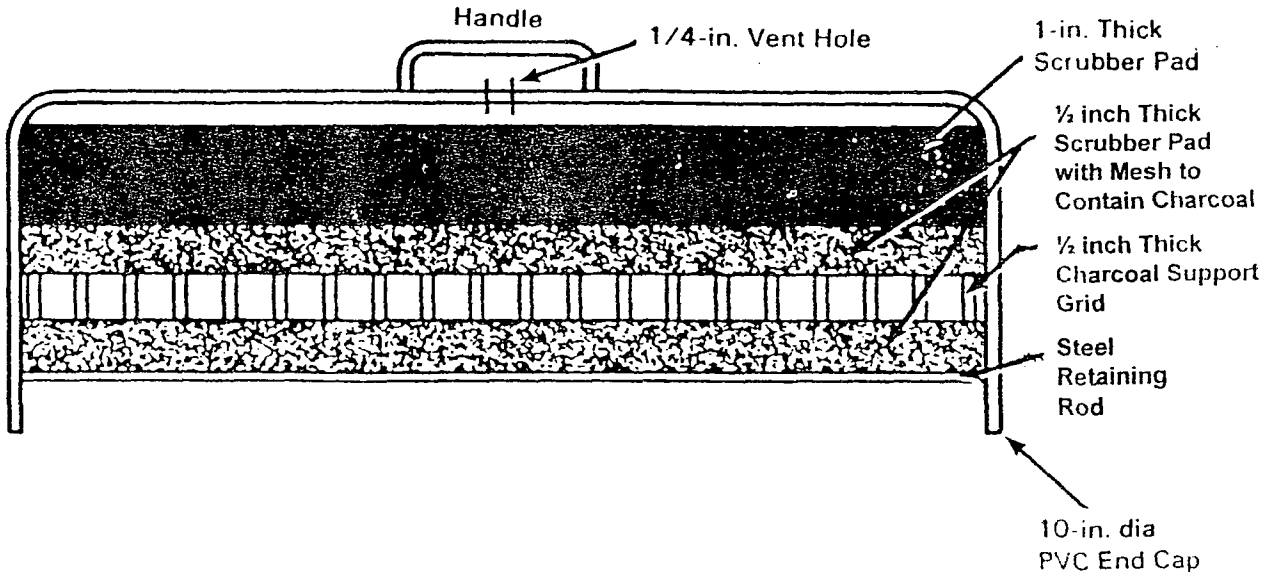
7.4 Example of Report

7.5 Memo to File regarding EPA's informal field and laboratory audit of ELI's LAACC Program.

7.6 Record of Acknowledgment/Signature Page

7.1 DIAGRAM OF LARGE AREA COLLECTOR

SOP ELI-C-50-907-01



Large Area Radon Collector

7.2 CHAIN OF CUSTODY
SOP ELI-C-50-907-01

MEMORANDUM

To: *LAACC Users*

From: *Sheryl Garling with Energy Laboratories, Inc.*

Subject: *Chain-of-Custody For Large Area Activated Charcoal Canister (LAACC) Units*

ELI has designed this memorandum to serve as (1) *Chain-of-Custody* for shipping and receiving the LAACC Units and supplies that accompany the equipment, (2) directions on transfer of activated carbon to and from LAACC Units, and (3) placement information.

Packed by: _____, ELI-Casper Branch, Casper, Wyoming.

The LAACC Units have been shipped or delivered to:

Company Name: _____

Street Address: _____

City, State, Zip: _____

Phone & Fax: _____

Contact Person: _____

LAACC Units Shipped & No=s: _____ LAACC Units Rec=d & No=s: _____

Charcoal Cans Shipped & No=s: _____ Charcoal Cans Rec=d & No=s: _____

The attached *Large Area Activated Charcoal Canister (LAACC) Field Notes* table should be used when placing the LAACC Unit onto the tailings impoundments or stacks. The data necessary to generate proper radon flux is transcribed from your notes. Please write clearly. Field notes should be copied and one set returned to the laboratory along with LAACC Units, canisters, and any other equipment.

The following materials would be helpful for LAACC Unit set up and transfer of charcoal:

- < funnel and holder,
- < silicon grease,
- < pliers,
- < extra electrical tape, and
- < a table within a building.

When transferring activated carbon (charcoal) into the LAACC Unit (preferably inside a building), care should be taken that:

- < charcoal is leveled into the units,
- < charcoal canister number has been identified to the corresponding LAACC unit number on the field notes, and
- < the retaining rod is securely placed back into position

7.3 FIELD NOTES FORM

ELI-C-50-907-01

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page _____ Of _____

Client: Location:

Weather Condition: Precip: Min Temp:

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments

ENERGY LABORATORIES, INC.
SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601
MAILING: P.O. BOX 3258 • CASPER, WY 82602
E-mail: energy@trib.com • FAX: (307) 234 - 1639 • PHONE: (307) 235 - 0515 • TOLL FREE: (888) 235 - 05 3

7.4 EXAMPLE OF REPORT

SOP ELI-C-50-907-01

Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project:	**COMPANY NAME**	**Date Set:**	**August 13, 1996**
		Date Remove:	**August 14, 1996**
Location:	Project Name	Weather:	*Fair/Clear/min. temp 50 degrees F.
Report Date:	September 10, 1996	Date Counted:	August 15, 1996

Method: Comapany's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR Part 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal counts.

Lab I.D.	LAACC #	Canister #	Location	08-13-96 Time Set	08-14-96 Time Remove	Radon Flux pCi/m2s
96- 45644	1	1	1	09:14	09:15	10.4
96- 45645	2	2	2	09:14	09:15	3.5
96- 45646	3	3	3	09:15	09:15	6.7
96- 45647	4	4	4	09:16	09:16	0.6
96- 45648	5	5	5	09:16	09:17	<0.5
96- 45649	6	6	6	09:17	09:18	15.5
96- 45650	7	7	7	09:18	09:18	2.6
96- 45651	8	8	8	09:20	09:20	1.1
96- 45652	9	9	9	09:21	09:21	1.5
96- 45653	10	10	10	09:22	09:22	4.3
96- 45654	11	11	11	09:25	09:25	<0.5
96- 45655	12	12	12	09:26	09:26	8.1
96- 45656	13	13	13	09:27	09:27	11.1
96- 45657	14	14	14	09:27	09:27	1.0
96- 45658	15	15	15	09:29	09:29	16.8
96- 45659	16	16	16	09:30	09:32	24.6
96- 45660	17	17	17	09:31	09:32	14.0
96- 45661	18	18	18	09:32	09:33	5.3
96- 45662	19	19	19	09:32	09:33	8.9
96- 45663	20	20	20	09:35	09:35	33.5
96- 45664	21	21	21	09:38	09:38	6.5
96- 45565	22	22	22	09:41	09:41	2.2
96- 45666	23	23	23	09:41	09:41	1.3
96- 45667	24	24	24	09:41	09:42	1.6
96- 45668	25	25	25	09:43	09:43	0.9
96- 45669	26	26	26	09:44	09:44	3.1
96- 45670	27	27	27	09:45	09:45	3.6
96- 45671	28	28	28	09:47	09:47	3.0
96- 45672	29	29	29	09:47	09:47	2.1
96- 45673	30	30	30	09:48	09:48	5.0
96- 45674	31	31	31	09:49	09:49	6.8

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Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project:	COMPANY NAME	Date Set:	August 13, 1996
		Date Remove:	August 14, 1996
Location:	Project Name	Weather:	*Fair/Clear/min. temp 50 degrees F.
Report Date:	September 10, 1996	Date Counted:	August 15, 1996

Date Counted	Blank Charcoal cpm	Standard No. 1 cpm	Standard No. 2 cpm
08-15-96	98	1701	3384
08-15-96	94	1618	3421
08-15-96	90	1698	3358
Average	94	1672	3388

TRIP BLANKS		
Date Counted	Canister No.	Radon Flux** pCi/m2s
8-15-96	Trip Blank - 1	<0.5
8-15-96	Trip Blank - 2	<0.5
8-15-96	Trip Blank - 3	<0.5
8-15-96	Trip Blank - 4	<0.5
8-15-96	Trip Blank - 5	<0.5
8-15-96	Trip Blank - 6	<0.5
8-15-96	Trip Blank - 7	<0.5
8-15-96	Trip Blank - 8	<0.5
8-15-96	Trip Blank - 9	<0.5
5-96	Trip Blank -10	<0.5
.5-96	Trip Blank -11	<0.5
8-15-96	Trip Blank -12	<0.5
8-15-96	Trip Blank -13	<0.5
8-15-96	Trip Blank - 14	<0.5
8-15-96	Trip Blank - 15	<0.5
8-15-96	Trip Blank - 16	<0.5
8-15-96	Trip Blank - 17	<0.5
8-15-96	Trip Blank - 18	<0.5
8-15-96	Trip Blank - 19	<0.5
8-15-96	Trip Blank - 20	<0.5
8-15-96	Trip Blank - 21	<0.5
8-15-96	Trip Blank - 22	<0.5
8-15-96	Trip Blank - 23	<0.5
8-15-96	Trip Blank - 24	<0.5
8-15-96	Trip Blank - 25	<0.5

lmh tyw\d\data\laacc\report.xls

Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project:	COMPANY NAME	Date Set:	August 13, 1996
		Date Remove:	August 14, 1996
Location:	Project Name	Weather:	*Fair/Clear/min. temp 50 degrees F.
Report Date:	September 10, 1996	Date Counted:	August 15, 1996

DUPLICATES			
Date Counted	Cannister No.	Radon Flux** pCi/m2s	Recovery Decimal
8-15-96	Duplicate - 45653	4.1	0.9
8-15-96	Duplicate - 45663	23.4	0.7
8-15-96	Duplicate - 45673	5.1	1.0
8-15-96	Duplicate - 45683	0.3	0.8
8-15-96	Duplicate - 45693	19.8	1.0
8-15-96	Duplicate - 45703	2.0	1.1
8-15-96	Duplicate - 45713	5.6	1.1
8-15-96	Duplicate - 45723	3.0	1.1
8-15-96	Duplicate - 45733	56.6	1.0
8-15-96	Duplicate - 45743	6.3	1.0
8-15-96	Duplicate - 45753	1.9	0.9
Average of Replicates:			1.0

REPORT SUMMARY	
Minimum Measurement	<0.5 pCi/m2s
Maximum Measurement	55.2 pCi/m2s
Average Radon Flux for #1-100	8.85 pCi/m2s

*Minimum temperature under 35 degrees Fahrenheit not acceptable.

**Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m2s.

Report Approved By:

Reviewed By:

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7.5 MEMO TO FILE REGARDING EPA'S UNOFFICIAL RADON FLUX AUDIT

ELI SOP-50-907-01

MEMORANDUM

Date: *June 10, 1997*

To: *Energy Laboratories, Inc. File*

From: *Sheryl Garling with Energy Laboratories, Inc. - Casper, Wyoming*

Subject: *Summer of 1990 Unofficial Audit of ELI's Large Area Activated Charcoal Canister (LAACC) Program - From the Field to the Laboratory*

To date Energy Laboratories, Inc. (ELI) has not been officially audited by any regulatory agency regarding its Large Area Activated Charcoal Canister (LAACC -radon flux) program. On June 9, 1997 Milt Lammering with U.S. Environmental Protection Agency (EPA) in Denver was contacted to verify if there was any unofficial documentation made to file regarding ELI's radon flux program. **His response was that during an unofficial audit no documentation is made if all aspects of the audit are acceptable to the agency.**

To clarify the unofficial audit the following background information has been recorded:

Pathfinder Mines Corporation's Shirley Basin Operation scheduled to perform radon flux measurements for their tailings impoundment. They contacted the EPA's representative, Milt Lammering, and requested that he provide an on site audit of the program that ELI proposed. Milt Lammering and Bob Tower, EPA's Certification Officer for radiochemistry from Las Vegas, Nevada, visited the site during the time the collectors were deployed. They observed all aspects of the program from deployment to retrieval, charcoal transfer to and from collectors, and laboratory procedures for accepting samples, logging into laboratory, laboratory equipment, and analysis.

At no time, during the unofficial audit was there any comments or concerns regarding ELI's protocol. ELI designed the radon flux program from all the EPA documentation that was published at the time. The radon flux program has been maintained, since its inception, to the rigorous guidelines published by EPA.

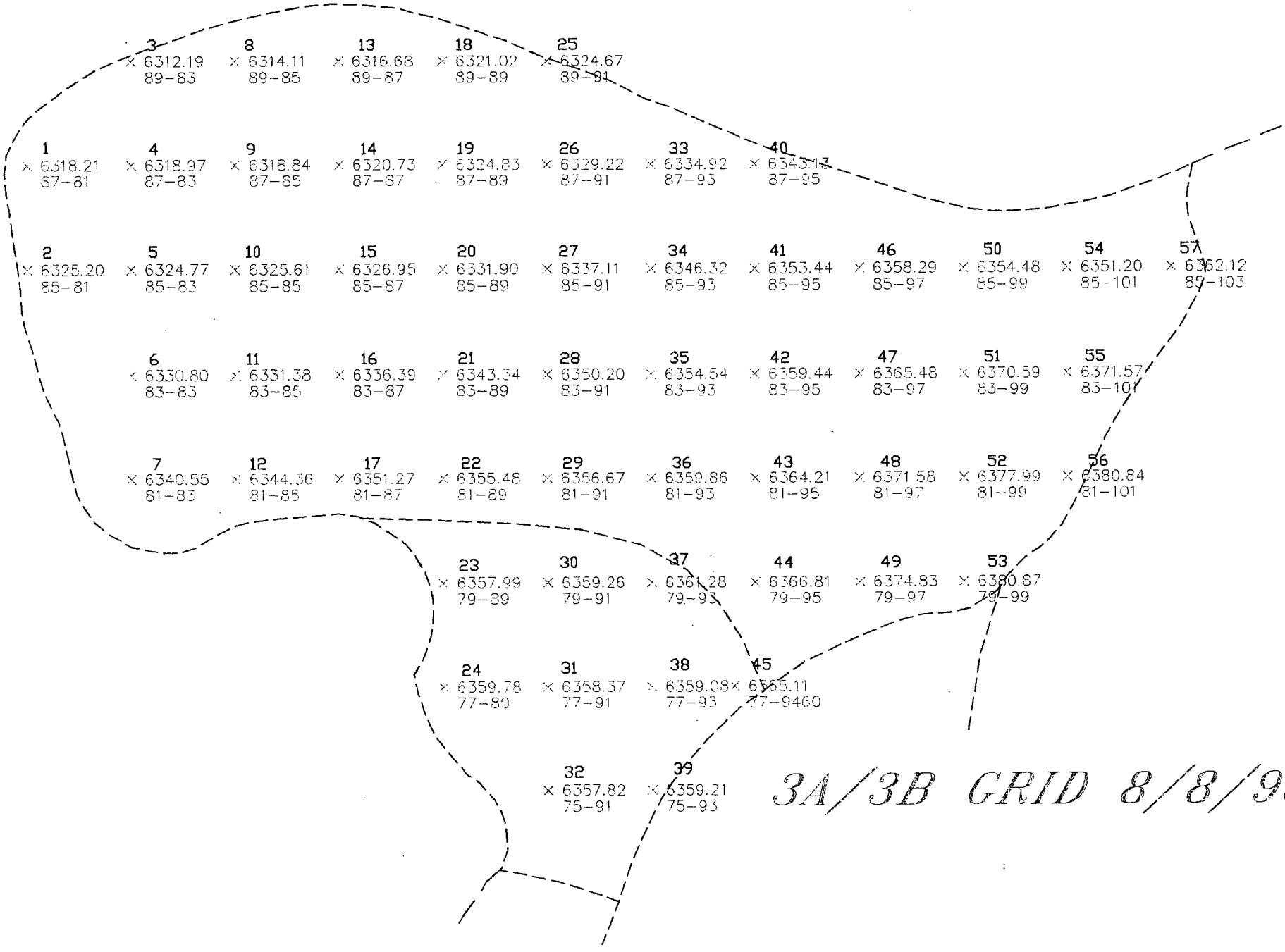
To date, all ELI data submitted by clients, has not been questioned by the regulatory agencies overseeing the program.

For additional information please see SOP Section 6.0, *References*.

7.6 Record of Acknowledgment/Signature

My signature below constitutes my acknowledgment that I have read and understand this SOP.

Date	*Print Name*	*Signature*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31 × 6358.37 77-91
38 × 6359.08 77-93
45 × 6365.11 77-9460
32 × 6357.82 75-91
39 × 6359.21 75-93
3A/3B GRID 8/8/95

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

PAGE 1 / 5

Client: WNI

Location: Split Rock

Weather Condition: Partly Cloudy Precip.: None Min Temp.: 59°

INST. _____ EFF: _____ TECH: _____

INST. BACK: _____

CHARC. BACK: _____ LOT: _____

STANDARD: _____ COUNT: _____

LAACC UNIT #	CHARC CAN #	LOCATION I.D./STATION	MONTH 08 DAY 21 1995 24 HR TIME SET	MONTH 08 DAY 22 1995 24 HR TIME REMOVED	SITE PERSONNEL INITIALS	LAB SAMPLE NUMBER	DATE/TIME START	COUN MIN.	GROSS COUNTS	COMMENTS
1	121	1	0807	0903	JS					
2	86	2	0811	0904						
3	110	7	0815	0906						
30	94	6	0933	1051						
4	125	6	0818	0908						
5	90	5	0820	0910						
6	22	4	0824	0911						
7	101	3	0826	0913						
8	109	8	0829	0914						
9	122	9	0832	0916						
10	88	10	0835	0917						
11	91	11	0839	0919						
31	100	12	0936	1048						
12	93	12	0841	0920						
13	108	17	0844	0922						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Location:

Weather Condition: Partly Cloudy Precip.: none Min Temp.: 57°

INST. _____ EFF: _____ TECH: _____

INST. BACK: _____

CHARC. BACK: _____ LOT: _____

STANDARD: _____ COUNT: _____

LAACC UNIT #	CHARC CAN #	LOCATION I.D./STATION	MONTH 08 DAY 21 1995 24 HR TIME SET	MONTH 08 DAY 22 1995 24 HR TIME REMOVED	SITE PERSONNEL INITIALS	LAB SAMPLE NUMBER	DATE/TIME START	COUN MIN.	GROSS COUNTS	COMMENTS
14	89	16	0848	0925	JS					
15	107	15	0850	0927						
16	95	14	0853	0928						
17	98	13	0856	0930						
35	96	18	0940	1040						
22	26	18	0859	1012						
23	24	19	0902	1015						
19	102	20	0905	1017						
21	106	21	0907	1018						
18	104	22	0909	1019						
24	120	23	0913	1021						
32	117	24	0946	1044						
25	123	24	0915	1023						
26	97	32	0919	1025						
27	113	31	0924	1027						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Location:

Weather Condition: Partly Cloudy Precip.: None Min Temp.: 59°

INST. _____ EFF: _____ TECH: _____

INST. BACK: _____

CHARC. BACK: _____ LOT: _____

STANDARD: _____ COUNT: _____

LAACC UNIT #	CHARC CAN #	LOCATION I.D./STATION	MONTH 08 DAY 21 1995 24 HR TIME SET	MONTH 08 DAY 22 1995 24 HR TIME REMOVED	SITE PERSONNEL INITIALS	LAB SAMPLE NUMBER	DATE/TIME START	COUN MIN.	GROSS COUNTS	COMMENTS
28	112	30	0929	1029	JS					
29	99	30	0929	1029						
37	103	29	0953	1032						
36	85	28	0957	1034						
38	105	27	1001	1036						
40	124	26	1004	1038						
39	114	25	1008	1126						
41	115	33	1011	1127						
42	9	34	1014	1128						
43	10	35	1017	1129						
46	12	36	1021	1130						
47	22	36	1021	1130						
48	30	37	1025	1132						
49	18	38	1029	1133						
50	13	39	1033	1134						

ARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

PAGE 4 / 5

Event: Location:

Weather Condition: Partly Cloudy Precip.: None Min Temp.: 59°

INST. _____ EFF: _____ TECH: _____

INST. BACK: _____

CHARC. BACK: _____ LOT: _____

STANDARD: _____ COUNT: _____

UNIT	CHARC CAN #	LOCATION I.D./STATION	MONTH 08 DAY 21 1995 24 HR TIME SET	MONTH 08 DAY 22 1995 24 HR TIME REMOVED	SITE PERSONNEL INITIALS	LAB SAMPLE NUMBER	DATE/TIME START	COUN MIN.	CROSS COUNTS	COMMENTS
51	20	45	1036	1136	DS					
52	28	44	1039	1138						
54	27	43	1042	1139						
55	111	42	1046	1140						
56	11	42	1046	1140						
57	25	41	1049	1142						
58	23	40	1052	1143						
59	15	46	1056	1146						
60	119	47	1059	1147						
61	116	48	1103	1149						
62	19	48	1103	1149						
63	1	49	1106	1150						
64	3	53	1110	1152						
65	4	52	1113	1153						
67	2	51	1116	1154						

ARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES PAGE 5 / 5

Trial: Location:

Weather Condition: Partly Cloudy Precip.: None Min Temp.: 59°

INST. _____ EFF: _____ TECH: _____

INST. BACK: _____

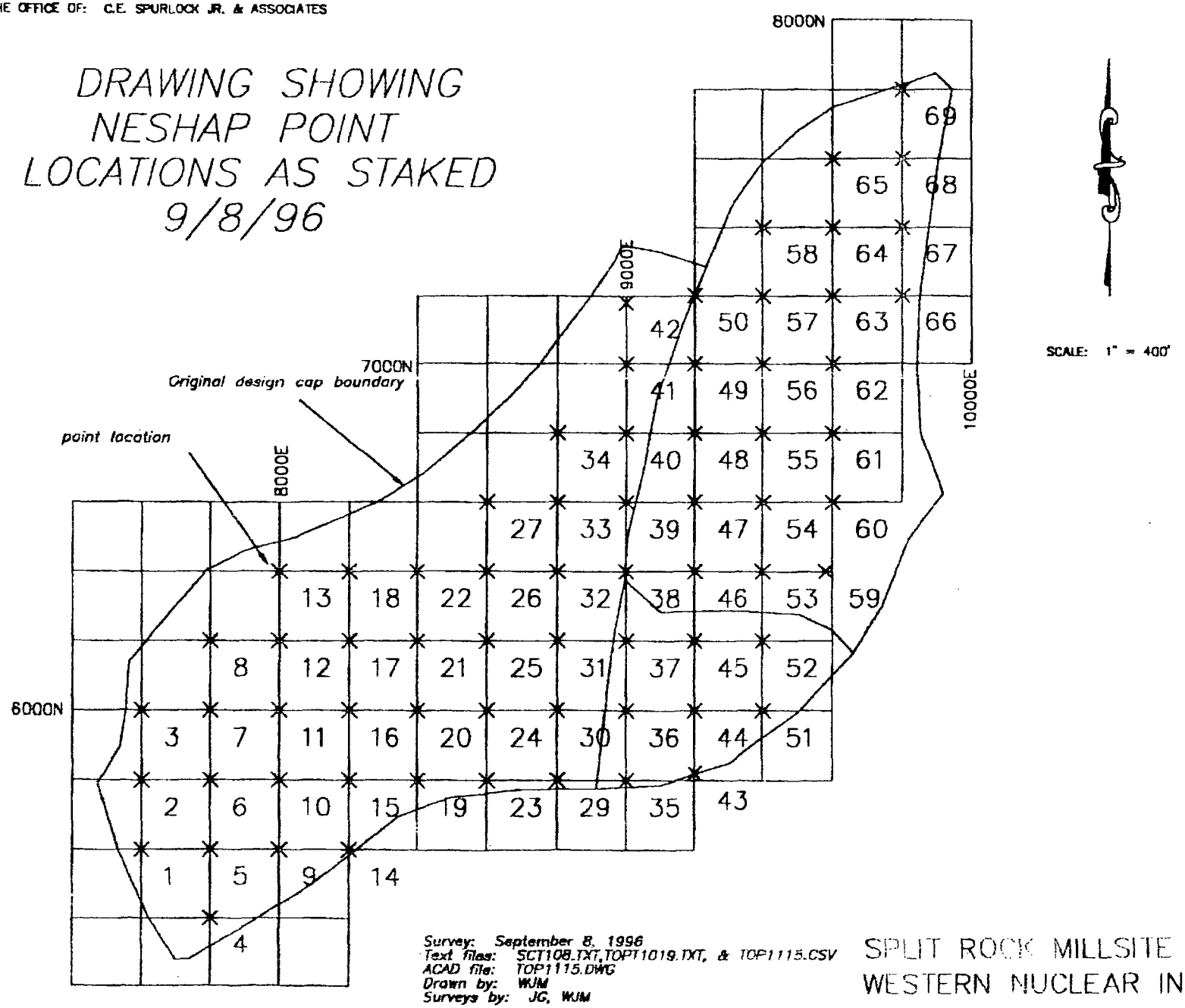
CHARC. BACK: _____ LOT: _____

STANDARD: _____ COUNT: _____

UNIT	CHARC CAN #	LOCATION I.D./STATION	MONTH 08 DAY 21 1995 24 HR TIME SET	MONTH 08 DAY 22 1995 24 HR TIME REMOVED	SITE PERSONNEL INITIALS	LAB SAMPLE NUMBER	DATE/TIME START	COUN MIN.	CROSS COUNTS	COMMENTS
69	16	50	1121	1155	JS					
70	14	54	1126	1157						
71	8	54	1126	1157						
72	29	55	1130	1159						
73	17	56	1133	1201						
74	21	57	1137	1203						
75	5	57	1137	1203						
76	118	North East	1145	1210						
66	6	Graham Ranch	1223	1232						
77	7	Graham Ranch	1223	1232						

FROM THE OFFICE OF: C.E. SPURLOCK JR. & ASSOCIATES

DRAWING SHOWING NESHAP POINT LOCATIONS AS STAKED 9/8/96



Survey: September 8, 1996
Text files: SCT108.TXT,TOPT1019.TXT, & TOPT1115.CSV
ACAD file: TOPT1115.DWG
Drawn by: WJM
Surveys by: JG, WJM

SPLIT ROCK MILLSITE
WESTERN NUCLEAR INC.

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
2393 SALT CREEK HIGHWAY • CASPER, WY 82601 • FAX (307) 234-1639

Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project:	WESTERN NUCLER CORPORATION	Date Set:	09-10-96
Location:	Areas 2A, 2B, 1C	Date Remove:	09-11-96
Report Date:	October 2, 1996	Date Counted:	09-11-96
Weather:	Partly Cloudy, min. temp 38° F. No precipitation		

Method: WNI's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

Lab I.D.	LAACC #	Canister #	Location	09-10-96 Time Set	09-11-96 Time Remove	Radon Flux pCi/m2s
96- 53267	14	1	1	08:29	08:30	<0.5
96- 53268	2	2	2	08:31	08:31	<0.5
96- 53269	1	3	3	08:33	08:33	<0.5
96- 53270	16	4	8	08:35	08:35	<0.5
96- 53271	13	5	7	08:36	08:36	<0.5
96- 53272	3	6	7	08:36	08:36	<0.5
96- 53273	5	7	6	08:39	08:39	<0.5
96- 53274	4	8	5	08:40	08:40	<0.5
96- 53275	15	9	4	08:41	08:41	<0.5
96- 53276	6	10	9	08:44	08:44	<0.5
Duplicate						<0.5
96- 53277	8	11	10	08:45	08:45	<0.5
96- 53278	7	12	11	08:46	08:46	<0.5
96- 53279	18	13	12	08:47	08:47	<0.5
96- 53280	9	14	13	08:49	08:49	<0.5
96- 53281	11	15	18	08:50	08:50	<0.5
96- 53282	10	16	17	08:51	08:51	<0.5
96- 53283	12	17	16	08:53	08:53	<0.5
96- 53284	17	18	15	08:55	08:55	<0.5
96- 53285	19	19	14	08:57	08:57	<0.5
96- 53286	20	20	14	08:57	08:57	<0.5
Duplicate						<0.5
96- 53287	22	21	19	09:25	09:25	<0.5
96- 53288	60	22	20	09:27	09:27	<0.5
96- 53289	21	23	21	09:28	09:28	<0.5
96- 53290	32	24	21	09:28	09:28	<0.5
96- 53291	23	25	22	09:30	09:30	<0.5
96- 53292	24	26	27	09:32	09:32	<0.5
96- 53293	59	27	26	09:33	09:33	<0.5
96- 53294	39	28	25	09:35	09:35	<0.5
96- 53295	26	29	24	09:36	09:36	<0.5
96- 53296	40	30	23	09:38	09:38	<0.5
Duplicate						<0.5

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ELI

Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project:	WESTERN NUCLER CORPORATION	Date Set:	09-10-96
Location:	Areas 2A, 2B, 1C	Date Remove:	09-11-96
Report Date:	October 2, 1996	Date Counted:	09-11-96
Weather:	Partly Cloudy, min. temp 38° F. No precipitation		

Lab I.D.	LAACC #	Canister #	Location	09-10-96 Time Set	09-11-96 Time Remove	Radon Flux pCi/m2s
96- 53297	37	31	29	09:40	09:40	<0.5
96- 53298	38	32	29	09:40	09:40	<0.5
96- 53299	25	33	30	09:42	09:42	<0.5
96- 53300	27	34	31	09:44	09:44	<0.5
96- 53301	28	35	32	09:46	09:46	<0.5
96- 53302	29	36	33	09:48	09:48	<0.5
96- 53303	58	37	34	09:49	09:49	<0.5
96- 53304	30	38	42	09:52	09:52	<0.5
96- 53305	36	39	42	09:52	09:52	<0.5
96- 53306	35	40	41	09:54	09:54	<0.5
Duplicate						<0.5
96- 53307	47	41	40	10:07	10:20	<0.5
96- 53308	49	42	39	10:09	10:21	<0.5
96- 53309	44	43	38	10:10	10:22	<0.5
96- 53310	48	44	37	10:12	10:23	<0.5
96- 53311	64	45	36	10:13	10:23	<0.5
96- 53312	50	46	35	10:15	10:24	<0.5
96- 53313	51	47	35	10:15	10:24	<0.5
96- 53314	62	48	43	10:17	10:25	<0.5
96- 53315	61	49	44	10:18	10:26	<0.5
96- 53316	55	50	45	10:19	10:27	<0.5
Duplicate						<0.5
96- 53317	43	51	46	10:21	10:28	**0.6**
96- 53318	52	52	47	10:24	10:30	**1.4**
96- 53319	41	53	48	10:25	10:31	<0.5
96- 53320	42	54	49	10:27	10:32	<0.5
96- 53321	53	55	49	10:27	10:32	<0.5
96- 53322	54	56	50	10:29	10:33	<0.5
96- 53323	57	57	58	10:31	10:34	**3.1**
96- 53324	45	58	57	10:35	10:35	<0.5
96- 53325	46	59	56	10:36	10:36	<0.5
96- 53326	56	60	56	10:36	10:36	<0.5
Duplicate						<0.5
96- 53327	100	61	55	10:59	11:03	<0.5
96- 53328	75	62	54	11:01	11:04	<0.5

ELI

Large Area Activated Charcoal Canister (LAACC) Radon Flux Report

Project:	WESTERN NUCLER CORPORATION	Date Set:	09-10-96
Location:	Areas 2A, 2B, 1C	Date Remove:	09-11-96
Report Date:	October 2, 1996	Date Counted:	09-11-96
Weather:	Partly Cloudy, min. temp 38° F. No precipitation		

Lab I.D.	LAACC #	Canister #	Location	09-10-96 Time Set	09-11-96 Time Remove	Radon Flux pCi/m2s
96- 53329	76	63	53	11:02	11:04	<0.5
96- 53330	69	64	52	11:04	11:05	<0.5
96- 53331	63	65	51	11:05	11:06	<0.5
96- 53332	78	66	59	11:08	11:08	<0.5
96- 53333	65	67	60	11:09	11:09	<0.5
96- 53334	79	68	61	11:11	11:11	<0.5
96- 53335	80	69	62	11:12	11:13	<0.5
96- 53336	66	70	63	11:16	11:16	<0.5
Duplicate						<0.5
96- 53337	68	71	63	11:16	11:16	<0.5
96- 53338	67	72	64	11:19	11:19	**1.9**
96- 53339	70	76	65	11:20	11:20	<0.5
96- 53340	71	77	69	11:23	11:24	<0.5
96- 53341	73	78	69	11:23	11:24	<0.5
96- 53342	72	79	68	11:24	11:25	<0.5
96- 53343	74	80	67	11:26	11:26	<0.5
Duplicate						<0.5
96- 53344	77	81	66	11:27	11:27	<0.5
96- 53345	98	82	Graham Ranch	11:56	11:59	<0.5
96- 53346	99	83	Graham Ranch	11:56	11:59	<0.5

Large Area Activated Charcoal Canister (LAACC) Radon Flux Quality Assurance Report

Project:	WESTERN NUCLER CORPORATION	Date Set:	09-10-96
Location:	Areas 2A, 2B, 1C	Date Remove:	09-11-96
Report Date:	October 2, 1996	Date Counted:	09-11-96
Weather:	Partly Cloudy, min. temp 38° F. No precipitation		

Trip Blank - Lab I.D.	Cannister #	Radon Flux - pCi/m²s*
96- 53242	1	<0.5
96- 53243	2	<0.5
96- 53244	3	<0.5
96- 53245	4	<0.5
96- 53246	5	<0.5
96- 53247	6	<0.5
96- 53248	7	<0.5
96- 53249	8	<0.5
96- 53250	9	<0.5
96- 53251	10	<0.5
96- 53252	11	<0.5
96- 53253	12	<0.5
96- 53254	13	<0.5
96- 53255	14	<0.5
96- 53256	15	<0.5
96- 53257	16	<0.5
96- 53258	17	<0.5
96- 53259	18	<0.5
96- 53260	19	<0.5
96- 53261	20	<0.5
96- 53262	21	<0.5
96- 53263	22	<0.5
96- 53264	23	<0.5
96- 53265	24	<0.5
96- 53266	25	<0.5

Blank Charcoal cpm	Standard Number 1 cpm	Standard Number 2 cpm
60	1557	3260
76	1579	3278
89	1628	3191

Total Number of Laboratory Duplicates:	8
Total Number of Field Duplicates:	10
Total Number of Trip Blank Cannisters:	25
Total Number of Measurements On Closure Cell:	68

Average Radon Flux for Areas 24, 2B, & 1C:	**0.57**	**pCi/m²s**
Minimum Radon Flux for Areas 24, 2B, & 1C:	<0.5	pCi/m²s
Maximum Radon Flux for Areas 24, 2B, & 1C:	3.1	pCi/m²s

* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m²s.

Report Approved By: R. A. Seeley

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LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: WESTERN NUCLEAR, INC. Jeffrey City Wyoming

Location: Split Rock Mill Site Areas, 2A, 2B and 1C

Weather Condition: Partly Cloudy Precip: -0- None

Min Temp: 38°F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
14	1	1	9-10-96 0829	9-11-96 0830	JB					
2	2	2	0831	0831	"					
1	3	3	0833	0833	"					
16	4	8	0835	0835	"					
13	5	7	0836	0836	"					
3	6	7	0836	0836	"					
5	7	6	0839	0839	"					
4	8	5	0840	0840	"					
15	9	4	0841	0841	"					
6	10	9	0844	0844	"					
8	11	10	0845	0845	"					
7	12	11	0846	0846	"					
18	13	12	0847	0847	"					
9	14	13	0849	0849	"					
11	15	18	0850	0850	"					
10	16	17	0851	0851	"					
12	17	16	0853	0853	"					

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear, Inc Jeffrey City Wyoming

Location: Split Rock Mill Site Areas 1C, 2A & 2B

Weather Condition: Partly Cloudy Precip: None Min Temp: 38°F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
17	18	✓ 15	9-10-96 0855	9-11-96 0855	JS					
19	19	✓ 14	0857	0857	"					
20	20	✓ 14	0857	0857	"					
22	21	✓ 19	0925	0925	JS					
60	22	✓ 20	0927	0927	"					
21	23	✓ 21	0928	0928	"					
32	24	✓ 21	0928	0928	"					
23	25	✓ 22	0930	0930	"					
24	26	✓ 27	0932	0932	"					
59	27	✓ 26	0933	0933	"					
39	28	✓ 25	0935	0935	"					
26	29	✓ 24	0936	0936	"					
40	30	✓ 23	0938	0938	"					
37	31	✓ 29	0940	0940	"					
38	32	✓ 29	0940	0940	"					
25	33	✓ 30	0942	0942	"					
27	34	✓ 31	0944	0944	"					

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear, Inc Jeffrey City Wyoming

Location: Split Rock Mill Site Areas 1C, 2492B

Weather Condition: Partly Cloudy

Precip: None

Min Temp: 38°F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
28	35	32	9-10-96 0946	9-11-96 0946	JP					
29	36	33	0948	0948	"					
58	37	34	0949	0949	"					
30	38	42	0952	0952	"					
36	39	42	0952	0952	"					
35	40	41	0954	0954	"					
47	41	40	1007	1020	JP					
49	42	39	1009	1021	"					
44	43	38	1010	1022	"					
48	44	37	1012	1023	"					
64	45	36	1013	1023	"					
50	46	35	1015	1024	"					
51	47	35	1015	1024	"					
62	48	43	1017	1025	"					
61	49	44	1018	1026	"					
55	50	45	1019	1027	"					
43	51	46	1021	1028						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: WESTERN Nuclear Inc - Jeffrey City, WY Location: Split Rock Mill site Areas 2A, 2B & 1C

Weather Condition: Partly Cloudy Precip: None Min Temp: 38°F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
52	52	47	9-10-96 1024	9-11-96 10:30	JS					
41	53	48	1025	10 31	"					
42	54	49	1027	10:32	"					
53	55	49	1027	10:32	"					
54	56	50	1029	10 33	"					
57	57	58	1031	10 34	"					
45	58	57	1035	10 35	"					
46	59	56	1036	10:36	"					
56	60	56	1036	10:36	"					
100	61	55	1059	11 03	JS					
75	62	54	1101	1104	"					
76	63	53	1102	1104	"					
69	64	52	1104	1105	"					
63	65	51	1105	11:06	"					
78	66	59	1108	1108	"					
65	67	60	1109	1109	"					
77	68	61	1111	11:11	"					

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: WESTER Nuclear, Inc. Jeffrey City, WY Location: Split Rock Areas 2A, 2B & 1C

Weather Condition: Partly Cloudy Precip: NONE Min Temp: 38°F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
80	69	62	9-16-96 1112	9-11-96 11:13	JB					
66	70	63	1116	11 16	"					
65	71	63	1116	11 16	"					
67	72	64	1119	11 19	"					
70	76	65	1120	11 20	"					
71	77	69	1123	11:24	"					
73	78	69	1123	11:24	"					
72	79	68	1124	11:25	"					
74	80	67	1126	11:26	"					
77	81	66	1127	11:27	"					
98	82	Grahom Ranch	1156	11:59	JB					
99	83	Grahom Ranch	1156	11:59						

7.3 FIELD NOTES FORM

SOP ELI-C-50-907-01

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 1 of 6

Client: Western Nuclear Jeffrey City Location: Split Rock Mill Site

Weather Condition: Partly Cloudy Precip: Trace Min Temp: 49.1

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
1	4	4	09-10-97 0825	09-11-97 0835	JS	97-53449				
2	1	1	0827	0837	"	53450				
4	2	2	0829	0839	"	53451				
3	3	3	0832	0840	"	53452				
5	15	15	0837	0842	"	53453				
6	14	14	0839	0844	"	53454				
7	13	13	0842	0845	"	53455				
8	12	12	0844	0847	"	53456				
9	11	11	0846	0848	"	53457				
10	10	10	0849	0850	"	53458				
11	9	9	0851	0852	"	53459				
12	8	8	0853	0853	"	53460				
13	7	7	0855	0858	"	53461				
14	6	6	0858	0859	"	53462				
15	5	5	0900	0901	"	53463				
16	16	16	0903	0904	"	53464				
	17	17	0907	0908	"	53465				

7.3 FIELD NOTES FORM
SOP ELI-C-50-907-01

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear Jeffrey City Location: Split Rock Mill Site

Weather Condition: Partly Cloudy Precip: Trace Min Temp: 49.1

Inst.: _____ Eff: _____ Tech: _____
Inst. Back: _____
Charcoal Back: _____ Lot: _____
Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
18	18	18	09-10-97 0909	09-11-97 0910	JS	534166				
19	19	19	0911	0912	"	534167				
20	20	20	0913	0914	"	534168				
25	21	21	0916	0916	"	534169				
26	22	22	0917	0918	"	534170				
27	23	23	0919	0920	"	534171				
28	24	24	0922	0922	"	534172				
29	25	25	0925	0925	"	534173				
30	26	26	0927	0927	"	534174				
31	27	27	0929	0929	"	534175				
32	28	28	0931	0931	"	534176				
33	42	42	0933	0933	"	534177				
34	41	41	0935	0935	"	534178				
35	40	40	0938	0938	"	534179				
36	39	39	0940	0940	"	534180				
37	38	38	0942	0942	"	534181				
8	37	37	0944	0944	"	534182				

7.3 **FIELD NOTES FORM**
SOP ELI-C-50-907-01

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear Jeffrey City Location: Split Rock Mill Site

Weather Condition: Partly Cloudy Precip: Trace Min Temp: 49.1

Inst.: _____ Eff: _____ Tech: _____
Inst. Back: _____
Charcoal Back: _____ Lot: _____
Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
39	36	36	09-10-97 0946	09-11-97 0946	JS	53483				
40	35	35	0948	0948	"	53484				
21	34	34	0959	1003	"	53485				
22	33	33	1001	1004	"	53486				
23	32	32	1003	1006	"	53487				
24	31	31	1005	1008	"	53488				
41	30	30	1007	1010	"	53489				
42	29	29	1010	1012	"	53490				
43	43	43	1014	1014	"	53491				
44	44	44	1016	1016	"	53492				
45	45	45	1019	1019	"	53493				
46	46	46	1021	1021	"	53494				
47	47	47	1022	1024	"	53495				
48	48	48	1025	1026	"	53496				
49	49	49	1027	1027	"	53497				
50	50	50	1029	1029	"	53498				
	51	51	1031	1032	"	53499				

7.3 FIELD NOTES FORM

SOP ELI-C-50-907-01

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Page 4 of 6

Client: Western Nuclear Jeffrey City Location: Split Rock Mill Site

Weather Condition: Partly Cloudy Precip: Trace Min Temp: 49.1

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
52	52	52	09-10-99 1033	09-11-99 1034	JL	53500				
53	53	53	1035	1036	"	53501				
54	54	54	1037	1038	"	53502				
55	55	55	1040	1040	"	53503				
56	56	56	1042	1042	"	53504				
57	57	57	1044	1044	"	53505				
58	72	72	1048	1049	"	53506				
59	71	71	1050	1050	"	53507				
60	70	70	1052	1052	"	53508				
79	69	69	1103	1104	"	53509				
65	68	68	1104	1106	"	53510				
63	67	67	1106	1107	"	53511				
61	66	66	1108	1109	"	53512				
75	65	65	1110	1112	"	53513				
64	64	64	1112	1114	"	53514				
62	63	63	1113	1116	"	53515				
?	62	62	1115	1117	"	53516				

7.3 FIELD NOTES FORM
SOP ELI-C-50-907-01

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear Jeffrey City Location: Split Rock Mill Site

Weather Condition: Partly Cloudy Precip: Trace Min Temp: 49.1

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
78	61	61	09-10-97 1112	09-11-97 1119	JD	53517				
74	60	60	1119	1121	"	53518				
76	59	59	1121	1122	"	53519				
71	58	58	1123	1124	"	53520				
73	73	73	1125	1127	"	53521				
72	74	74	1127	1129	"	53522				
67	75	75	1129	1130	"	53523				
68	76	76	1132	1132	"	53524				
66	77	77	1135	1137	"	53525				
69	78	78	1136	1139	"	53526				
70	79	79	1138	1140	"	53527				
80	80	80	1140	1142	"	53528				
81	81	81	1143	1144	"	53529				
82	82	82	1145	1146	"	53530				
83	83	83	1147	1148	"	53531				
84	84	84	1149	1149	"	53532				
5	85	85	1151	1151	"	53533				

7.3 FIELD NOTES FORM
SOP ELI-C-50-907-01

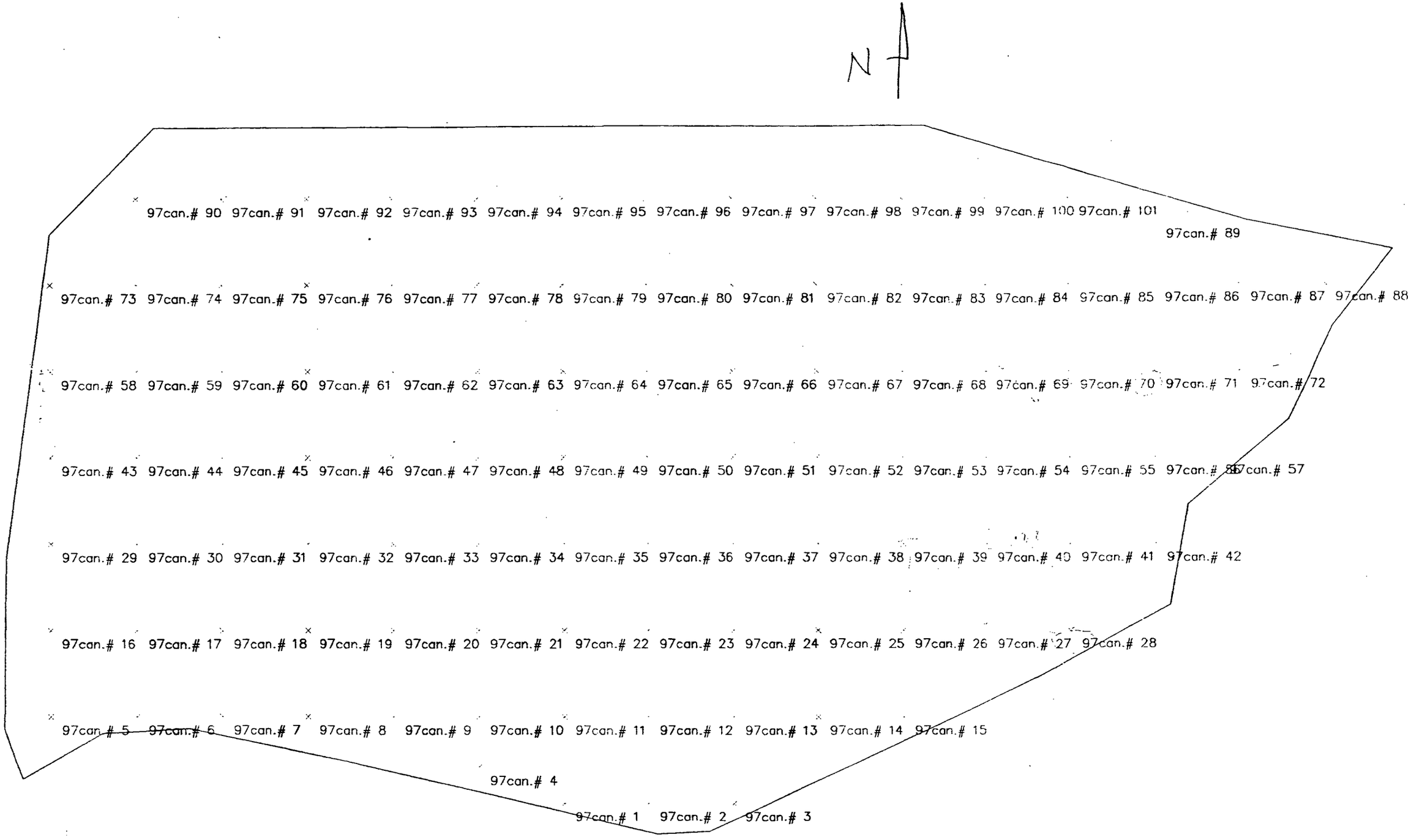
LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear Jeffrey City Location: Split Rock Mill Site

Weather Condition: Partly Cloudy Precip: Trace Min Temp: 49.1

Inst.: _____ Eff: _____ Tech: _____
Inst. Back: _____
Charcoal Back: _____ Lot: _____
Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
86	86	86	09-10-99 1153	09-11-99 1153	JJ	53534				
87	87	87	1200	1200	"	53535				
88	88	88	1202	1202	"	53536				
89	89	89	1205	1205	"	53537				
100	100	100	1209	1209	"	53538				
99	99	99	1211	1211	"	53539				
98	98	98	1212	1213	"	53540				
97	97	97	1214	1214	"	53541				
96	96	96	1216	1216	"	53542				
95	95	95	1218	1218	"	53543				
94	94	94	1220	1220	"	53544				
93	93	93	1222	1222	"	53545				
92	92	92	1224	1224	"	53546				
91	91	91	1226	1226	"	53547				
90	90	90	1229	1229	"	53548				
101	101	NE ~~101~~	1237	1237	"	53549				
1	102	Graham Ranch ###	1315	1317		53550				


N
97can.# 90 97can.# 91 97can.# 92 97can.# 93 97can.# 94 97can.# 95 97can.# 96 97can.# 97 97can.# 98 97can.# 99 97can.# 100 97can.# 101
97can.# 89
97can.# 73 97can.# 74 97can.# 75 97can.# 76 97can.# 77 97can.# 78 97can.# 79 97can.# 80 97can.# 81 97can.# 82 97can.# 83 97can.# 84 97can.# 85 97can.# 86 97can.# 87 97can.# 88
97can.# 58 97can.# 59 97can.# 60 97can.# 61 97can.# 62 97can.# 63 97can.# 64 97can.# 65 97can.# 66 97can.# 67 97can.# 68 97can.# 69 97can.# 70 97can.# 71 97can.# 72
97can.# 43 97can.# 44 97can.# 45 97can.# 46 97can.# 47 97can.# 48 97can.# 49 97can.# 50 97can.# 51 97can.# 52 97can.# 53 97can.# 54 97can.# 55 97can.# 56 97can.# 57
97can.# 29 97can.# 30 97can.# 31 97can.# 32 97can.# 33 97can.# 34 97can.# 35 97can.# 36 97can.# 37 97can.# 38 97can.# 39 97can.# 40 97can.# 41 97can.# 42
97can.# 16 97can.# 17 97can.# 18 97can.# 19 97can.# 20 97can.# 21 97can.# 22 97can.# 23 97can.# 24 97can.# 25 97can.# 26 97can.# 27 97can.# 28
97can.# 5 97can.# 6 97can.# 7 97can.# 8 97can.# 9 97can.# 10 97can.# 11 97can.# 12 97can.# 13 97can.# 14 97can.# 15
97can.# 4
97can.# 1 97can.# 2 97can.# 3

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: WESTERN NUCLEAR, INC. Location: JEFFREY CITY, Wyoming

Weather Condition: Sunny/clear Precip: None Min Temp: 47° F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
66	215	5	07/14/98 0804	07/15/98 0831	CA					
73	219	6	0808	0833						
38	200	7	0810	0833						
75	236	8	0813	0835						
5	226 ~~236~~	9	0815	0836						
55	222	10	0817	0838						
58	220	11	0820	0839						
68	230	12	0822	0841						
52	202	13	0825	0841						
103	208	14	0827	0843						
1	223	15	0829	0844						
31	212	16	0831	0845						
53	234	17	0833	0846						
40	237	18	0835	0848						
24	231	1	0840	0852						
60	238	2	0842	0853						
3	27	3	08	0855						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: WESTERN NUCLEAR, INC Location: JEFFREY CITY, WYOMING

Weather Condition: Clear Precip: None Min Temp: 47° F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
2	239	4	07/14/98 0848	07/15/98 0857	[illegible]					
95	224	47	0853	0903						
62	216	46	0855	0905						
59	229	48	0857	0907						
54	240	32	0900	0909						
50	206	31	0902	0910						
51	209	30	0904	0912						
23	232	29	0906	0913						
27	217	28	0908	0914						
63	207	27	0910	0917						
91	235	26	0912	0919						
49	214	25	0914	0920						
7	221	24	0916	0922						
100	218	23	0918	0923						
56	205	22	0920	0925						
47	228	21	0922	0926						
43	04	20	0924	0928						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: WESTERN NUCLEAR INC. Location: JEFFREY CITY, WYOMING

Weather Condition: CLEAR Precip: NONE Min Temp: 47°F

Inst.: _____ Eff: _____ Tech: _____

Inst. Back: _____

Charcoal Back: _____ Lot: _____

Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
36	225	33	07/14/98 0928	07/15/98 0931						
57	213	34	~~0920~~ 0930	0932						
48	201	35	0931	0934						
68	233	36	0933	0935						
99	203	19	0938	0939						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear, Inc. Location: Jeffrey City, WY

Weather Condition: Clear Precip: none Min Temp: 52°

Inst.: _____ Eff: _____ Tech: _____
Inst. Back: _____
Charcoal Back: _____ Lot: _____
Standard: _____ Count: _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
68	284	2A	07/15/98 1034	07/16/98 1046	[illegible]					
103	292	2A	1034	1046						
1	297	37	1050	1100						
38	288	38	1052	1101						
47	264	39	1054	1102						
63	298	39	1054	1102						
52	300	40	1056	1102						
66	275	41	1058	1105						
75	293	42	1100	1107						
24	294	43	1102	1108						
55	268	44	1103	1110						
49	252	45	1105	1111						
91	211	59	1108	1113						
73	248	58	1109	1115						
5	276	57	1111	1116						
50	3	56	1113	1117						
57	251	55	1115	1119						

LARGE AREA ACTIVATED CHARCOAL CANISTER (LAACC) FIELD NOTES

Client: Western Nuclear, Inc. *Location:* Jeffrey City, WY

Weather Condition: Clear *Precip:* none *Min Temp:* 52°

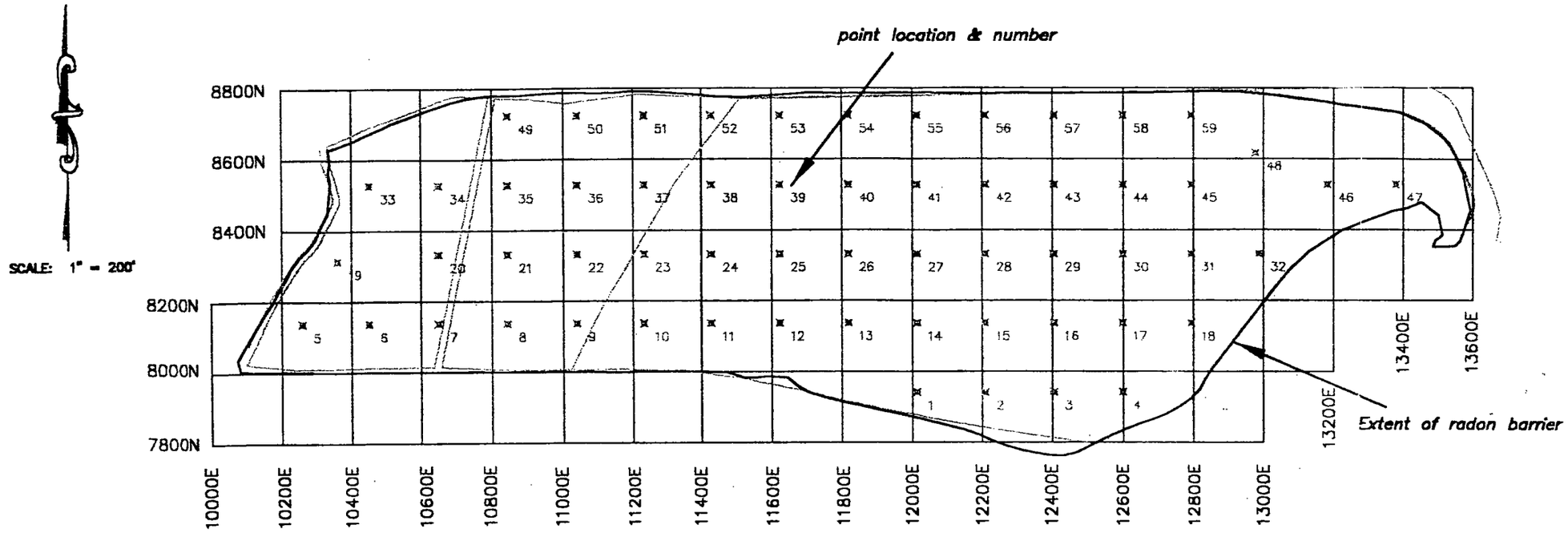
Inst.: _____ *Eff:* _____ *Tech:* _____

Inst. Back: _____

Charcoal Back: _____ *Lot:* _____

Standard: _____ *Count:* _____

LAACC Unit #	Charcoal Can #	Location I.D. / Station	Mo/Day/Yr 24 hr time set	Mo/Day/Yr 24 hr time removed	Site Personnel Initials	Lab Sample Number	Date/Time Start	Count Min	Gross Counts	Comments
58	291	54	07/15/98 1113	07/16/98 1121	[illegible]					
99	247	53	1119	1122						
43	256	52	1121	1124						
56	295	51	1123	1125						
100	296	50	1125	1126						
3	299	49	1128	1128						
7	210	49	1128	1128						
59	272	N.E.	1141	1144						
2	260	GRAHAM RANCH	1213	1213						

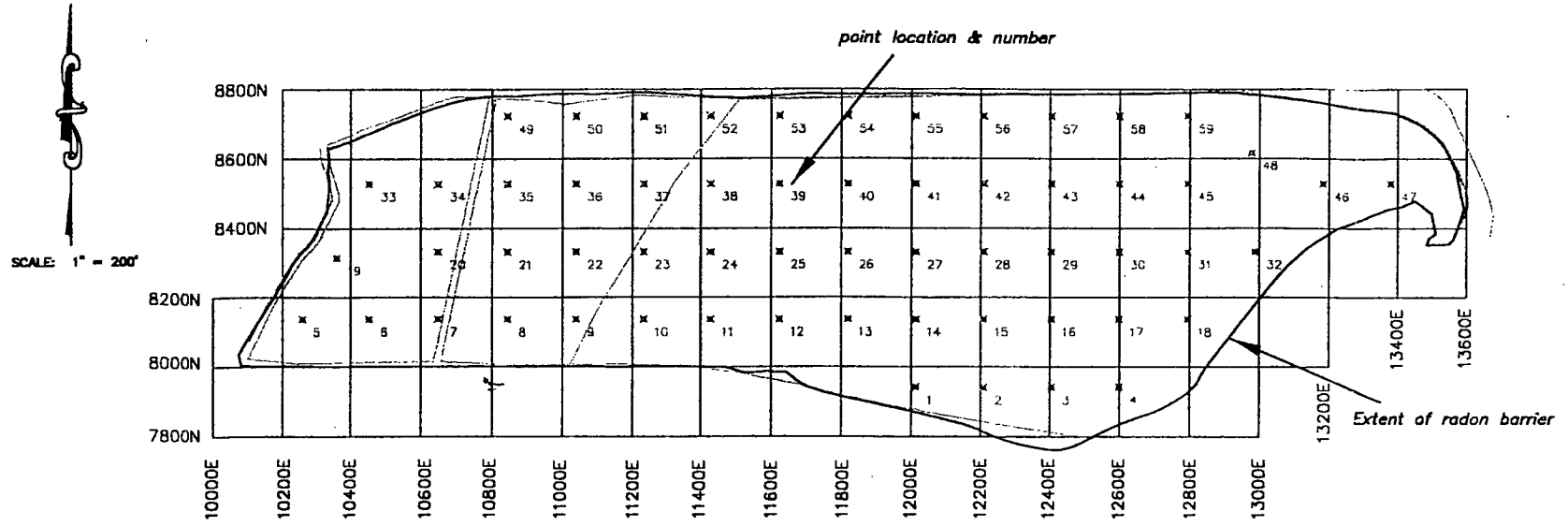


DRAWING SHOWING 1998 NEESHAP POINT LOCATIONS AS STAKED, MAY 1998

Survey: May 11th & 14th, 1998
ACAD file: NEESHAP98.DWG(R13)
Drawn by: WJM
Survey by: W.T.

SPLIT ROCK M SITE
WESTERN NUCL AR INC.

FROM THE OFFICE OF: C.E. SPURLOCK JR. & ASSOCIATES



DRAWING SHOWING 1998 NEESHAP POINT LOCATIONS AS STAKED, MAY 1998

Survey: May 11th & 14th, 1998
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FROM THE OFFICE OF: C.E. SPURLOCK JR. & ASSOCIATES

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Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Project:	**Western Nuclear, Inc.**	**Date Set:**	**07-14-98**
Location:	**Jeffrey City, WY**	**Date Remove:**	**07-15-98**
Report Date:	**July 22, 1998 Revised 10-3-98**	**Date Counted:**	**07-16-98**
Weather:	**Clear**		

Method: Western Nuclear's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

Lab ID	LAACC #	Cannister #	Location	07-14-98 Time Set	07-15-98 Time Remove	Radon Flux pCi/m²s
98- 44439	66	215	5	8:04	8:31	<0.5
98- 44440	73	219	6	8:08	8:33	<0.5
98- 44441	38	200	7	8:10	8:33	<0.5
98- 44442	75	236	8	8:13	8:35	<0.5
98- 44443	5	226	9	8:15	8:36	<0.5
98- 44444	55	222	10	8:17	8:38	<0.5
98- 44445	58	220	11	8:20	8:39	<0.5
98- 44446	68	230	12	8:22	8:41	<0.5
98- 44447	52	202	13	8:25	8:41	<0.5
98- 44448	103	208	14	8:27	8:43	<0.5
98- -	-	208	14	8:27	8:43	<0.5
98- 44449	1	223	15	8:29	8:44	<0.5
98- 44450	31	212	16	8:31	8:45	<0.5
98- 44451	53	234	17	8:33	8:46	<0.5
98- 44452	40	237	18	8:35	8:48	<0.5
98- 44453	24	231	1	8:40	8:52	<0.5
98- 44454	60	238	2	8:42	8:53	<0.5
98- 44455	3	227	3	8:44	8:55	<0.5
98- 44456	2	239	4	8:48	8:57	<0.5
98- 44457	95	224	47	8:53	9:03	<0.5
98- 44458	62	216	46	8:55	9:05	<0.5
98- -	-	216	46	8:55	9:05	<0.5
98- 44459	59	229	48	8:57	9:07	<0.5
98- 44460	54	240	32	9:00	9:09	<0.5
98- 44461	50	206	31	9:02	9:10	<0.5

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Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Project:	**Western Nuclear, Inc.**	**Date Set:**	**07-14-98**
Location:	**Jeffrey City, WY**	**Date Remove:**	**07-15-98**
Report Date:	**July 22, 1998 Revised 10-3-98**	**Date Counted:**	**07-16-98**
Weather:	**Clear**		

Method: Western Nuclear's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

Lab ID	LAACC #	Cannister #	Location	07-14-98 Time Set	07-15-98 Time Remove	Radon Flux pCi/m^{2}s
98- 44462	51	209	30	9:04	9:12	<0.5
98- 44463	23	232	29	9:06	9:13	<0.5
98- 44464	27	217	28	9:08	9:14	<0.5
98- 44465	63	207	27	9:10	9:17	<0.5
98- 44466	91	235	26	9:12	9:19	<0.5
98- 44467	49	214	25	9:14	9:20	<0.5
98- 44468	7	221	24	9:16	9:22	<0.5
98- -	-	218	24	9:16	9:22	<0.5
98- 44469	100	218	23	9:18	9:23	<0.5
98- 44470	56	205	22	9:20	9:25	<0.5
98- 44471	47	228	21	9:22	9:26	<0.5
98- 44472	43	204	20	9:24	9:28	<0.5
98- 44473	36	225	33	9:28	9:31	<0.5
98- 44474	57	213	34	9:30	9:32	<0.5
98- 44475	48	201	35	9:31	9:34	<0.5
98- 44476	68	233	36	9:33	9:35	<0.5
98- 44477	99	203	19	9:38	9:39	<0.5

Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report

Project:	**Western Nuclear, Inc.**	**Date Set:**	**07-14-98**
Location:	**Jeffrey City, WY**	**Date Remove:**	**07-15-98**
Report Date:	**July 22, 1998 Revised 10-3-98**	**Date Counted:**	**07-16-98**
Weather:	**Clear**		

Trip Blank - Lab ID	Cannister #	Radon Flux - pCi/m^{2}s*
98- TB-1	1	< 0.5
98- TB-2	2	< 0.5
98- TB-3	3	< 0.5
98- TB-4	4	< 0.5

Blank Charcoal cpm	Standard Number 1 cpm	Standard Number 2 cpm
105	1708	3390

Replicate Lab ID	Date Counted	Radon Flux pCi/m^{2}s*	Recovery Decimal
98- 44448	07-16-98	<0.5	1.000
98- 44458	07-16-98	<0.5	1.000
98- 44468	07-17-98	<0.5	1.000

Average of recoveries: **1.000**

Minimum Radon Flux for WNI, Jeffrey City:	<0.5 pCi/m^{2}s
Maximum Radon Flux for WNI, Jeffrey City:	<0.5 pCi/m^{2}s
Average Radon Flux for #215-203	<0.5 pCi/m^{2}s

* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m^{2}s.
Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By: **Reviewed By:**

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Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Project:	Western Nuclear, Inc	Date Set:	07-15-98
Location:	Jeffrey City, WY.	Date Remove:	07-16-98
Report Date:	July 23, 1998 Revised 09-16-98	Date Counted:	07-17-98
Weather:	Clear		

Method: Western Nuclear's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

Lab ID	LAACC #	Cannister #	Location	07-15-98 Time Set	07-16-98 Time Remove	Radon Flux pCi/m²s
98- 44649	68	284	2A	10:34	10:46	<0.5
98- 44650	103	292	2A	10:34	10:46	<0.5
98- 44651	1	297	37	10:50	11:00	<0.5
98- 44652	38	288	38	10:52	11:01	<0.5
98- 44653	47	264	39	10:54	11:02	<0.5
98- 44654	63	298	39	10:54	11:02	<0.5
98- 44655	52	300	40	10:56	11:02	<0.5
98- 44656	66	275	41	10:58	11:05	<0.5
98- 44657	75	293	42	11:00	11:07	<0.5
98- 44658	24	294	43	11:02	11:08	<0.5
98- -	-	294	43	11:02	11:08	<0.5
98- 44659	55	268	44	11:03	11:10	<0.5
98- 44660	49	252	45	11:05	11:11	<0.5
98- 44661	91	211	59	11:08	11:13	<0.5
98- 44662	73	248	58	11:09	11:15	<0.5
98- 44663	5	276	57	11:11	11:16	<0.5
98- 44664	50	263	56	11:13	11:17	<0.5
98- 44665	57	251	55	11:15	11:19	<0.5
98- 44666	58	291	54	11:17	11:21	<0.5
98- 44667	99	247	53	11:19	11:22	<0.5
98- 44668	43	256	52	11:21	11:24	<0.5
98- -	-	256	52	11:21	11:24	<0.5
98- 44669	56	295	51	11:23	11:25	<0.5
98- 44670	100	296	50	11:25	11:26	<0.5
98- 44671	3	299	49	11:28	11:28	<0.5

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Large Area Activated Charcoal Cannister (LAACC) Radon Flux Report

Project:	Western Nuclear, Inc	Date Set:	07-15-98
Location:	Jeffrey City, WY.	Date Remove:	07-16-98
Report Date:	July 23, 1998 Revised 09-16-98	Date Counted:	07-17-98
Weather:	Clear		

Method: Western Nuclear's employees placed and retrieved LAACC units. EPA Method 115 per 40 CFR 61 (NESHAPs). Radon Flux results have been corrected for instrument & charcoal background counts.

Lab ID	LAACC #	Cannister #	Location	07-15-98 Time Set	07-16-98 Time Remove	Radon Flux pCi/m^{2}s
98- 44672	7	210	49	11:28	11:28	0.57
98- 44673	59	272	NE	11:41	11:44	<0.5
98- 44674	2	260	GRAHAM	12:13	12:13	1.09

ELI

Large Area Activated Charcoal Cannister (LAACC) Radon Flux Quality Assurance Report

Project:	Western Nuclear, Inc	Date Set:	07-15-98
Location:	Jeffrey City, WY.	Date Remove:	07-16-98
Report Date:	July 23, 1998 Revised 09-28-98	Date Counted:	07-17-98
Weather:	Clear		

Trip Blank - Lab ID		Cannister #	Radon Flux - pCi/m²s*
98-	TB-3	T1	<0.5
98-	TB-5	T2	<0.5
98-	TB-6	T3	<0.5
98-	TB-7	T4	<0.5
98-	TB-9	T5	<0.5
98-	TB-10	T6	<0.5

Blank Charcoal cpm	Standard Number 1 cpm	Standard Number 2 cpm
115	817	1596

Replicate Lab ID		Date Counted	Radon Flux pCi/m²s*	Recovery Decimal
98-	44658	07-17-98	<0.5	1.000
98-	44668	07-17-98	<0.5	1.000

Average of recoveries: **1.000**

Minimum Radon Flux for WNI, Jeffrey City:	<0.5	pCi/m²s
Maximum Radon Flux for WNI, Jeffrey City:	1.09	pCi/m²s
Average Radon Flux for #284-260	0.53	pCi/m²s

* Note: ELI's Radon Flux Practical Quantitative Limit (PQL) is 0.5 pCi/m²s.

Minimum temperature under 35 degrees Fahrenheit not acceptable.

Report Approved By: **Reviewed By:**

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