

SCANTECHNOLOGIES

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RECD FEB 22 2001

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Georgia Department of Natural Resources
Radioactive Materials Program
Attn: Eric Jameson
4244 International Parkway, Suite 114
Atlanta, GA 30354

Dear Mr. Jameson:

This letter is in response to Scan Technologies' application to amend the SS&D registration for the COALSCAN 9200/9500 device. The answers to your questions are as follows.

1. Section 2.1, "Written Description" states that the original design, now referred to as the Mk1, is obsolete. Are there any original models still in use in the field? NOTE: This question is for information only. Mk1 devices need not be removed from service.

There are currently 10 COALSCAN 9200/9500 original-design devices in service worldwide, 3 of which are currently installed in the United States.

2. Section 2.1 states that the gravity-controlled neutron attenuator is only used on the Mk2. Please confirm that the reason for the removal of the attenuator is the addition of another layer of bismuth shielding in the source housing between the source holder and the analyzing chute (refer to drawing 8020-90-0044 sheet 1 of 2, revision 1).

The gravity-controlled neutron attenuator is only used on the Mk2, which has the source drive mechanism mounted below the source and source rod. The new designs have a smaller size source drive which is mounted to the side of the source rod. The free space made available by removing the Mk2 source drive mechanism is now filled with CNS cast neutron shielding, providing for more neutron shielding than previously. In addition, the new source drive mechanisms retract the source further into the shielding, which lowers the neutron flux to the point where the gravity-controlled neutron attenuator is no longer necessary.

3. Section 2.2, "Drawings" states that the details for the Mk4 source drive design can be found on drawing 6060-90-0004 sheets 1 and 2. The title block of this drawing indicates that this source drive is used on the Mk2 design. Please confirm that the title block should indicate that this is for the Mk4 design.

The title block should indicate that this is for the Mk4 design. The Mk2 listed on the title block refers to the version of computer control/software version.

4. Section 3.1, "Conditions of Use" states that up to three Cf-252 sources will be installed in the COALSCAN 9200/9500 Mk2 or Mk3 devices. Please confirm that this also applies to the COALSCAN 9200/9500 Mk4.

The Mk2, Mk3 and Mk4 devices all hold up to three Cf-252 source capsules. Mk4 is erroneously missing from this paragraph.

5. Please confirm that, in the third paragraph of Section 3.2, "Details of Construction" the drawing reference for the Mk3 should read "6060-90-0003" instead of "6060-90-000".

You are correct, this was a typographical error.

6. Section 3.3, "Labeling" refers to the sample label Exhibit 4. The top of the label shows "DEVICE: COALSCAN S/N: _____". There is a line beneath COALSCAN. Is this the line in which the device model (i.e., 9500 Mk3) would be identified?

This is correct, the device model will be entered on this line.

7. Section 3.4, "Testing of Prototypes" states that the Mk4 actuator drive design has been undergoing prototype testing for over one year. Please provide an approximate number of cycles that the actuator has tested, and compare this to an expected number of cycles over the useful life of the device.

The linear actuator used in the Mk4 design has undergone 10,000 cycles without failure and is extremely reliable. The source rod assembly used in the Mk4 has undergone 5,000 cycles in the lab and over 1,000 cycles in actual devices installed in the field without any failures.

8. Section 3.6, "Radiation Profiles" states that the survey was performed in January 1997 with instruments that were calibrated in May 1998 and November 1998, respectively. Please confirm that survey was performed in January 1999.

The radiation survey was performed during the interval January 10-14, 1999, not 1997 as the application erroneously states.

9. Section 3.6 includes a set of tables that provide radiation dose rates at various points on each face of the device.

- a) Please provide diagrams showing the locations for points A1-A9 and B1-B9.

The measurement locations for points A1-A9 and B1-B9 are depicted in Figure 1 and Figure 2 respectively in the application. I have included a copy of Figures 1 and 2 with this letter.

- b) Please provide neutron dose rates for Table 3 and Table 9, or provide a justification why neutron dose rates were not evaluated.

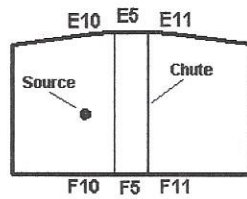
The neutron dose rates for Points C1 – C9 in Table 3 and Table 9 were determined to be non-detectable. This is the right side of the COALSCAN 9200/9500. There should be zeros in each of the measurement points for C1-C9 for both Table 3 and Table 9.

- c) Tables 13 and 14 (source ON, chute full) are referenced in the application but were not included. Please provide copies of these tables.

Tables 13, 14 and 15 are all on one page of the application, directly before Figure 1 and Figure 2. These pages must be missing from your copy of the application and they have been included with this letter.

- d) Tables 5 and 11 include dose rate values for points E10 and E11.
Tables 6 and 12 include dose rate values for points F10 and F11.
Figures 5 and 6 do not identify points E10 & E11 and F10 & F11, respectively. Please provide diagrams that include these points.

Points E10, E11, F10 and F11 were additional measurement points on the top and bottom of the device near the measurement chute as depicted in the drawing. Points F10 and F11 are located approximately underneath the source holder and detector assembly respectively.



Coalscan 9500
Showing position of additional measurement
points at top and bottom of frame.

9500dose.bmp

10. After comparing the component lists for the Mk3 and Mk4 found on drawings 6060-90-0003, sheet 1 of 2 and 6060-90-0004, sheet 2 of 2, respectively, it was noted that the two models appeared to have a number of components in common, but the respective part numbers did not match. The majority of the drawings included in the application pertain to the Mk3. Please indicate if the following components are similar in size, material of construction, et cetera. Otherwise, provide current revisions of the Mk4 drawings.

Many of the parts, and therefore the drawings, are very similar. Please find enclosed a new drawing for each of the part numbers below for the Mk4 model. Please note that some of these drawings are labeled Mk2, etc. This refers to the version of computer system and should be ignored.

component description	Mk3 part #	Mk4 part #
SOURCE HOUSING ASSEMBLY	8020- 90- 0044	8020- 90- 0067
MOUNT – SOURCE ASSEMBLY	7855- 00- 0045	7855- 50- 0001
PLATE – INDICATOR AND LOCKING	5010- 00- 0258	5010- 00- 0259
ARM – LIMIT SWITCH	6870- 00- 0019	6870- 00- 0020

LEVER – SOURCE LOCKING	6835- 00- 0008	6835- 00- 0009
TONGUE – SOURCE LOCKING	5025- 00- 0001	5025- 00- 0002
BLOCK – RETAINING	7860- 00- 0037	7860- 00- 0038
R CLIP	6250- 00- 0019	6250- 00- 0020

11. Please provide copies of drawings for the following components of the 9200/9500 Mk4 source drive mechanism, identified on drawing 6060-90-0004, sheet 2 of 2:

Drawings for each of the following part numbers for the Mk4 source drive are attached.

component description	Mk4 part #
LINEAR ACTUATOR	2610- 00- 0016
BEARING AND TRACK	5205- 00- 0001
BEARING – FLANGED SMF2225	5208- 00- 0011
SHIELD SET – LEFT SIDE	5805- 00- 0177
SHIELD SET – RIGHT SIDE	5805- 00- 0176

12. In the component lists for the Mk3 and Mk4 found on 6060-90-0003, sheet 1 of 2 and 6060-90-0004, sheet 2 of 2, respectively, it was noted that some of the part numbers did not match other drawings submitted with the

application. The components in question physically match the source drive mechanism drawings; the part reference numbers appear to be inaccurate. Please verify the components listed in the table below:

Please find the drawing for part number 5415-00-0019 attached. Drawing 5415-00-0016 originally submitted is correct and should replace drawing 5414-00-0016 on the list.

	component description	part # on component list	drawing submitted
	SHAFT – SOURCE LOCKING	5415-00-0019	5415-00-0018
	SHAFT – SOURCE LOCKING	5414-00-0016	5415-00-0016

13. Please provide the travel length for the Mk 4 actuator (i.e., drawing 6060-90-0003, sheet 1 of 2 indicates a 150mm travel length for the Mk3).

The travel of the source rod for the Mk4 actuator is 140 mm. The ‘On’ position of the source rod is identical for both, but the ‘Off’ position is 10 mm different for the two actuators.

14. The 9200/9500 Mk2 design as described in the SS&D registry includes the capability to manually retract the neutron source housing via a wrench. Please confirm that the Mk3 and Mk4 designs can be manually retracted in a similar manner.

The source rod in both designs can be manually retracted. The procedure for both Mk3 and Mk4 is to unbolt and remove a shielding panel. This allows access to the end of the source loading rod, which can be withdrawn into the ‘Off’ position.

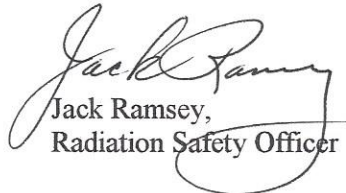
I have also read over the preliminary SS&D Registration Certificate for the COALSCAN 9200/9500. Changes were made to the preliminary version and are indicated in red on the attached copy.

1. **Manufacturer:** The manufacturer needs to be changed from MCI to Scantech International Pty Ltd. MCI changed its name. The address for Scantech is correct.

2. Description: The following line needs to be added to the end of the first paragraph. 'Alternatively, the COALSCAN Model 9200 series and 9500 series Elemental Analyzers can be used in a laboratory setting in which case coal samples are lowered in a bucket through the chute in the center of the analyzer, via a rope.'
3. On page 6, External Radiation Levels, '97.5 micrograms' needs to be changed to '87.9 micrograms'.
4. On page 6, External Radiation Levels, 'The values have been increased by 28% ---' needs to be changed to 'The values have been multiplied by 1.42 ---'.
5. On page 6, External Radiation Levels, 'The table below shows the three highest readings at each distance.' needs to be changed to 'The table below shows the two highest readings at each distance.'
6. The ANSI classification should be changed to: ANSI 24-532-542-R3 and is based on the following radiation levels, which have been changed on the preliminary SS&D registration, but are based on the same measurement points you had indicated. (See point 4 above.)

If you have any more questions, please don't hesitate to contact me.

Sincerely,


Jack Ramsey,
Radiation Safety Officer

Attachments: 16 Drawings
Amended preliminary SS&D certificate
Table 13 (Application)
Table 14 (Application)
Figure 1 (Application)
Figure 2 (Application)

Table 13. Top 9500 Mk3, Source On, Chute full. Dose rates in

$\mu\text{Sv/hr}$

$^{252}\text{Cf} = 87.9$ micrograms (47.1 mCi), $^{137}\text{Cs} = 185$ MBq
(5.0 mCi)

Point	Neutron			Gamma 7.0 mg/cm ²			Gamma 300 mg/cm ²			Total		
	5	30	100	5	30	100	5	30	100	5	30	100
E1	25	12	3	15	8	2	15	8	2	40	20	5
E10	2	4	1	4	2	1	4	3	1	6	7	2
E11	4	2	2	1	2	1	1	1	1	5	3	3

Table 14. Bottom 9500 Mk3, Source On, Chute full. Dose rates in

$\mu\text{Sv/hr}$

$^{252}\text{Cf} = 87.9$ micrograms (47.1 mCi), $^{137}\text{Cs} = 185$ MBq
(5.0 mCi)

Point	Neutron			Gamma 7.0 mg/cm ²			Gamma 300 mg/cm ²			Total		
	5	30	100	5	30	100	5	30	100	5	30	100
F5	50	35	10	25	18	3	27	11	3	77	46	13
F10	25	29	14	9	7	3	11	8	3	36	37	17
F11	9	13	9	3	3	3	3	3	3	12	16	12

Table 15. Total Neutron and Gamma radiation levels – corrected to maximum activity for COALSCAN 9200 and 9500 – Source Off and On. Data in $\mu\text{Sv/hr}$ and rounded to nearest unit.

Model	Source Off			Source On		
	cm			cm		
	5	30	100	5	30	100
COALSCAN 9200 (Corrected for 50 micrograms ^{252}Cf)	40	19	10	8	7	4
COALSCAN 9500 (Corrected for 125 micrograms ^{252}Cf)	90	41	21	17	16	9

Table 16. Gamma and neutron survey instruments and calibration data.

Model	Serial Number	Date of Calibration
Ludlum 12-4	118951	22MAY98
Nuclear Enterprises PDM-1	000286	06NOV98

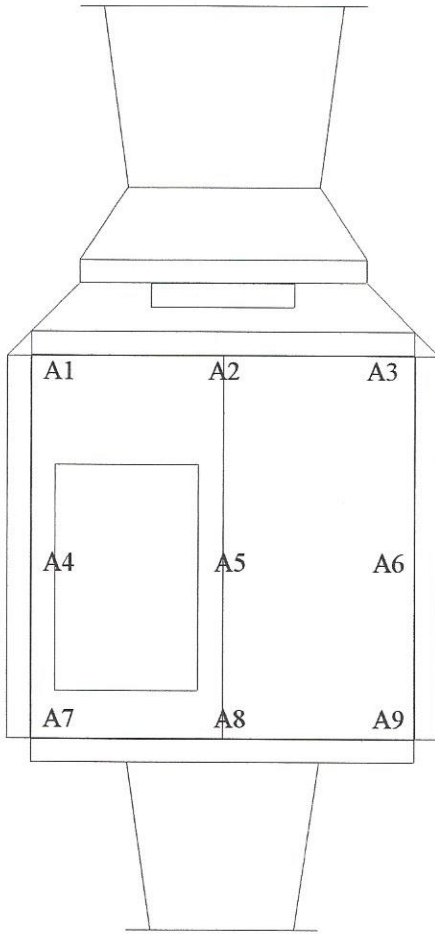


Figure 1. Measurement Locations – Front of COALSCAN 9200/9500 Mk3. Electronics Access Doors.

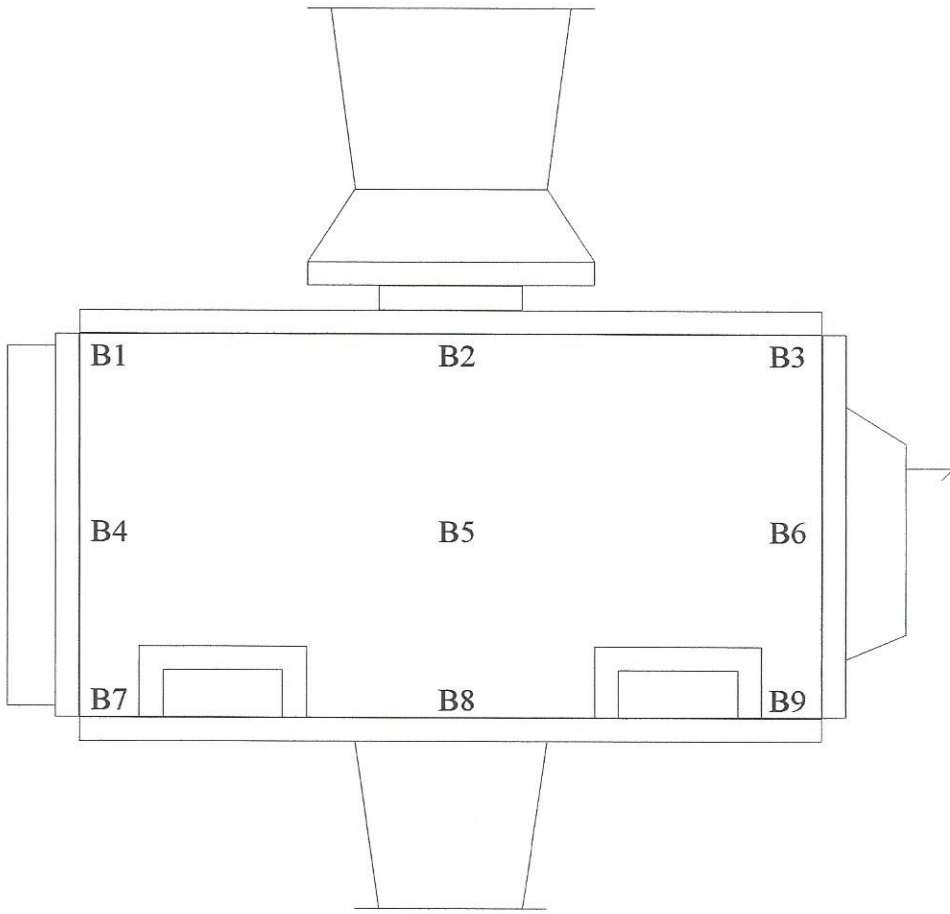


Figure 2. Measurement Locations – Left Side of COALSCAN 9200/9500 Mk3. (Source access is on left side of diagram.)