A Summary Of The Decommissioning Process of The University Of Utah AGN-201M Reactor No. 107

Final Report

License No. R-25 Docket No. 50-72

Prepared By:

C. Ross Schmidtlein Darrell S. Hall John S. Bennion Enrique C. Estrada Henry F. Moeller David M. Slaughter, Ph.D. Gary M. Sandquist, Ph.D.

April 11, 1994

University of Utah Nuclear Engineer Laboratory Salt Lake City, Utah 84112

Byren L. Hardy

Acting Radiation Safety Officer

Dietrich K. Gehmlich Reactor Administrator

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Table of Contents

.

Decommission	ing Activiti	es	1
Results And M	ajor Milest	ones	2
Supporting D	ocumenta	tion	4
Summary Of D	ecommissi	oning Activities	5
Appendices			6
Append	lix A:	AGN Parts List And Location	
Append	lix B:	Completed Disassembly Procedures	
	Completed	Form NEL-103: Dismantling Plan For UUAGN Reactor	
	Completed	Form NEL-104: AGN-201M Defueling Procedure	
	Completed	Form NEL-105: Procedure For Removing AGN Control Rods	
	Completed	Form NEL-106: Procedure For Removing Neutron Source	
Append	lix C:	Parts Transferred To Other Reactor Licenses	
Append	ix D:	Parts Disposed Of As Radiological Waste	
Append	ix E:	Parts Released As Unrestricted Waste	
Append	ix F:	Fuel Shipment Information	
Append	ix G:	Survey Results	
Append	ix H:	Survey Instrument And Operation Data	

A Summary of the Decommissioning Process of the University Of Utah AGN-201M Reactor No. 107 Final Report

The final report provides a brief summary of the activities that assured the reactor was decommissioned in a safe manner complying with all NRC regulations, stipulations, and in accordance with the NRC approved decommissioning plan, "Decommissioning Plan, University Of Utah, AGN-201M Reactor No.107, License No. R-25, Docket No. 50-72". This document contains the survey results, the final destination records for the reactor parts, fuel transport records and the completed decommissioning procedures as carried out.

Decommissioning Activities

We decontaminated the equipment, structures and portions of the facility and site containing radioactive contaminates to a level that permits the property associated with University of Utah's AGN-201M Nuclear reactor to be released for unrestricted use. A brief description of this plan is presented below. For a more detailed description of the decommissioning plan, see the NRC approved plan. The plan was implemented as follows:

- 1) Surveyed and disposed of the cement shielding blocks.
- 2) Conducted defueling operations.
- 3) Surveyed all components of the reactor core, including the fuel.
- 4) Surveyed and disposed of the shielding water.
- 5) Created an NRC approved decommissioning plan for the AGN-201M.
- 6) Performed a detailed survey of the decommissioning area.
- 7) Transferred the fuel to the DOE.
- 8) Disassembled the AGN.
- 9) Surveyed the remaining parts of the AGN.
- 10) Disposed of and decontaminated the reactor parts.
- 11) Scheduled a survey with the NRC to remove all decontaminated parts.
- 12) Prepared Final report on the decommissioning for the NRC.

When the NRC completes the final survey to confirm our results, the license will be surrendered to them. In the case of the University's AGN facility, the room in which the reactor is located is under license of the University's TRIGA reactor. In addition, some useful components from the AGN were transferred to the University of Utah TRIGA license (Lic. No. R-126; Doc. No. 50-284) or the Idaho State University reactor license (Lic. No. R-110; Doc. No. 50-284) rather than being disposed.

Results And Major Milestones

The decommissioning process for the AGN-201M closely followed the planned decommissioning activities. However small changes were made as the situation warranted to insure regulatory compliance and radiological safety.

 The preliminary steps for the decommissioning of the AGN-201M reactor began with the survey and disposal of the cement shielding blocks surrounding the reactor. These blocks were found to be non-contaminated and were removed and disposed of on March 25, 1988.

• Defueling operations began and the reactor was defueled on August 18, 1989. During the defueling steps, the Ra-Be neutron source and the fuel were removed and surveyed in detail. At that time, all components in the reactor core were removed and surveyed. The fuel and source were placed into safe storage waiting transfer to the DOE.

• The initial survey of the reactor core components began on September 9, 1989. These surveys showed very little activity on any of the core components.

• On January 9,1989, the AGN-201M's shielding water was analyzed for activity. No activity above background was detected and the water was disposed of by public sewer.

• On July 17, 1990, the "Decommissioning Plan, University Of Utah, AGN-201M Reactor No.107, License No. R-25, Docket No. 50-72", was completed. This plan has received NRC approval for decommissioning, and it contains in detail the steps and procedures that were used to decommission the AGN-201M reactor.

• The reactor fuel was shipped to Martin Marietta Energy Systems, at the Oak Ridge National Laboratory, for the DOE on February 5, 1991.

A considerable delay existed between the completion of the decommissioning plan and the actual decommissioning of the reactor. This delay was due, in part, to the interest of the faculty from University of North Texas State in acquiring the reactor. If the reactor was to be transferred, the decommissioning process would be changed to accommodate the reassembling of the reactor at the new site while maintaining regulatory and safety requirements. North Texas State ultimately decided against acquiring the reactor and decommissioning work following the current plan began again. During the delay instrumentation and personnel changed so it became necessary to duplicate some of the steps performed during defueling operations such as the decommissioning site and core component surveys to assure consistent and reproducible results.

• Another site survey was performed to insure as low as possible a background for component surveys. This survey was performed on March 25, 1993.

• The next step in the decommissioning procedures was the disassembly and survey of the reactor. On April 6-8, 1993, the reactor was disassembled and the interior components were surveyed. Also, all unsealed reactor components that were removed and surveyed during defueling operations were re-surveyed.

Several options existed for the disposal of the AGN reactor components. These were; disposal as low level radioactive waste, disposal as non-radioactive waste to public land fill, and transfer to other reactor licenses i.e., the University of Utah's TRIGA license. The decision varied based on several factors which included: cost of disposal, value of the part, and contamination on the part.

Parts from the core can had alpha contamination from contact with the fuel. Most of these parts were of no value outside the AGN so these parts were disposed of as low level radioactive waste. The graphite reflector was of value for future experiments conducted in the TRIGA reactor program, and was therefore transferred to the University of Utah TRIGA reactor license. Outside of the core can the main graphite reflector and lead shield were also deemed valuable and were moved to the TRIGA reactor license. The control console and two drives were transferred to the ISU reactor license.

The main reactor tank, thermal column, and the access port covers were non-contaminated and will be disposed of in a public land fill pending the NRC's final survey results. Other waste being disposed of as low level radioactive waste are the paint chips from the thermal column, the wood plugs from the access ports, and the trash generated during decommissioning. These pieces were considered to be constructed from materials that did not allow accurate surveys with a high degree of confidence to be performed.

• After the survey of the reactor components was completed the NRC was contacted to inform them of the progress. The confirmation survey of the parts from the reactor that are to be disposed of in a public land fill will be scheduled and performed by a contractor employed by the NRC.

The NRC final inspection is the last requirement in the decommissioning process. When the NRC has performed a confirmation survey, the remaining reactor parts will be unrestrictedly released.

Supporting Documentation

The attached appendixes contain the documentation which show our compliance with NRC regulations and the decommissioning plan.

In Appendix A, the parts of the AGN-201M are numbered and described along with drawings. The intent is to clearly identify where the various parts are located in the reactor and establish an effective strategy to assure accurate record keeping for surveyed reactor parts.

Appendix B contains the disassembly procedures used during the decommissioning of the reactor. The completed procedure sheets documented the process and demonstrated compliance with the decommissioning plan.

The Appendices C, D, and E together document the final disposition of all non fuel AGN-201M parts. Here each part or related group of parts are photographed and have listed their part numbers and final disposition. Appendix C's parts are transferred to the licenses of other nuclear reactor facilities. Appendix D's parts are disposed of as low level radioactive waste. Finally, Appendix E's parts are released for unrestricted disposal pending NRC approval.

Fuel shipment information is located in Appendix F. The final disposition of the fuel is documented by checklists, approval and transfer forms, and a list of the non-University of Utah individuals involved in the fuel shipping process.

Appendix G contains the results of the radiological surveys conducted during the decommissioning of the AGN-201M reactor. This section contains surveys for:

Facility, Concrete blocks surrounding the reactor, Water shield, Thermal column, Start up source and fuel, Core components survey, and Parts to be unrestrictedly released

The final appendix, Appendix H, contains a list of the detectors used in the decommissioning of the AGN-201M reactor. Listed are the Type, Make, Serial Number, Background, Efficiencies, Calibration Date, and Use of these detectors. Listing this information allows further documentation of the process involved in the decommissioning of the reactor.

Summary of Decontaminating Activities

Due to the low power level and design of the AGN-201M reactor, the activation of materials was almost nonexistent. Parts outside the core can were not activated or contaminated. For components that are located inside the core can, alpha contamination measured on the order of nano-curies was found on the surfaces that were directly in contact with the fuel. This was the only radiological hazard found in the reactor. The exterior components which indicated no contamination will be released to general disposal after direct surveys from the NRC to confirm our results. In the process of decommissioning the AGN-201M reactor, certain items (wood, paint chips) due to their material characteristics and form, had to be considered low level waste even when results from radiation and swipe surveys indicated that these items were not activated or contaminated. Properly transferring selected components of the AGN reactor from its license to our TRIGA reactor license or other facilities allowed extending the usefulness of those components.

APPENDICES:

Appendix A:

AGN-201M Parts List And Location

The following is a list of the numbered parts of the AGN-201M reactor. The numbering system was used to facilitate the surveys of the reactors parts. This list gives the part number used in the surveys, a description of the parts, and the parts location in the reactor. Also for greater clarity two figures are included with the part numbers and the parts location in the reactor.

Part #	Description	Location
1	Safety Rod #2 (Empty)	Core Can
2	Course and Fine Control Rod Thimbles	Core Can
3	"O" Ring Core Can Top Plate	Core Can
4	Paint Chips from Thermal Column	Thermal Column
5	Safety Rod #2 Parts	Core Can
6	Core Can Assembly Bolts and Spring	Core Can
7	Assembly Bolts And Washers (Core Can)	Core Can
8	Core Support Rod	Core Can
9	Quantity-2 Safety Rod Thimbles	Core Can
10	Safety #1 with Parts	Core Can
11	Course Control with Parts	Core Can
12	Fine Control Rod with Parts	Core Can
13	Core Support	Core Can
14	Core Can Top Plate	Core Can
15	Core Can Bottom Plate	Core Can
16	Polyethylene Disk	Core Can
17	Graphite Reflector for Interior Core Can	Core Can
18	Aluminum Core Can	Core Can
19	Graphite Reflector Plate	Core Can
20	Graphite Reflector Plate	Core Can
21	Graphite Reflector (Bottom Interior Core Can)	Core Can
22	Internal Thermal Column	Thermal Column
23	External Thermal Column	Thermal Column
24	Top Thermal Column Cover Plate	Thermal Column
25	Bottom Thermal Column Cover Plate	Thermal Column
26	Socket and Wrench	Exterior to Core
27	Glory Hole/Port Covers Assembly with Covers	Glory Hole / Access Port
28	Rod Drive	Below Core Can
29	Rod Drive	Below Core Can
30	Rod Drive	Below Core Can
31	Rod Drive	Below Core Can
32	Wood Plug in Access Port	Access Port
33	Wood Plug in Access Port	Access Port
34	Wood Plug in Access Port	Access Port
35	Wood Plug in Access Port	Access Port
36	Wood Plug in Access Port	Access Port
37	Wood Plug in Access Port	Access Port
38	Wood Plug in Access Port	Access Port

Interference and the state of the second second second second		
39	Wood Plug in Access Port	Access Port
40	Wood Plug in Access Port	Access Port
41	Wood Plug in Access Port	Access Port
42	Lead Plug in Access Port	Access Port
43	Lead Plug in Access Port	Access Port
44	Lead Plug in Access Port	Access Port
45	Lead Plug in Access Port	Access Port
46	Lead Plug in Access Port	Access Port
47	Lead Plug in Access Port	Access Port
48	Lead Plug in Access Port	Access Port
49	Lead Plug in Access Port	Access Port
50	Lead Plug in Access Port	Access Port
51	Lead Plug in Access Port	Access Port
52	Lead Plug in Access Port	Access Port
53	Lead Plug in Access Port	Access Port
54	Lead Plug in Access Port	Access Port
55	Lead Plug in Access Port	Access Port
56	Lead Plug in Access Port	Access Port
57	Lead Plug in Access Port	Access Port
58	Aluminum Fuse Support	Core Can
59	Alignment Screws	Below Core Can
60	Polyethylene Rod	Glory Hole
61	Graphite Plug in Access Port	Access Port
62	Graphite Plug in Access Port	Access Port
63	Graphite Plug in Access Port	Access Port
64	Graphite Plug in Access Port	Access Port
65	Cadmum Plug	Glory Hole
66	Graphite Plug in Access Port	Access Port
67	Graphite Plug in Access Port	Access Port
68	Graphite Plug in Access Port	Access Port
69	Graphite Plug in Access Port	Access Port
70	Aluminum Access Port Sleeve	Access Port
71	Aluminum Access Port Sleeve	Access Port
72	Aluminum Access Port Sleeve	Access Port
73	Aluminum Access Port Sleeve	Access Port
74	Graphite Reflector Column	Surrounding Core Can
75	Bottom Lead Shield Ring	Below Core Can
76	Bottom Lead Shield Ring w/Access Ports	Surrounding Core Can
77	Ton Lead Shield Ring w/Access Ports	Surrounding Core Can
78	Top Lead Shield Ring	Surrounding Core Can
70	Rottom Lead Shield Plate	Surrounding Core Can
80	Fission Gas Canister	Exterior to Peactor
81	Wood Plug in Access Port	Access Port
82	Wood Plug in Access Port	Access Port
83	Associated Core Associate	Core Cor
84	Control Pod Support Plate	Relow Core Can
85	Cadmium Dieke	Clore Unia
86	Main Reactor Tank	Main Paratas Task
87	Panatar Canada	Fritan Reactor Tank
07	Reactor Console	Exterior to Reactor



A3



Appendix B:

Completed Disassembly Procedures

The following dissassembly forms are listed in this appendix.

Form:	Status:
Form NEL-103	Completed
Form NEL-104	No Completed Form Exists
Form NEL-105	Completed with additional comments added
Form NEL-106	Completed

Form NEL-103 RSC Approval: 5/25/88

Dismantling Plan for the University of Utah AGN-201 Reactor

I. Introduction

The Dismantling Plan for the University of Utah AGN-201 Reactor gives the general procedures to be followed for disassembly of the reactor. These procedures give more specific details regarding the preparation needed prior to disassembly and the actual disassembly steps themselves.

- NOTE: Check the items in the appropriate place as each step is accomplished.
 - Maintain one master copy for reference.
- II. Preparation Prior to Disassembly
- (R) 3/25/93 1. Radiation Protection

a. The following instruments will be checked for proper operation, then placed in the reactor room for use:

00 2125192 (R) 3/25/45

(D)

(m)

(M)

(2) 3/25/93

LP3 4/1/45

- 1) Continuous air monitor or high volume air sampler.
- 2) Neutron survey meter (spherical TMC Neutron survey Did
 - meter). Model 4-88 Substitute. 073
- 3/25/93 3) Beta-gamma dose rate survey meter (Cutie Pie or Radector). 1 5831 4) Contamination survey meter (thin-window Geiger counter). 100 7 E. - 3, - 56 217
- (1) 3/25/93
 - The following supplies will be collected and placed in the reactor room for use b. as needed.

4) Shielded storage container for storing the Ra-Be startup source.

- 3/25/95 1) Filters for air sampling.
- (P) 5/25/95 Smearing materials for wipe tests.
- (K) 3/25/95 3) Containers for air samples and wipe test smears.
- UN NA
- URS 3/25/93
- (1) 1/25/43 (1) 1/25/43 (1) 1/25/43 (1) 1/25/43 (1) 1/25/43

IN NA

- 6) Redioacuve waste containers.
 - 7) Cadmium foil for core can insert.
- 8) Respiratory protection equipment.
- CRS 3/25/43 Work Area and Tools
- 3125/43 a. Survey reactor room area in preparation for proposed activities. DS14 (E) (A)

5) Coveralls, 120 coats, gloves, and shoe covers.

- 3125/53 b. Relocate equipment as necessary to maximize working area room.
- (E) 3/25/43 c. Collect the following tools and place in reactor room:
 - (1) 3/25/23 1) Hand Tools (socket and Allen wrenches) required for disassembly.
 - 2) Handling tool for removing the Ra-B: source. US WA
 - $(2) = \frac{1}{2} \frac{1}{5} \frac{1}{2} \frac{1}{3}$ Lifting lugs and rigging for thermal column, core tank, and upper graphite reflector.
 - 4) Cart for transporting the core can to the designated storage area.
 - d. The following items will also be placed in the reactor room:
 - $\frac{3/21/51}{42}$ d. The following items will also be placed in $\frac{3/21/51}{42}$ 1) Plastic bags for packing components. (N) 3/25/43
 - 2) Labels for dismantled components.
 - CH 5/25/75 3) Camera with flash and film for photographically documenting the procedure at key stages.
 - III. Detailed Disassembly Procedures
 - The assembly part numbers are correlated with the part listing on drawing NOTE: number E-2-000100.
 - 1. The Health Physicist will make a pre-disassembly radiological survey. He will also initiate special access procedure personnel and equipment monitoring procedures and other procedures needed to keep radiation exposure as low as reasonably achievable. An operational check will be made of radiation monitoring
 - equipment present. If all equipment responds properly, the operation will proceed. 2. The Reactor Supervisor will brief the disassembly group on each step prior to its accomplishment, with clarification made, if necessary, of the tasks to be performed.
- (R) NA 3. Insure that the temporary cadmium rod is in the glory hole and well fixed.

Form NEL-103 RSC Approval: 5/25/88

(P) NA

(R)4/6/53

GP3 4/6/93

103

6.

8.

9.

NOTE:

4/6/51

CK> 4/6/23

CRS 4/6/43

(1) NA

(R) NA

(n) NA

4. Remove bottom cover plate (2-000169). The gasket (2-000593) should come off with the cover. Bag the cover plate thumb screws (H-1007-10) and label. 5. Insure that the control and safety rods have indeed been removed earlier, as declared. Label rods and store in approved fuel storage locations

succi rous and succ in approved ruch	swiage weat	TOUD'	
Safe Rod Assembly:	2-000550	I	
Safe Rod Assembly	2-000550	П	
Coarse Control Rod Assembly	2-000550	Ш	
Fine Control Rod Assembly	2-000550	IV	

Remove the three dash pots (2-000510), label and store for future shipment. 7. Remove the four control rod drive mechanisms.

- Console power off (neutron detection channels 1, 2, & 3 remain on). a.
- b. Disconnect rod drive power plugs. Identify and label each. C.
 - Remove (2 each) jam nuts (1/4-28) from the tie bolts and carefully lower each rod drive frame assembly until free. Identify and label each frame. Bag the jam nuts and label.
- Insert cadmium in the control and safety rod holes in the core can.
- Remove the top cover plate (2-000226). The gasket (2-000591) should come off with the cover. Bag the eight cover plate bolts (H-1069-12) and label.

10. Drain the thermal column.

- Obtain permission from the Health Physicist to drain thermal column water a. to sewer (a water sample will have been previously taken and analyzed for radioactivity as a basis for release of the water).
 - Pump water to sewer until thermal column is as dry as possible. The entries for health physics records will be made in the Waste Log. including: date/time; estimated water volume dumped; gross sample results in µCi/ml, % of applicable mpc, estimated activity dumped.
- 11. Remove the thermal column (2-000139):

NOTE: Thermal column could weigh 2,000 to 2,400 pounds.

- a. Unbolt thermal column from reactor tank (16 each 3/4 inch bolts).
- b. Attach lifting sling and dynamometer to crane and thermal column.
- c. Lift thermal column from well (the dynamometer will indicate the weight of the 4/6/43 lead-lined thermal column). lbs. (n) 4/1/23
 - d. Remove thermal column from reactor and move to an appropriate space on the floor. Set thermal column on absorbent paper. Phatic.
 - e. Label thermal column. Bag the 16 each 3/4 inch hold-down bolts and label.

12. Remove the Ra-Be neutron source (H-3018) from the graphite reflector. Leak test the source and place it in the storage container.

- 13. Conduct a core survey. Since the core tank will not be opened at this time, an off gas sample will not be taken. A direct radiation survey and smear survey of the core tank top will be made.
 - 14. Remove cadmium rod from glory hole (operator monitor neutron detector channels 1 through 3, H.P. representative monitor portable neutron survey meter response). Only a slight increase in reading may be noted (Log any reading change

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	the second s	

15. Remove glory hole tube.

- a. Remove glory hole flange (2-000419) (2 each) by removing (4 each) socket HD machine screws, 1/4-20 X 1/2 (H-1023-8).
- b. Remove glory hole flange "0" ring (H-4009) (2 each).
- c. Remove glory hole tube (2-000422). Extreme care should be taken when removing this tube. It should not be bent (straight pull) and if binding is excessive, it may be necessary to lift the core tank slightly to relieve the bind.





COMMENTS:

NOTE:

The Health Physicist will monitor very closely the removal of the core can. All radiation and criticality monitors will be checked for proper operation just prior to the removal of the core, and surveys of radiation levels from the core can will be made continuously during removal.

- (4) <u>N/A</u>
 16. Core Can Removal (2-000114):

 a. Make a reference mark on the core can and graphite reflector for reassembly orientation.
 b. Attach lifting frame with cap screws (sock HD., 10 X 24) to core tank.
 c. Attach lifting frame and dynamometer to hoist. The dynamometer will monitor

lifting loads. NOTE:

- Hoist must be positioned with care to insure vertical alignment. Any deviation from the vertical will cause binding of the core tank in the reflector and shielding of the reactor. The unit being lifted weighs approximately 250 pounds. Tension should be applied with the hoist and the core tank lifting frame should be manipulated until any excess force is relieved. Tension is then again applied. The misuse of the electrical hoist could cause damage to the reactor reflector, if binding occurs and force is applied. A man will stand by the hoist circuit breaker (Panel B, Breaker #5) in the event of an "up" button failure of the hoist. Binding should be expected for approximately 4 inches until the thimbles have cleared the lower housing.

 (\mathcal{C}) (\mathcal{C}) (18. Conduct radiation survey to determine direct radiation levels from the core can and removable surface contamination on the exterior surface of the can.

- 19. Transfer the core to its storage container.
 - a. Remove lifting frame.
 - b. Seal and label core can container and hold in Reactor Room.

20. Health Physics will perform a radiation survey of accessible internal surfaces to ascertain direct (induced) radiation levels and removable contamination levels.

- NOTE: This concludes the nuclear portion of the disassembly process. The remaining disassembly will be conventional mechanical and electrical, with radiation surveys made as directed by the Health Physicist.
- b. Use a pole to push from one end, while another person is at the other end of the port, remove the port fillers (2 wood (2-000342), 4 lead (2-000341), 2 graphite (2-000340) each).
 - c. Remove access port flanges (2-000418) (8 each) by removing (4 each) screws (H-1023-8) (socket HD mach., 1/4 - 20 1/2).
 - - - g. Label all parts and store.

CR3 4/8/92

- - **B**4

GR) 4/0/55

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> lbs. ibs. lbs.

lbs.

- thermal column has been removed. (h) $\frac{4/8/91}{4/8/93}$ c. Attach sling to hoist. (The graphite reflector will weigh ~700 pounds.) d. Slowly raise graphite shield until clear of reactor. $\begin{array}{c} (4) \overline{4/8/93} \\ (4) \overline{4$ e. Actual reflector weight: a. Make alignment marks on the first lead shield and reactor structure for $\begin{array}{c} (f) \quad \frac{(f+1/2)}{(f+1/2)} & \text{b. Screw in lifting eyes. (perhaps the graphite reflector eyes can be used.)} \\ (f) \quad \frac{(f+1/2)}{(f+1/2)} & \text{c. Attach sling and dynamometer to hoist.} \\ (f) \quad \frac{(f+1/2)}{(f+1/2)} & \text{d. Slowly raise lead ring; monitor for binding until clear of reactor.} \\ (f) \quad \text{NOTE: Lead rings 1 and 4 weigh 600 pounds, ring 2 weighs ~900 pounds} \end{array}$ reassembly. Lead rings 1 and 4 weigh 600 pounds, ring 2 weighs ~900 pounds, and ring 3 weighs ~800 pounds. (M) 4/8/93 e. Transfer to an appropriate storage area and label. f. Place alignment marks on next ring, and repeat process for all four rings.
 Ring #1
 (2-000123)
 Actual Weight

 Ring #2
 (2-000122)
 Actual Weight

 Ring #3
 (2-000121)
 Actual Weight

 Ring #4
 (2-000123)
 Actual Weight
 $\begin{array}{c} (\mathcal{H}) \quad \underline{4/8/5} \\ \mathcal{C}^{(2)} \quad \underline{1/8} \\ \mathcal{C}^{(2)} \quad \underline{1/$ a. Place alignment marks on core support plate (top and bottom). (1) 4/2/51 b. From beneath reactor, remove hold-down bolts (H-1114-96) (4 each, right-hand thread). Do not change position of tension nuts (H-2017). CAUTION: Control rod drive tie bolts are still attached to core support plate. Take care not to bend or break bolts. (n) $\frac{4/1/6}{2}$ c. Manually lift plate from the top and transfer to floor area for s (n) $\frac{4/1/6}{2}$ 25. Remove the lead base plate shield (2-000124). (n) $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ a. Make alignment marks on the lead base and reactor structure. c. Manually lift plate from the top and transfer to floor area for storage. (R) 4/8/43 (R) 4/8/43 b. Screw in lifting eyes.
 - c. Attach sling and dynamometer to hoist. (This piece should weigh slightly less than the thermal column.)
 - $(\pi) \frac{2i/i/93}{2i/i/93}$ d. Slowly raise lead base plate; watch for binding until clear of reactor. GCJ 4/1/55 e. Transfer to floor area for storage.

COMMENTS:

- (R) NA 26. Drain the shield water tank (2-000655).
 - a. Obtain permission from the Health Physicist to drain shield water to sewer (a water sample will have been taken and analyzed for radioactivity as a basis for release of the water).
 - b. Connect hose to drain valve (H-3009) at bottom of shield tank and drain water to sewer. Reactor manhole cover should be off.
 - NOTE: Entries will be made in the Waste Log, including: date/time; estimated quantity dumped: activity of sample; estimated activity dumped.
 - Close drain valve and remove hose.
 - **REMARKS**:

(K) NA

(K)

27. Reactor electrical and instrumentation disassembly:

B5

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The electrical and instrumentation cables will be disconnected in the following <u>general</u> sequence. They will be identified for future reassembly, surveyed, and packaged for transportation.

- a. Nuclear Channel #1:
 - 1) Detector channel H.V. off.
 - 2) Ratemeter main power off.
 - 3) Open and remove access manhole cover.
 - Remove detector dry well from reactor tank shield water.
 - 5) Disassemble dry well.
 - 6) Disconnect and tag pre-am (2) and H.V (1) cables.
 - Transfer components to clean area for radiological survey (gross smears), and packing.
- b. Nuclear Channels #2 and #3:
 - Disconnect and tag H.V. cables at battery supply pack (rear of control console).
 - 2) Remove detector dry wells from reactor tank shield water.
 - 3) Disassemble dry wells.
 - 4) Disconnect and tag signal and H.V. cables.
 - 5) Transfer components to clean area for radiological survey and packing.
- c. Main distribution cable:
 - 1) Main power switch (left side reactor console) off.
 - 2) Disconnect and tag P-15 (control console).
 - Disconnect and tag P-16 (control console).
- d. Miscellaneous:
 - 1) Disconnect and tag monitor cable at control console. Pull it to storage beneath reactor tank.
 - 2) Disconnect and tag main power cable.
 - Remove the EARTHQUAKE SCRAM ASSEMBLY ball (H3005), bag and label.
 - 4) Remove the THERMO SWITCH (E-10035).
 - a. Label electrical leads.
 - b. Disconnect electrical leads.
 - c. Label thermo switch and bag for shipment.
- LA 28. Console

Un.

(NO)

The console will be retained in its present location until final disposition.

From NEL-104 RSC Approval: 5/25/88

University of Utah Nuclear Engineering Laboratory AGN-201 Reactor Defueling Procedure

I. Introduction

This document gives the general procedures to be followed for defueling the AGN-201 reactor. These procedures give details regarding the preparations, monitoring, setup, general procedures and specific defueling procedures.

- Check and date each item in the appropriate place as each step is NOTE: accomplished. Maintain one master copy for reference.
- II. Preparation Prior to Defueling
 - 1. Radiation Protection
 - a. The following instruments will be checked for proper operation, then placed in 1205-E for use:
 - 1) High-volume air sampler.
 - 2) Neutron survey meter (Texas Nuclear Bonner Sphere).
 - 3) Beta/gamma dose rate survey meter (Eberline).
 - 4) Contamination survey meter (TBM-3S).
 - b. The following supplies will be collected and placed in the reactor room for use as needed.
 - 1) Filters for high-volume air sampling.

 - Smearing materials for wipe tests.
 Containers for air filters and wipe test smears.
 Shielded storage container for storing the Ra-Be neutron source.
 - 5) Coveralls, lab coats, gloves, and shoe covers.
 - 6) Radioactive waste containers.
 - Cadmium foil for core can insert.
 - 8) Respiratory protection equipment (retain at first-aid station unless required).
 - 2. Work Area and Tools
- Survey reactor room area in preparation of defueling activities.
 - b. Relocate equipment as necessary to maximize working area room.
 - c. Collect the following tools and place in reactor room:
 - 1) Hand Tools required for disassembly (socket and Allen wrenches).
 - 2) Handling tool for removing the Ra-Be source.
 - 3) Lifting lugs and rigging for thermal column, core tank, and upper graphite reflector.
 - d. The following items will also be placed in 1205-E:
 - 1) Plastic bags for storing components.
 - 2) Camera with flash and film for photographically documenting the procedure at key stages.
- III. Detailed Disassembly Procedures
 - The assembly part numbers are correlated with the part listing on drawing NOTE: number E-2-000100. The ventilation system and air sampler should be operating during all disasssembly procedures.
 - 1. A representative from the Radiological Health Department will perform a predefueling radiological survey.
 - 2. The Reactor Supervisor will initiate special access procedures, personnel and equipment monitoring procedures and other procedures as needed to keep personnel radiation exposures as low as reasonably achievable (ALARA). An operational check will be made of radiation monitoring equipment. If all equipment responds properly, the operation may proceed. The Reactor Supervisor will brief personnel involved in the defueling operation on each step prior to its completion, with clarification made, as necessary, of the tasks to be performed.
 - 3. Insure that the temporary cadmium rod is in the glory hole and well fixed.
 - 4. Remove the top cover plate (2-000226). Drain the thermal column.

From NEL-104 RSC Approval: 5/25/88

- a. Obtain permission from the Health Physicist to drain thermal column water to sewer (a water sample will have been previously taken and analyzed for radioactivity as a basis for release of the water).
- b. Pump water to sewer until thermal column is as dry as possible.
- The entries for health physics records will be made in the Waste Log, including: date/time; estimated water volume dumped; gross sample results in μ Ci/ml, % of applicable mpc, estimated activity dumped.

5. Remove the thermal column (2-000139):

NOTE:

- NOTE: Thermal column is estimated to weigh 2,400 pounds.
 - a. Unbolt thermal column from reactor tank (16 each 3/4 inch bolts).
 - b. Attach lifting sling to crane and thermal column.
 - c. Remove thermal column from reactor and move to an appropriate space on the floor. Set thermal (olumn on plastic sheet or absorbent paper.
 - d. Label thermal column. Bag the 16 each 3/4 inch hold-down bolts and label.
 - Place borated paraffin over Ra-Be source and perform radiation survey of thermal column cavity. Replate top cover plate and secure to flange at top of reactor tank until ready for removal of neutron source. Survey exterior surface of top plate cover for radiation level and possible contamination; mark area as a radiation hazard as appropriate.
- 7. Remove and survey etch lead brick from thermal column. Use paper towels to dry the lead and dispose r i towels as low-level contaminated waste. Should any surface of a brick yield a dose rate greater than 3 times the background rate, label and segregate from unactivated bricks; place bricks on polyethylene sheeting until a confirmatory survey by a Radiological Health Dept. representative indicates release of the bricks for unrestricted use. Any activated or contaminated bricks will be retained by UUNEL.

 Remove bottom cover plate (2-000169). The gasket (2-000593) should come off with the cover. Bag the cover plate thumb screws (H-1007-10) and label.

 Insure that the control and safety rods have indeed been removed earlier, as declared. Label rods and store in approved fuel storage locations.

2-000550	П
2-000550	Ш
2-000550	IV
	2-000550 2-000550 2-000550

- 10. Remove the three dash pots (2-000510), label and store for future disposition.
- 11. Remove the four control rod drive mechanisms.
 - a. Console power off (neutron detection channels 1, 2, & 3 remain on).
 - b. Disconnect rod drive power plugs. Identify and label each.
 - c. Remove (2 each) jam nuts (1/4-28) from the tie bolts and carefully lower each rod drive frame assembly until free. Identify and label each frame. Bag the jam nuts and label.
- 12. Insert neutron absorber in the control and safety rod holes in the core can.
- Remove the top cover plate (2-000226). The gasket (2-000591) should come off with the cover. Bag the eight cover plate bolts (H-1069-12) and label.
- Remove the Ra-Be neutron source (H-3018) from the graphite reflector. Wipe test the source and place it in the storage container. Survey storage container.
- 15. Conduct a core survey. Since the core tank will not be opened at this time, an off gas sample will not be taken. A direct radiation survey and smear survey of the core tank top and environs will be made.
- Remove cadmium rod from glory hole (operator monitor neutron detector channels 1 through 3, H.P. representative monitor portable neutron survey meter response). Only a slight increase in reading may be noted. (Log any reading change.)

BEFORE

AFTER

From NEL-104 RSC Approval: 5/25/88

ID

	CRM:	
	LINEAR:	
17.	Remove glory hole tube.	
	a. Remove glory hole flange (2-000419)	(2 each) by removing (4 each) socket I

- machine screws, 1/4-20 X 1/2 (H-1023-8).
- b. Remove glory hole flange "0" ring (H-4009) (2 each).
- c. Remove glory hole tube (2-000422). Extreme care should be taken when removing this tube. It should not be bent (straight pull) and if binding is excessive, it may be necessary to lift the core tank slightly to relieve the bind.

COMMENTS:

- NOTE: The Health Physicist will carefully monitor the removal of the core can. All radiation and criticality monitors will be checked for proper operation just prior to the removal of the core, and surveys of radiation levels from the core can will be made continuously during removal.
- 18. Core Can Removal (2-000114):
 - a. Attach lifting frame with cap screws (sock HD., 10 X 24) to core tank.
- b. Attach lifting frame and to hoist. NOTE: Hoist must be positioned
 - Hoist must be positioned with care to insure vertical alignment. Any deviation from the vertical will cause binding of the core tank in the reflector and shielding of the reactor. The unit being lifted weighs approximately 250 pounds. Tension should be applied with the hoist and the core tank lifting frame should be manipulated until any uneven tension is relieved. Tension is then again applied. The misuse of the electrical hoist could cause damage to the reactor reflector, if binding occurs and force is applied. A man will stand by the hoist circuit breaker (Panel B, Breaker #5) in the event of an "up" button failure of the hoist. Binding should be expected for approximately 4 inches until the thimbles have cleared the lower housing.
 - d. Lift the core tank from the reactor.

NOTE OF INTEREST:

- Other facilities have measured a loss of reactivity after removing the core tank : U.S Naval Postgraduate School and Colorado State University).
- 19. Place an appropriate piece of neutron absorber (Cd or In) in glory hole.
- 20. Conduct radiation survey to determine direct radiation levels from the core can and removable surface contamination on the exterior surface of the can.
- 21. Transfer the core to its storage container.
 - a. Remove lifting frame.
 - b. Seal and label core can container and hold in Reactor Room.
- Health Physics will perform a radiation survey of accessible internal surfaces to ascertain direct (induced) radiation levels and removable contamination levels.
- NOTE: This concludes the nuclear portion of the disassembly process. The remaining disassembly will be conventional mechanical and electrical, with radiation surveys made as directed by the Health Physicist.

Procedure for Removal of AGN Control Rods

Precautions: Be sure proper ventilation and air sampling equipment is in operation during this procedure. Use gloves as necessary when handling potentially contaminated materials.

- 1. Remove the nuts securing the control rod drive assembly to the AGN structure taking care to support the assembly as the last nut is removed.
- 2. Carefully lower the control rod avoiding binding and remove the assembly from the crawl space beneath the reactor.
- 3. Survey the rod and record radiation levels in spaces provided below. Wipe the exterior surface of the fuel cladding to determine if surface contamination exists. Note below any removable contamination discovered.

TX11-85

Instrument:

4

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6.

Serial Calibr	No.:	0 87129 12/22/88	n and and an		
Max level	CR1	CR2	Fine	Coarse	Bak
@ contact	. 065m8/4.	. CES MRING	.02 MP/4.	12000 cpm	ECMR
@ 1 foot	0035mR/w	.030 MR/10-	-02500×14	- 8000	
Unscrew the f temporary stor activation. Not use as necessar	fueled control rod age container. Sur te below any elevat ry.	ls from the remain rvey the drive assen led radiation levels.	der of the assemb iblies for any resid Set the drive assen	bly and place in t lual contamination nblies aside for futu	he or ire
Repeat steps 1 rods and secure	through 4 for eac container lid when	h control rod. Inse n all fuel has been lo	rt borated paraffin aded.	between the cont	lo
Load borated p the paraffin wil	paraffin into the real remain in place.	actor core through th	ne control rod guid	le tubes assuring th	iat

7. Place the temporary storage container in the Middle Fuel Storage Pit and secure until ready for shipment to DOE. 2012

8. Comments: Wijnis (bucker round - 40 cpm) inel <u>Clarkfun</u> - Drive Assembly _____ sel: " " " " " " " " "

. varse ilid; " The detectable continumation doe rysel on and portion of the control vets or drive assemblies. The meled control vides were sealed in lover, Date Procedure Started: 5/2/89 Date Procedure Finished: 5/2/89 for for for

Procedure reviewed and approved on behalf of the Reactor Safety Committee by:

AGN Reactor Supervisor: AGN Reactor Supervisor: AGN Reactor Supervisor:	2)
610	-

NEL-105

Written on back of NEL-105

... plastic and placed in a temporary steel barrel. The barrel was secured in the middle fuel storage pit and will remain there pending transfer of fuel to DOE.

John S. Bennion

Procedures for Removal of Ra-Be Neutron Source from AGN-201 Reactor

- Precautions: Be sure proper ventilation and air sampling equipment are operating during this procedure. Gloves and personnel dosimetry must be worn throughout this procedure.
- Remove the top cover plate from the reactor and remove the borated paraffin covering the 1. Ra-Be source.
- Using a remote swiping tool, obtain a wipe of the top of the source and the area immediately 2. surrounding the source. Minimize the exposure time and use the AGN tank to provide as much shielding as possible.
- Analyze the wipe with both a contamination survey meter and gamma spectroscopy. Record 3. the results below.

Survey Instrument:7BM - 35Serial Number:087129Calibration Date:12/22/88

Background: Gross Counts Net Counts:

	0.0	
-	50	
	70	
	20	Corres

Comments: completed 5/4/89.

Gamma Spectroscopy (Attach spectrum):

Instrument: Intrinsis Ge

Visible Peaks:

observed co-60, Mn-54, and K-40 peaks only (all are background)

Radium Daughter Products: __yes Dao

Comments: completed 5/4/89

- 4. If any evidence of leakage of the neutron source exists, notify the Reactor Supervisor. Otherwise, follow the remaining items of the procedure.
- Place the neutron source transfer container next to the AGN reactor on the upper floor of the 5. reactor room.
- Make sure a strong neutron absorbing material such as boron or cadmium has been inserted 6.

into the core through at least two control rod guide tubes.

Absorbing material: cadimin mass: 35.1 grams

7. Transfer the source from the AGN reactor to the transfer container using a remote handling tool and secure container. Wipe the source while transferring to container. Also wipe and survey the location of the reactor containing the source. Record data below.

	Survey Instrument:	lister.	15			
	Calibration Date: Backgr Gross Net Co	round Counts	aurce Wipe	Reactor Wit	26 (sfr)	formed back stra
	Radiation level @ co	ntact at sour	ce location:		mr/hr	
	Gamma Spectroscopy (Attach sp Instrument: Peaks:	ectrum): 🖈	Paride space, Rice . March	d an sayin	1. 6 C.B.S.	discu
	Comments:					
Ji v Lal	Place fid on and secure neutro container. Mark container with r MEB 1205-A (Irradiation Facilit External radiation survey of cont Survey Instrument: Serial Number: Calibration Date: Itune 5NH 2241 Maxim	n source co radiation has y Room). ainer: $V_{12} + or$ $V_{2} + or$ $V_{2} + or$ $V_{2} + or$ $V_{2} + or$ $V_{2} + or$ v um dose rate	Een 4 Feb Z9 e @ contact:C	SOP.	adiation surve activity. S	Martin Thr
- -	Replace and secure top cover pla	te of reactor	they smith	289	mm	r/hr
urve	ys Performed by:					
	JonBerg	·		I	Date: 5/8	/87
roce	dure reviewed and approved on B Reactor Supervisor: <u>May</u>	Schalf of the	Reactor Safet	y Committee by	: Date: <u>21</u>	44.89

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Appendix C:

Parts Transferred To Other Reactor Licenses

The following are a set of pictures of the AGN-201M's parts that have been transferred to other reactor's licenses. The forms that these pictures are on, contain a brief description, a summary of the radiological survey, and the specific reactor license that these parts are being transferred to.

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Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #28 - Rod Drive Part #29 - Rod Drive

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Jane 05. Nall Date: 6/30/93

Part Disposal (or Transfer):

The two rod drives shown here were transferred from License No. R-25, Docket No. 50-72, to Idaho State University's Nuclear Facility, License No. R-110, Docket No. 50-284.

R. David Clons Lazze 6/30/03 -Date: 6/30/93 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #87 - Reactor Console

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Danell 5. Fall Date: 6/ 80/93

Part Disposal (or Transfer):

The reactor console shown here was transferred from License No. R-25, Docket No. 50-72, to Idaho State University's Nuclear Facility, License No. R-110, Docket No. 50-284.

R. David Cloro 2/1/93 Roc 6/30/93 - Date: 6/30/83 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description:

Part #17 - Graphite Reflector from Top of Core Tank Part #21 - Graphite Reflector from Bottom of Core Tank Part #18 - Graphite Reflector from Bottom of Core Tank Part #19 - Graphite Reflector Side Plate from Core Tank Part #20 - Graphite Reflector Side Plate from Core Tank Part #20 - Graphite Reflector Side Plate from Core Tank Part #s 61,62,63,64,66,67,68,69 -Graphite Plugs for Access Port Part #s 42,43,44,45,46,47,48,49, 50,51,52,53,54,55,56,57 -Lead Shielding Plugs in Access Port

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Druells Hall Date: 6/70/43

Part Disposal (or Transfer):

The graphite reflectors from both the top and bottom of the core tank, the graphite reflector side plates from the core tank, the graphite plugs for the access port and the lead shielding plugs in the access port have been transferred from License No. R-25, Docket No. 50-72, to UUNEL's TRIGA License No. R-126, Docket No. 50-407.

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Reactor Supervisor:	DOW	1. J_)	Date:	6/30/	93



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Recommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #65 - Cadmium Foil

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Jauells Hall Date: 6/32/93

Part Disposal (or Transfer):

The cadmium foil shown here were transferred from License No. R-25, Docket No. 50-72, to UUNEL's TRIGA License No. R-126 Docket No.50-407.

M. S. Jl Date: 6/30/93 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location





Part Description: Part #74 - Main Graphite Reflector

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected. Survey results are attached.

HP Technician: ______ Dauel Date: 6/30/93

Part Disposal (or Transfer):

The main graphite reflector shown here were transferred from License No. R-25, Docket No. 50-72, to UUNEL'S TRIGA License No. R-126 Docket No.50-407.

Date: 6/30/93 Reactor Supervisor



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decomplisioning Staff Subject: Part Status and Location

Part Description:



Part Description: Part #30 - Rod Drive Part #31 - Rod Drive

Date: June 8, 1993

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Drught Stall Date: 6/30/47

Part Disposal (or Transfer):

The two Rod Drives shown here were transferred from License No. R-25, Docket No. 50-72, to UUNEL's TRIGA License No. R-126 Docket No.50-407.

Date: 6/30/93 Reactor Supervisor



INO

Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #70 - Aluminum Sleeve for Access Port Part #71 - Aluminum Sleeve for Access Port Part #72 - Aluminum Sleeve for Access Port Part #73 - Aluminum Sleeve for Access Port

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: _____ Date ____ Date _____ Date _____ d/30/93

Part Disposal (or Transfer):

The four aluminum sleeves for access ports shown here were transferred from License No. R-25, Docket No. 50-72, to UUNEL'S TRIGA License No. R-126 Docket No.50-407.

MDL_ Date: 6/38/93 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description:

Part #75 - Lead Shielding Ring Part #76 - Lead Shielding Ring Part #77 - Lead Shielding Ring Part #78 - Lead Shielding Ring Part #79 - Lead Shielding Ring

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Dauells Hall Date: 6/30/93

Part Disposal (or Transfer):

The five lead shielding rings shown here were transferred from License No. R-25, Docket No. 50-72, to the UUNEL'S TRIGA License No. R-126, Docket No. 50-407.

- Date: 6/30/93 Reactor Supervisor

Appendix D:

Parts To Be Disposed Of As Radiological Waste

The following are a set of pictures of the AGN-201M's parts that have been set aside to be disposed of as radiological waste. The forms that these pictures are on contain a brief description, a summary of the radiological survey, and the method of disposal of the parts.



NUCLEAR ENGINEERING

Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Generated Decommissioning Waste

Radiological Survey Results:

The Direct Survey of the decommissioning waste showed nonremovable contamination from activation products. Activity was measured at 10mCi. Survey results are attached.

HP Technician: Druell'S 7 Jall Date: 7/193

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

- Date: 7/1/9.3_ Reactor Supervisor:


NUCLEAR ENGINEERING

Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #2 - Safety Rod Guide Tubes Quantity-2 Part #9 - Control Rod Guide Tubes Quantity-2

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. Alpha contamination was detected on both parts at .07nCi from U-235 and U-238. Survey results are attached.

HP Technician: Druell Hall Date: 7/8/97

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

Reactor Supervisor: DUL Date: 7/8/93



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decompussioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description:

Part #6 - AGN Screws & other parts Part #7 - AGN Screws & other parts Part #8 - Core Support Part #13 - Core Support Part #83 - AGN Screws & other parts

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. All parts were alpha contaminated. Parts 6, 7, and 83 at .07nCi, part 8 at .1nCi, and part 13 at .134nCi. All parts were contaminated with U-235 and U-238 isotopes. Survey results are attached.

HP Technician: _____Half ____ Date: ____/1/93

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

____ Date: 7/8/93 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #18 - Core Can

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts: survey results indicate alpha contamination of .07nCi from U-235 and U-238. Survey results attached.

HP Technician: Dourell Fal Date: 7/8/97

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

Reactor Supervisor:

____ Date: 7/9/93_



NUCLEAR ENGINEERING

Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommensioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #80 - Vacuum Cylinder for Core Gas Sampling

Radiological Survey Results:

Direct survey, LSC and Alpha wipes were performed on these parts. The exterior contained no contamination, while the interior was alpha contaminated with .27nCi. Survey results are attached.

HP Technician: _____ Nall Date: _____/8/93

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

Reactor Supervisor: AOM. L. Date: 2/9/93_



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description:

Part #1 - Safety Control Rod #2 Part #5 - Safety Control Rod #2 and Spring Assembly Part #10 - Safety Control Rod #1 and Spring Assembly Part #11 - Course Rod and Spring Assembly Part #12 - Fine Control Rod and Spring Assembly

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. Contamination is specified as follows: Part 1 showed alpha contamination at .272nCi, Part 5 had alpha at .075nCi, Part #11 alpha contamination at .12 and Part #12 showed alpha contamination at .04nCi. Survey results are attached.

HP Technician: Daugel 7 all Date: 7/8/43

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

Reactor Supervisor: D.C.M. Jel Date: 7/9/53



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location

Date: June 8, 1993



Part Description: Part #s 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 81, 82 - Wooden Access Port Plugs

Radiological Survey Results:

Direct survey, LSC and Alpha wipes were performed on these parts. No removable contamination was detected, but due to the absorbing nature of the wood the parts must be considered contaminated by activation products at 10mCi. Survey results are attached.

HP Technician: _____ Date: _7/8/93

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

Reactor Supervisor: A.C.M. Scheme Date: 7/4/93



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #4 - Paint Chips from Thermal Column

Radiological Survey Results:

Direct survey, LSC and Alpha wipes were performed on these parts. No removable contamination was detected, but due to the absorbing nature the parts, they must be considered contaminated by activation products at 10mCi. Survey results are attached.

HP Technician: Dornell Hall Date: 7/8/93

Part Disposal (or Transfer):

The aforementioned parts were segregated, packaged and labeled by the AGN Decommissioning Staff, prior to collection for disposal by the Radiological Health Department, under approved procedures outlined in the Radiation Safety Manual.

Reactor Supervisor:

OM. Le Date: 7/9/43

Appendix E:

Parts To Be Disposed Of As Unrestricted Waste

The following are a set of pictures of the AGN-201M's parts that have been set aside to be disposed of as unrestricted waste. The forms that these pictures are on contain a brief description, a summary of the radiological survey, and the method of disposal of the parts.



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #22 - Interior Steel Thermal Column Part #23 - Exterior Steel Thermal Column Part #24 - Top of Thermal Column Cover Plate Part #25 - Bottom of Thermal Column Cover Plate

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: _____ Dauel Hall Date: _7/9/97

Part Disposal (or Transfer):

The aforementioned parts were disposed of through non-contaminated waste.

D M Date: 3/11/94 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decomprissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part # 27 - Port Covers and Glory Hole Covers With "O" Ring and Bolts

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Jourell Hall Date: 7/9/93

Part Disposal (or Transfer):

The port and glory hole covers as well as the "O" ring and boits were disposed of through non-contaminated waste.

Date: 3/11/44 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decomplissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #58 - Aluminum Fuse Support Part #59 - Alignment Pins Part #60 - Polyethelane Rod

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Dougels Jall Date: 7/9/93

Part Disposal (or Transfer):

The parts listed above were disposed of through non-contaminated waste.

Date: 3/11/44 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decomplessioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #13 - "O" Ring for Core Tank Part #14 - Core Tank Cover (upper) Part #15 - Core Tank Cover (lower) Part #16 - Polyethelane Disk Part #84 - Control Rod Support Plate

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: Daught Hall Date: 7/9/93

Part Disposal (or Transfer):

The "O" ring, core tank covers, polyethelane disk and the control rod support plate were all disposed of through non-contaminated waste.

Date: 3/11/94 Reactor Supervisor:



Memorandum

To: D.M. Slaughter, Reactor Supervisor From: AGN Decommissioning Staff Subject: Part Status and Location



Date: June 8, 1993

Part Description: Part #86 - Main Reactor Tank

Radiological Survey Results:

Alpha, Beta, and Gamma contamination surveys were conducted on these parts. No contamination was detected: survey results are attached.

HP Technician: ______ Duells Hall Date: _____ Date: _____ Jul 94

Part Disposal (or Transfer):

The main reactor tank was disposed of through non-contaminated waste.

Date: 3/4/94 Reactor Supervisor

Appendix F:

Fuel Shipment Information

This appendix contains a copy of the paper work associated with the transfer of the AGN-201M's fuel from the University of Utah's reactor laboratory to the DOE at Oak Ridge Tennessee. This section is broken into three subsections these are

- 1) Fuel Transfer Check Lists
- 2) Fuel Transfer Forms
- 3) Fuel Transfer Correspondence List

This break down is designed to show clearly the tracking, procedures, and correspondence necessary for the transport of the AGN-201M's fuel.

1. Fuel Transfer Check Lists

The following forms NEL-110, NEL-117, and NEL-118, are listed in this section. These forms demonstrate the document control procedures used during the fuel transfer and the final check lists performed to insure safety during the fuel shipment to the DOE.

AGN Fuel Shipment Document Control

The following documents pertaining to the shipment of the special nuclear material (SNM) from the AGN-210M training reactor (NRC License No. R-25) will be maintained on file for a minimum period of three years after shipment as required by 10 CFR 71.135.

- , Approved DOE Scrap Declaration No. ID-90-1 (Forms OR-658A, B, C, and D)
- Manufacturer's Quality Excellence Program and Other Procurement Documents
- DOE 7A, Type A Qualification (Mound Report)
- NRC Approval of QA J rogram for AGN Fuel Shipment
- NRC-Approved QA Program for AGN Fuel Shipment
- 6. Y-12 Plant Authorization To Ship

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- Form NEL-111, Primary Container Loading Procedure and QA Checklist: UU-AGN-1/1
- 8. Form NEL-112, Primary Container Loading Procedure and QA Checklist: UU-AGN-2/1
- 9. Form NEL-113, Primary Container Loading Procedure and QA Checklist: UU-AGN-3/1
- 10. Form NEL-114, Shipping Container Loading Procedure and QA Checklist: UU-AGN-1
- 11. Form NEL-115, Shipping Container Loading Procedure and QA Checklist: UU-AGN-2
- J2. Form NEL-116, Shipping Container Loading Procedure and QA Checklist: UU-AGN-3
- 13. Form NEL-117, Hazardous Material Shipment Checklist and Transfer
- 14. Form NEL-118, Hazardous Material Shipment Checklist and Transfer

15. Shipping Papers

16. DOE/NRC Form 741, Nuclear Material Transaction Report

Form reviewed and approved by:	
Director, UUNEL: Jan gudgurot	Date: 5 70 91
Radiation Safety Other By the Ringh BSC	Date: 2/5/91
Reactor Administrator: alutert Kichmuch	Date: 2 - 5 - 9/

Form NEL-117

AGN Fuel Shipment Hazardous Material Shipment Checklist and Transfer

Date: 2/5/91		Shipment No.: ZWW - FZF - 1
Shipping Container Identification an	d Description:	
UU-AGN-1 and UU-AGN-2	(two packages): USA DO	DT 7A, Type A (DOT Spec. 17H.
55-gallon steel drums); Gross	Weight: 75 lbs. each packa	ge
Contents:		
UN2918: Radioactive Materia	al. Fissile, n.o.s.	
Carrier: T.S.M.T	and and a fair and a state of the	
Vehicle No.: # 384 #	448141	
Driver: Timethy L. Smi	, ch	teres to the second
Current Chauffeur's License: 4	97561470	
Review Of Physical Security Plan: Medical Certificate: Special State Permits: Carrier Certificate of Insurance: Driver Logs: Placards: Exclusive Use Instructions: Emergency Response Instructions: Tie Downs/Blocking: Final Post-Loading Radiation Survey: External Radiation Survey of Vehicle: Bill of Lading: Shipping Papers Signed: Consignee Notified and Authorized to Receive Shipment:	Check: Comments: To be obtained by	v.driver
Vehicle Seal No.: 33887	lift Door	
Comments: 44045	Light Darr.	

Comments:

Final Inspection: ____ By J. May attender 650 Date/Time: 2/5-191/3:00 Material Transfer: Material Released By: Delen Date/Time: 91-1500 MS Material Received By-Date/Time: 4/5/9/ 2:50 PM ren Campus Security Escort Form reviewed and approved by: sandann Director, UUNEL: Date: 5 Radiation Safety Officer: Date: 2/5 191 Cahmulul Date: 2-4-91 Reactor Administrator: Alecture

Form NEL-118

AGN Fuel Shipment Hazardous Material Shipment Checklist and Transfer

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Date: 2/5/91	Shipment No.: ZWW - FZF - 2
Shipping Container Identification and Des	cription:
UU-AGN-3 (one package): USA	DOT 7A, Type A (DOT Spec. 17H, 55-gallon steel
drum); Gross Weight: 75 lbs.	
Contents:	
UN2918: Radioactive Material Fis	sile nos
Carrier The - State Males The	TSUT
Vehicle No: 245 / 44	19360
Driver To St T	<u> </u>
Driver. Jerres James Jones	0
Current Chauffeur's License: <u><i>M.C.</i></u> Chec	ck: Comments:
Review Of Physical Security Plan:	and an and a second
Medical Certificate:	
Carrier Certificate of Insurance:	To be obtained by driver
Driver Logs:	
Placards:	
Exclusive Use Instructions:	
Emergency Response Instructions:	
Final Post-Loading Radiation Survey	
External Radiation Survey of Vehicle:	
Bill of Lading:	
Shipping Papers Signed:	
Consignce Notified and	
Vehicle Seat No : 84970 / 10	
venicie sear No. <u>84270</u> cyt of	<u>Y</u>
Comments: 8424J Kylt A	iar

Final Inspection: By J. March, Allante RSD.	Date/Time: 2/5/91/3:00pm
Material Transfer:	/ /
Material Released By and and and gust	Date/Time: 5 726 911500 #57
Material Received By Jones Elmen Jones	Date/Time: 02-05-91 -14= 50.MS
Campus Security Escont Ford Build	
Form reviewed and approved by	
Director, UUNEL: July Ill gulgunget	Date: 5-706 91
Radiation Safety Officer The Mole	Date: 2/5-191
Reactor Administrator: Alerrach Kelchmuch	Date: 2-4-51

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2. Fuel Transfer Forms

The following forms are included in this section, Uranium Scrap Declaration ID-90-1, DOE/NRC FORM 741 Nuclear Materials Transactions Report, correction to DOE/NRC FORM 741, and the Bill Of Lading of the fuel shipment.

Unit	ed States Departmen Dak Ridge Operations	t of Energy R Office	ECEIVED	REQUEST NO.
SECTION 1 - (TO BE COMPLETED BY SCRAP	GENERATOR)	DISPUSITION	OCT 0 9 1990	
I (1) PREPARE IN QUADRUPLET; RETA N THE SCRAP GENERATING CONTRACT. OVER THE GENERATING SS ACCOUNTAN (2) IT IS IMPERATIVE THAT A COMM AND OR-6580 MUST BE UTILIZED FOR U BY DECLARATION NUMBER IN BLOCK J C ATTACHED TO THIS REQUEST FORM. T OR-6588. I (3) IF A NEGATIVE STATEMENT IS I N	IN 4TH COPY AND FORWARD THE (AN ADDITIONAL COPY SHOULD BILITY STATION WHEN DIFFERE PLETE AND CONCISE DESCRIPTI I THIS PURPOSE. COMPLETED I ON, THIS FORM. FORM OR-6 ANY HUMBER OF SCRAP DECLAR. NDICATED FOR ITEM 4 BELOW,	ORIGINAL AND 2 COMP BE PREPARED & FORWAR NT FROM THE CONTRACTI ON OF THE SCRAP BE FU FORMS OR-658C AND OR- 588, URANIUM SCRAP SH ATIONS MAY BE MADE BY GIVE FULL DETAILS ON	CLOCA REES CORNER MANTER & ST DED TO, LHE DOG OFFICE HAVI NG OFFICE.) RNISHED WITH EACH REQUEST. 6580 SHOULD BE ATTACHED TO IPPING DATA, SHOULD ALSO B UTILIZING THE SAME FORMS REVERSE SIDE OF THIS FORM	FICE ADMINISTERING NG JURISDICTION FORMS OR-6580 , AND IDENTIFIED E COMPLETED AND OR-658A AND
1. TO: U. S. Department of OAK RIDGE OPERATIONS OFFICE POST OFFICE BOX "E" OAK RIDGE, TENNESSEE 37830 ATTN: CENTRAL SCRAP MANAGEM	Energy ENT OFFICE	2. FROM: Univers Dept. o MEB 320 Salt La	ity of Utah F Mechanical Engine 9 ke City. UT 84112	ering
3. DECLARATION NUMBERS ATTACHED; ID-90-1				
4. SCRAP IS AVAILABLE FOR IMMEDIATE D	LIVERY TO A REDROCESSON		- 10	
REQUESTOR HEREBY CERTIFIES THAT THE SCI THE REQUIRED SHIPPING DATA ARE DETAILED	RAP COVERED BY THIS REQUEST ON FORM CR-5588 WHICH HAS	WILL BE IN CONFORMAN BEEN ATTACHED HEDETE	CE WITH ALL APPLICABLE REC	ULATIONS AND THAT
5. DATE April 27, 1990	6. SIGNATURE OF REQUE	stor Brown	7. NAME AND TITLE K. R. Brown University Po-	cton fraint
SECTION 11 - CONCURRENCE OF COGNIZANT D	OE OPERATIONS OFFICE		I ONIVEISILY REC	ACTOR ASSIST.
THE DESCRIPTIVE AND ALL OTHER DATA ON A AND ACCOURACY. THIS DEFICE HEREBY CERTI OF THE URANIUM SCRAP COVER BY THIS REC.	TTACHED FORMS OR-6588, OR- FIES THAT DOE HAS THE FINAL EST.	6580, OR-6580 HAVE BE NCIAL RESPONSIBILITY	EN CHECKED AND RE-VIEWED F FOR THE RECOVERY AND/OR OT	OR COMPLETENESS NER DISPOSITION
1. DATE 5-10-90	2. SIGNATURE	3el	3. DOE OPERATIONS OFFI S&MM Branch Idaho Operation	ns Office
VER JON 111 - FOR USE BY THE CSMO IN RE	PLYING TO COGNIZANT ERDA OF	PERATIONS OFFICES		
SIIGH The uranium scrap descr Oak Ridge Y-12 Plant for F-GE-O221-O5C. Please Courtesy copy of the 7b CC: A. King, Y-12 D. Bopp, Y-12 D. Bopp, Y-12	TY IRRADIATED MATER ibed in Scrap Decla r recovery. Y-12 s call Dixie Bopp at 1 document should b	TAL ration No. ID-5 hould receive t FTS 626-2506 fo e sent to John	0.1 should be shirp he material in Proj r an authorization Miller, ORO-C940.	ed to the ect No. to ship.
10-1-90	John H Hiller	Huille	ORO-C.SMO	
DRM OR-658A (REV. 3/78)	and the second			The local design of the second s

	Oak Ridge Operations Office URANIUM SCRAP SHIPPING DATA								A - COMMERCIAL VEHICLE (ARMED ESCORT) B - COMMERCIAL VEHICLE (LIL) C - GOVERNMENT VEHICLE (ARMED ESCORT) D - OTHER MENDER		
DECLARATION NO. AND/OR SCRAP LOT NO.	SHIPPING COSIS FROM PRESENT LOCATION OF SCRAP 10:			SHIPPING METHOD	NUMBER OF SHIFHENIS RECHIRLD		HUMPER OF SI	IPPING TOTAL NO. IRA		TH REMARKS)	
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ID-90-1		\$250		D						1133110 11	

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United States Department of Energy Oak Ridge Operations Office

4. SHIPPING CONTAINER DATA (LOADED)

1. LOCATION OF SCRAP University of Utah

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	m.	90	-	1	-
SHE	er T			DF.	

URANIUM SCRAP DECLARATION 3. SECURITY CLASSIFICATION OF SCRAP č5

UNCLASSIFIED D CONFIDENTIAL

BY

SHAPE COMPOSITION

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	1 1			204/5			1946		1	492.3*	11	90.0	
UU-AGN-	2 F		DOD Max	20470			1992		2012				
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				20389			10.00		11				
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AN 158 AL	<u>()</u>		8	OT PLASTIC B	OTTLE			1	F = 6J or 1711 DON' spec. - 55 gal. steel				
- CH (33 641	.)		C P	LASTIC BAG OR	URAPPING			2				gal. steel	
-04 (110 64	11.)		0 0	2 SEALED MET	AL CAN			3		drums wi	th liner	з.	
SP (SPECIA	Y IN BLOCK 7)		E	3 OR LARGER	SIZED NETAL	-AH		6					
TR (SPECIFY	IN BLOCK 7)		FO	THER (SPECIFY	IN BLOCK Z			5					
1-OR-658	C (REV. 3/	78)	and the second s	CA IN THE REAL	TIME TIME	-		6	CSMO I	OT NO.		and the second	

United States Department of Energy Oak Ridge Operations Office

DECL	ARAT	ION	NO.
	ID-	90-1	

DESCRIPTION OF DECLARED URANIUM SCRAP

SHEET 1 OF 1

UU-AQN-1 UU-AQN-2 UU-AQN-3		 3- AGN Reactor core fuel disks is 19.5% enriched UO₂ partic #20481: 1 cm thick, total #20474: 4 cm thick, total #20475: 4 cm thick, total 3- AGN Reactor core fuel disks: #20470: 1 cm thick, total #20476: 4 cm thick, total #20476: 4 cm thick, total #20476: 4 cm thick, total 3- AGN Reactor core fuel disks: 	<pre>server DESCRIPTION : right-circular cylinders of cles homogeneously dispersed 1 disk mass = 652 g 1 disk mass = 2157 g 1 disk mass = 2164 g : same description as above. 1 disk mass = 657 g 1 disk mass = 2051 g 1 disk mass = 2065 g</pre>	of 25.6 cm diameter. Pue 1 in polyethylene.
UU-AQN-2 UU-AQN-3		<pre>#20481: 1 cm thick, total #20474: 4 cm thick, total #20475: 4 cm thick, total 3- AGN Reactor core fuel disks: #20470: 1 cm thick, total #20442: 4 cm thick, total #20476: 4 cm thick, total #20476: 4 cm thick, total #20476: 4 cm thick, total</pre>	l disk mass = 652 g l disk mass = 2157 g l disk mass = 2164 g : same description as above. l disk mass = 657 g l disk mass = 2051 g l disk mass = 2065 g	и и ратусспутеле.
UU-AQN-2 UU-AQN-3		 3- AGN Reactor core fuel disks: #20470: 1 cm thick, total #20442: 4 cm thick, total #20476: 4 cm thick, total 3- AGN Reactor core fuel disks: 	: same description as above. L disk mass = 657 g L disk mass = 2051 g L disk mass = 2065 g	
UU-AQN-3		<pre>#20470: 1 cm thick, total #20442: 4 cm thick, total #20476: 4 cm thick, total #20476: 4 cm thick, total 3- AGN Reactor core fuel disks:</pre>	l disk mass = 657 g l disk mass = 2051 g l disk mass = 2065 g	
W-AQN-3		3- AGN Reactor core fuel disks:		
			: same description as above.	
		#20478: 2 cm thick, total #20473: 2 cm thick, total #20469: 2 cm thick, total	l disk mass = 1267 g l disk mass = 1269 g l disk mass = 1273 g	
		12- AGN Safety and control rod f meter and 4 cm high, each di homogeneously dispersed in p	fuel disks: right-circular c sk is 79 g. Fuel is 19.5% colyethylene.	vlinder of 4.7 cm dia- enriched NO ₂ particles
		#20386 #20395 #20387 #20393 #20394 #20390	#20391 #20389 #20388	
		#20392 #20396	# 20385 ,	
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U.S. DEPATHMENT OF BRENGY AND U.S. NUCLEAR REGULATORY COMMISSION NUCLEAR MATERIAL TRANSACTION REPORT

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U.S. DEPARTMENT OF ENERGY AND U.S. NUCLEAR REGULATORY COMMISSION NUCLEAR MATERIAL TRANSACTION REPORT

Approved by OM8 038-R0418 Approved by GAO 9-180225 (R0040) 5 xtbites 6-30-83

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BU.S. Beimermannt Printing Officer 1521-341-375/1571

Correction Of DOE/NRC FORM 741

The Following corrections need to be made to DOE/NRC FORM 741 Nos. ZWW-FZF-1 & ZWW-FZF-2.

Corrections to ZWW-FZF-1:

- (1)Block 22. TOTAL GROSS WEIGHT: Add" 150 lb. ".
- (2) Block 24. Item D. NO. OF ITEMS: Add " 2 ".
- (3) Block 24. Iten, M. GROSS WEIGHT: Change from " < 200 lb. " to " 150 lb. ".

Corrections to ZWW-FZF-2:

- Block 22. TOTAL GROSS WEIGHT: Add" 75 lb, ". Block 24. Item D. NO. OF ITEMS: Add " 1 ". (4)
- (5)
- Block 24. Item M. GROSS WEIGHT: Change from " < 100 lb. " to " 75 lb. ". (6)

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Street	Y-12 Plant, P.O. Box 2009	Street	1205 Merrill	Engineering	Build	ing
Destinatio	Oak Ridge, TN Zip 37831	Origin	Salt Lake Ci	ty, UT		Zip 84112
Route:	I-57, I-24, I-65, I-265, I-40, State 58	9 1-√Ug 1-∞CA	0,1-200,1-04,	Vehicle 3 Number	84 / 4	48141
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	1.7 g U-234 each container; Seal Most / Add /////	111 deschal / het 1	Seal Nos. B-	5171 and E-\$	1723	
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3. Fuel Transfer Correspondence List

During the shipping procedures the following personnel were involved with the shipment of the AGN-201M's fuel. These People were

J. H. Miller Oak Ridge Operations Office CSMO P.O. Box 2001 Oak Ridge, TN 37831

M. A. Thom EG&G Idaho, Inc. P.O. Box 1625 Idaho Falls, ID 83415-3126

Adolphus King Martin Marietta Energy Systems, Inc. P.O. Box 2009 Oak Ridge, TN 37831-8169

Bob Berry EG&G Idaho, Inc. P.O. Box 1625 Idaho Falls, ID 83415-4113

A. J. Vinnola, Jr. EG&G Idaho, Inc. Fuel Manager P.O. Box 1625 Idaho Falls, ID 83415-7112

Appendix G:

Survey Results

The following are the results of the surveys conducted during the decommissioning of the AGN-201M reactor. Included in this appendix are the survey results from:

- 1) Preliminary Defueling Surveys.
- 2) Concrete Block Surveys.
- AGN Water Survey.
- 4) Thermal Column Survey.
- 5) The Fuel Surveys.
- 6) The Core Component Surveys.
- 7) Facility Survey For Continued Decommissioning Activities.
- 8) AGN Component Surveys.
- 9) The Surveys For Parts To Be Released For Unrestricted Use.

These different sections will allow easy identification of the parts of the reactor and the final disposition of those parts.

1. Preliminary Defueling Surveys

RADIOLOGICAL HEALTH DEPARTMENT Mail Code 05409

100 Orson Spencer Hall, University of Utah

John Bennion 5/17/89 TO: DATE: Nolan Smith FROM AGN Contamination Survey SUBJECT Main Office: I have surveyed the exterior of the AGN 581-6141 Dosimetry reactor using both direct metering and swipes -4135 and have found no removable contamination. Other Locations: Biology Bldg. Room B-06 This includes the floor immediately surrounding Ext. 5734 Medical Center the reactor. Swipes were taken on the top, sides Room 4A-439 Ext. 4209 and base while direct measurement were mainly Building 502 Ext. 7485 taken on the floor. I also surveyed the control rod mechanisms and found them free of external contamination. For the survey I used a TBM-3 geiger counter, serial # 092332, which has an overall efficiency for (2-36 (a medium energy beta emitter) of approx. 22%

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2. Concrete Block Surveys

University of Utah Nuclear Engineering Laboratory AGN-201M Decommissioning Project

Concrete Block Surveillance Procedure

Introduction

This report details the procedure to be followed during the removal of the concrete block used as shielding for the University of Utah Nuclear Engineering Laboratory (UUNEL) AGN-201M nuclear reactor. The removal of the block is a necessary first step in the decommissioning process of the AGN reactor. Surveillance of the bloc's is required to preclude the release of potentially contaminated material from UUNEL. This procedure has been developed by the staff of UUNEL in collaboration with and the approval of the University of Utah Radiological Health Department (UURHD) following guidelines established by the U.S. Nuclear Regulatory Commission.

Safety Considerations

The removal of the concrete block requires transferring the block from its present location onto wooden pallets while monitoring the block to assure contaminated block is not removed from UUNEL. It has been estimated that there are approximately 5700 block enclosing the AGN reactor as shielding. Moving such a large number of blocks presents a great potential for injury to personnel and laboratory equipment. Therefore, at any time work is in progress in laboratory, the safety of personnel must be of primary concern. Carelessness, horse-play, and unsafe procedure will not be tolerated of the personnel engaged in the block removal and surveillance project. In addition, the overhead crane is not to be operated without the permission and/or presence of UUNEL staff. Furthermore, the TRIGA reactor tank will be covered with plastic sheeting whenever blocks are moved to prevent contamination of TRIGA tank water by concrete dust.

General Procedure

The block will be monitored with portable survey meters, viz. Technical Associates Model TBM-3S "friskers." Readings will be made such that the bottom surface of the detector is nominally one inch from the surface of the block. In order to reduce variability in the readings, only one person will be allowed to perform the survey portion of the procedure per shift. The survey will be performed during the transfer of block onto the pallets as follows.

Each pallet is to be loaded with five to seven layers of block (depending upon the lifting capacity of the overhead crane and other safety considerations) with each layer comprised of 15 blocks compactly arranged. The first stage of the survey involves passing the frisker over 15 blocks (i.e., one pallet layer) in situ. Any blocks with readings found to be in excess of the maximum allowable activity will be marked and set aside for retention within UUNEL. Blocks with an acceptable activity level, which is defined in the next section, will be loaded onto the pallets in such a way that the surface of the block which was surveyed in the first stage is placed face down on the pallet or previously loaded layer of block. The second stage of the survey therefore involves passing the frisker over this surface of the block; any blocks with readings in excess of the maximum will again be marked and set aside. Following the loading of each layer, a record will be made on the special survey form prepared by UURHD (see attached sheet) in which the pallet number, number of block, maximum reading (in cpm), and the number of blocks set aside are recorded. In this manner, individual pallets will be loaded. Plastic sheeting will be used to cover loaded pallets to prevent accidental contamination. A radiation safety technician from UURHD will be contacted to perform an independent survey of loaded pallets to verify and assure blocks exceeding the criteria of acceptability are not released from UUNEL.

Upon completion of the block transfer and surveillance, and the final independent survey by UURHD, the sealed utility door located on the west wall of the reactor room will be opened to allow for the removal of approved block. The overhead crane will be used to aid in the transfer of the pallets from UUNEL onto flatbed trucks. Following removal of the loaded pallets, the utility door will be resealed as quickly as possible to minimize TRIGA reactor downtime. Steps will be taken to assure adequate security of the UUNEL during the entire period the utility entrance is breached.

Acceptable Activity Limits

The criterion for the rejection of concrete block as contaminated material as recommended by the Radiological Health Department is a measurable count rate in excess of twice the average area background count rate on the day of measurement. The average area background in the vicinity of the present location of the block runs between 100 to 150 cpm on the TBM-3S. Blocks exceeding a count rate of 250 cpm on any surface will be rejected as contaminated material. These blocks will be marked and set aside. Blocks with a count rate at or below 250 cpm will be stacked on pallets and will be removed from UUNEL.

Final Disposition

Once the blocks have been surveyed, and only those at or below the acceptable activity limit have been transferred onto pallets, they will be subjected to a final survey to be performed by UURHD. Following approval by UURHD that the block meet the criteria of acceptability, the block will be transferred to the University of Utah Broad Form License No. UT18-00001. The block will subsequently be released from UUNEL to a preapproved contactor for final disposition.
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	Bergy I Sm	.hle '	

Meter used:	<u>Seri</u>	Lal #: 066164
Averaged be	er: <u>40 100</u> cpm Cali ta detection efficience	ibration Date: 015 87
Pallet	Side Monitored	Maximum Reading
NUMDEL	<u>racing</u> :	(Cpm)
# 2	_ <u>E</u>	100
<u><u><u></u></u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u>	Le contraction de la contracti	100
the Y	top_	100
<u>H4</u>	- W	_100
#3	E	101
711		120
F 12	<u>_N</u>	120
#	<u> </u>	170
# 11	Ē	170
# 12	Ē	156
# 13	E	100
# 11	<u> </u>	100
# 12	5	100
# 12	<u></u>	170
世 13	W	120
# 12	W	120
#	<u> </u>	100
#17	1	100
# 16	N	100
1 16	F	100
± 17	E	100
+ 17	5	120
SURVEYED BY:	Christy m 2/2	DATE: 11/16/87

G17

Meter used: Bkg for met	TBW2S Serier: 100 cpm Cali	Lal #: 066/64 Ibration Date: 0/25/82
Averaged be	ta detection efficiency	:
Pallet Number	Side Monitored Facing:	Maximum Reading (cpm)
#1	N	100
5 4	Ē	100
# 1	W	100
# 1	<u>_N/</u>	100
# 2	Ę	100
# 1	5	100
# 2	W	100
# 18 18	K	10
# 15,8	E	150
# 15 18	S	100
# -K 18	W	100
* 8	N	100
# 8	E	100
# 8	Ŵ	100
# 9	international sector and a se	100
# 9	F	100
# 9	W	100
# 5	E	lon
# 6	E	120
# 7	Ē	IDP
± 1	W	/00
# A Curt ulst	10	100
	1.1.1.1	
SURVEYED BY	: Churty h. Flom	DATE: 11/16/83
	/ G18	

for	the AGN Reactor Deco	Diocks Survey	
Meter used: TBM-35 Bkg for meter: 100 c	Serial #: 08 Calibration D	37/29 Date: 9/15/87	
Mark for Palet Number of Blocks	Maximum Reading (cpm)	Number Set Aside (above background)	
(61 15	160	Ð	
12 15	120	Ð	
70 163 15	120	6	
LUJL4 15	110	\overline{Q}	-
L5 15	17.2		Bush
46.15	1.	4	11 0
7 13	120	0	10
1-1-	160		on
	120		1 0
2129-2	12.0	<u> </u>	10
CA 15	140	8	un
45 15	140	e)	2
61 15	120	0	1
A 15	120	and an and a second sec	0
15 15	120	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~
1. 15	12.4	<u> </u>	
22213	120	0	
14 15	17 0		
45 15	130		
46.15	150	1	
		A direct system in the second second	
SURVEYED BY: Henry Jed Br	2 miletery	DATE: 11/15/37	

G19

Meter used: Bkg for mete	TBM35 Seria	al #: $\frac{06/61/64}{5/25}$
Averaged bet	ta detection efficiency	: .12 (counts/disintegration)
Pallet Number	Side Monitored Facing:	Maximum Reading
# 17/6	2	100
# 17	U	100
# 16	W	120 11-17
# 10	5	100 - Christy h. tegi
±	E	100 11/16/87
# <u>10</u>	N	120 blug 120 11/20/22
\$ 10	W	170 max
# 14		120
rt <u>14</u>	E	120
# 14	N	120
t <u>14</u>	<u></u>	120
# 22	5	120
# 12	E	180 Max
\$ 22	N	100
# 22	W	120
# 12	tor	120 mm x -
\$ 2ª	N	100
# 24	<u>u</u> 2	120
# 24	E	130
p 20	5	120
\$ 24 al and	top	140
	1/ 2 2 2	
SURVEYED BY	unsig h. tem	DATE: 11/20/37

G20

Meter used: Bkg for meter	TBWGS Seri ar: 120 cpm Cali	Lal #: 066/64 Loration Date: 6/25/87
Pallet	Side Monitored	Maximum Reading
Number	Facing:	(cpm)
20	<u></u>	_120
20	W	140
	E	120
	<u></u>	_/00
	<u> </u>	100
19	5	_140
19	(w)	140
19	top	180 may Christy h. Lej
20	top	120 11/20/87
<u>15</u>	W	100 bkg 100 11/28/87
15	N	100
5	E	120
15	S	100
7	top	120
(9	br	100
10	top	to
17	top	100
12	bp	120
2	408	no
18	E	120
123	top	120
20	E	80
SURVEYED BY:_	Christy Mr. Fejn	DATE: 11/28/87
	The day A	

Meter used: Bkg for met Averaged be	cer: <u>80-140</u> cpm Calil ta detection efficiency	al #: 066164 bration Date: $6/c5/87$
Pallet Number	Side Monitored Facing:	<u>Maximum Reading</u> (cpm)
ne 20	N	100
20	W	120
20	5	æ
18	to P	80
# 9	For	IUn
#4	the second	170
#1	C	100
		120
# + 14	~	120
<u>tf 6</u>	N	80
46	5	180 max
4 5	top	120
# 4	N	100
₩_4	<u>S</u>	120
# 3	top	80
#9	5	100
# 8	top	120
H & suit	6	120
#10	/ tor	180 max
# 10	5	120
#11	top	100
# 16	top	pp.
		al Mar Marine reconstruction and

SURVEYED BY: Christy h. Zin G22

to 241

DATE: 11/28/82

Meter used: <u>BM-39</u> Bkg for meter: <u>90</u>	Serial #:	87/29 ate: 12/9/87
Mark for Palet Number of Blocks	Maximum Reading (cpm)	Number Set Aside (above background)
4 54-15	100	0
7-5-15	100	
(LI IS	112	<u> </u>
(22 15	120	Ð
S 2 23 15	110	Ð
$) \frac{24}{15}$	120	3
120 15	120	<u>e</u>
CI 15	150	- A
- 1215	100	
6 7 13 15	:05	ê
1415	100	Ð
$\left(\begin{array}{c} 1 \\ 1 \\ 1 \\ 5 \\ 1 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\$	100	
11 15	136	
21215	100	E)
	1	
SURVEYED BY: H CIVICI	and they	DATE: 1/27/88

1

Mete Bkg	er used: <u>T 8 M35</u> for meter: cpm	Serial #: Calibration 1	Date: 12/30/87
Mark for Palet	Number of Blocks	Maximum Reading (cpm)	Number Set Aside (above background)
	15	100	0
	15	80	
21	15	120	
1 1	15	80	
	15	100	
		100	
	· · · · · · · · · · · · · · · · · · ·		-
D2	15	120	
T	h <u>15</u>	12.0	encentre accounted and
	20015	100	
	<u> </u>	100	4
	and the same of th		
		wateren and a state of the stat	and the second se
SUR	VEYED BY: T.V VI	NH) TANG	DATE: 03/02/88

Meter use Bkg for m	d: <u>16m35</u> eter: <u>70</u> cpm	Serial #: 00 Calibration Da	ate: 6/25/8+
Averaged	beta detection e	efficiency: <u>~20</u>	(counts/disintegration)
Mark for Pallet Wumb	er of Blocks	Maximum Reading (cpm)	Number Set Aside (above background)
7 2	Weide	70	
-	N. cide	70	
	last ardi	70	
	Br. Dide	70	
. 14	top	70	
16 blocks 8	east	20	
for BM.	BE	70	
side inder to	West	30	Production
27 kill	north	70	
Down MM 3	what	70	
411-0	north	100	
	east	70	
	south	70	· · · · · · · · · · · · · · · · ·
1	west	20	
	Routh	20	
	east	70	
	nortz	70	
1	north	70	
	west	70	
4	north	70	
	west	20	
SURVEYED E	1: Wisty 2 ?	là	DATE: 3/25/88

15 4 4

rk for allet	Number of Blocks	Maximum Reading (cpm)	Number Set Aside (above background)
6	Al side	100	
	Iop_	100	
	E Side	100	
	5 side	100	
-	W side	100	
2	X side	_90_	
	Eside	100	
	5 side	001	
	Wside	_1102	
agentic to the	Top	- 20	
	service and provide a service service.	men and the second second second second	
	and the second second second second second second		
		attractional contract, Science Strengt	The Control of Control
	Annual of the Contraction of the		
	2 Marchine Report and and a second and		
			All Martin Concentrations
			Minist Institution and Annual
		1999 Billion Contraction Continues and an	
	And an extent and a second set	A DESCRIPTION OF THE PARTY OF T	

Meter us Bkg for Averaged	meter: <u>HO</u> cpm beta detection ef	Serial #: Calibration I ficiency: #20	de 14+ Date:
Mark for Pallet Num	ber of Blocks	aximum Reading (cpm)	Number Set Aside (above background)
9	west	100	4
	south	100 .	and a second spectrum of the second spectrum
	east	a 90	
	north	20	· · · · · · · · · · · · · · · · · · ·
10	top	100	- Revelations are an
	west	70	And a second sec
# places	aruth	100	
18 short and	north.	70	-
> longoid.			
Jugan			Restructure and a second
- 4	top	120 may	annon oracle announce.
3	tor	100	with a rest of the states.
9	top	100	HERE AND PROVIDENT RECEIPTION
, F	tor	7x	
Ĩ	ton	110	
1	Dast	AD.	attelation receptational data
	Manual Andrew		NY PROPERTY OF A DESCRIPTION
	Martineering and against		California de la constanción de la const
	deben könnlichen an einen einen si		The second se
		Mit feller (feller en fer en	
			40000000000000
SURVEYED	BY: Olity In	Hi	DATE: 3/25/88

in

3. AGN Water Survey

AGN Water Sample 1/9/89

Background 46764 Water 1 - 47278 2 - 46025 3 - 46732 4 - 46407 Background 45834 46246 46040 net = 348

Activity = $\frac{348}{533}$ = 0.56 nCi/l

John S. Bennion

Analysis of AGN Shielding Water September 22, 1989

Counted sample of water from AGN tank on HPGe detector for 30 minutes. No observable photopeaks besides Co-60 and Mn-54 background and K-40. Sample was taken on 9/2/89 and counted the same day.

-3 John S. Bennion 4

4. Thermal Column survey



Memorandum

26 February 1990

To: Gary Sandquist, Director Nuclear Engineering Laboratory

From:

Byron Hardy, Health Physicist (), Radiological Health

Re: Survey of AGN thermal Column

On 23 February 1990, I performed a spot check for evidence of residual contamination on the lead shielding (bricks) which had been removed from the AGN reactor. Using a calibrated TBM-3 contamination survey meter I found no detectable radioactive contamination on bricks originating in the AGN reactor.

Radiological Health Department

100 Orson Spencer Hall Salt Lake City, Utah 84112 (801) 581-6141

G32

5. Fuel Surveys



DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING MEB 3008 SALT LAKE CITY, UTAH 84112

5 May 89

Ti: RSC. From : AGN Reactor Supervision .

Robert Hafferran, ase't RSO. performed a radiation surveillance. for removal of the Rase mention source from the AGN-201 Core. aset RSO (RJH) and AGN RS (GMS) agreed to delay a playercal appl testand count of the RaBe source until disposal by Rad Health to reduce personnel exposure (ALARA). Source will be stored in a dry, shielded container pending disposal

My Sendquet

Ra-Be Neutron Source

5/17/89 - Moved source container from shielded location on upper level of reactor room near AGN to lower level against the TRIGA tank in the NE corner to provide shielding. Concrete blocks were placed around container to prevent access to the hot spot where surface radiaton dose is approx. 120 mr/hr. Radiation levels were as follows:

Max surface dose of concrete shield: 3 mr/hr Max dose at three feet: Max dose on tope surface of shield: 2 mr/hr

The movement of the source was recorded by the EPA's PIC detector. Before movement the reading was approx. 16 μ r/hr. (Normal background is approx. 9.8 - 10.4 μ r/hr) Transfer of the container by crance to the lower level resulted in a spike which decreased as the source was placed on the lower level. (Background reading regained) The lower level provides much more shielding as the line of sight to the detector must pass through the foundation, ground, etc. When transferred behind the tank, the PIC reading was back to normal.

Leak Tested 8/22/89 - Nolan Smith RHD

Bennion

RADIOLOGICAL HEALTH DEPARTMENT Mail Code 05409

100 Orson Spencer Hall, University of Utah

TO:	John Bennion / Keactor Lab	DATE: 9/14/89
FROM:	Nolan Smith	
SUBJECT: Sur	e heat Tost and Calibration	
Main Office: 501-8141	This memo is to inform	you that :
Dosimetry -4135	1) the wipe taken on the	10 m Ci Ra, Be
Other Lucetions:	startup source showed w	a sign of any leafage, and
Raom 8-06 Ext. 5734	2) The "Dosimeter" Area Mu	ourtor was calibrated
Medical Center Room 4A-439	and found to be within 1	inits for exposure
Ext. 4209 Building 502	rate measurements.	
Ext. 7485		

F.,

NO.	GENERAL DESCRIPTION	SURVEY INSTR(3)	SURVET TYPE(4	Y GROSS) cpm	NET	NET 100	dom cm ²	a	arem/	bour ((d sur To
1	5R-1 Fuel DISK # 20386	æ	D						18	and	The
1	1	3	D	284	5 28	377	4160	lodyn	n		
/	4)	3	WA	503	495	724	dom	lenter	2 54	, fac	inactions.
2	# 20395	2	D						16	mk/	x B
2	<i>ϵ</i> (3	D	24849	2484	1 36	3500	form			-
2	11	3	WA	504	496	72	y dp.	m/en	hie	Surf	ace
3	SK-1 fueldisk # 20391	2	D					1	f in	R/h.	R
	i,	3	0 2	2.2989	22981	35	AIDO	Low		1	
	n	3	WA	631	672	911	dom	hiti		1	
ETEC	TOR USED:	REMARKS									
) Bac	tror USED:	REMARKS	dom ≈		(loca)	tion) w	8.8C				-
) Bac) Bac) Surv) Surv	kground counting rate as	REMARKS	with panca Calibration $O \subset A$. -1 # PRO he object. ha detector.	he LLD at LCL No w ke probe (i Date: 7/25/E 2/32	(local 95% cont ipes wipe thin winds $\frac{6/23}{3}$	tion) wi mrem/h fidence s show	aa: ar. level w ed rem	vas: ovable	conta	minst	on
) Bac) Bac) Surv	TOR USED: kground counting rate as	REMARKS: 1205 instrument was e following ite m portable G-M (17 # 795 Mudt2 43- me surface of the ted with an alpho ted with a liquin nted with a gar	with panca Calibration $O \rightarrow R$. $-1 \neq PRO$ he object. ha detector. able G-M. d scintillation mans spectro	he LLD at LCL No w ke probe (Date: 7/25/16 2/32.	(locs) 95% contribution (locs) 95% contribution (locs) (tion) wi mrem/h fidence s show	aa: g. level a ed rem	vas: ovable	conta	minat	

TEM	er av etters sellt en en en en els d'al av seue al en el en el an este en este este en el este els este este e	61 fo 1 754					-			
10.	GENERAL DESCRIPTION	INSTR(3)	SURVEY	GROS	S NET	NET dom 100 cm ²	a	nrem/hc	VIII (@ s	nurfa Tota
	SR-1 Fuel Disk	ann a' Annaiche ann a' Allaicheannach ann					and a stand of the stand			-
4	# 20387	2	D		24111		1	(mR)	the B	1
4	1	3	D	25138	25130	36290	djam			
4	11	3	WA	772	766	1111 04	mant	ilsun	face	
5	Core Fuse	2	D				1-	u li li	0	~
-	4	3	0 5	6087	56077	80700	dan	or ney (er p)	21
-	11			000	20071	ocra	aprin			
			WA	671	663	953 0	pm/e	ntire	sutta	ici
		KEMARKS	i:							
Bac	kground counting rate at	KEMARK	i:		(local	tion) was:				
) Baci	kground counting rate at cpm = kground counting rate for this is	REMARKS	:: dpm ~		(local	tion) was: mrem/hr.				
) Bac	kground counting rate as cpm = kground counting rate for this in cpm =	KEMARKS	: dpm ~ s: dpm. Ti	he LLD at		ion) was: mrem/hr. fidence level				
Bac	kground counting rate at cpm = kground counting rate for this in cpm = net dpm =	REMARKS	: dpm	he LLD at	(locat 1 95% conf vipes wipe	tion) was: mrem/hr. fidence level s showed res	was: novable	contam	instion	
Bac	kground counting rate at cpm = kground counting rate for this in cpm = net dpm = net dpm =	REMARKS nstrument wa	: dpm == s: dpm. Τη net μ erns:	ne LLD ai ICi. No w	(locat 1 95% cont vipes wipe	tion) was: mrem/hr. fidence level s showed res	waa: novable	contam	instion	
) Baci	kground counting rate at cpm = kground counting rate for this in cpm = net dpm = net dpm = above the LLD, except from the	REMARKS	: dpm == s: dpm. Tr net µ ems;	ne LLD ai ICi. No w	(locat 1 95% conf vipes wipe	tion) was: mrem/hr. fidence level s showed res	was: novable	contam	instion	
) Baci	kground counting rate at kground counting rate for this in cpm = net dpm = net dpm = above the LLD, except from the ey Instrument Codes:	REMARKS	: dpm ~ s: dpm. Tr net µ ams:	ne LLD at Ci. No w	(locat 195% conf vipes wipe	tion) was: mrem/hz. fidence level s showed res	was: novable	contam	instion	
) Baci) Baci , Surv 7	kground counting rate at kground counting rate for this in 	REMARKS	i: dpm ~ s: dpm. Tr net µ ems:	te LLD at Ci. No w	(locat 195% conf vipes wipe	tion) was: mrem/hr. fidence level s showed res	was: novable	contam	instion	
Bac Bac Surv 1	kground counting rate at kground counting rate for this in 	REMARKS	dpm	te LLD at Ci. No w ce probe (Date:	(locat 195% conf vipes wipe	tion) was: mrem/hz. fidence level s showed res s w):	was: novabie	contam	ination	
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) Bacl) Bacl Surv (Surv I V V V	kground counting rate at kground counting rate for this is 	REMARKS nstrument wa following is portable G-M re surface of i ed with an ah ed with a portable d with a portable	dpm	te LLD at Ci. No w ce probe (Date:	(locat 195% conf vipes wipe thin winds	tion) was: mrem/hr. fidence level s showed res	was: novabie	contam	ination	
) Baci) Baci Surv) Surv) (Surv) V V V V V V	kground counting rate at cpm = kground counting rate for this in cpm = ret dpm = above the LLD, except from the ey Instrument Codes: (AGM = Technical Associates Serial #: Dther: ey Type Codes: 0 = Direct Survey over the enting VA = 100-300 cm ² wipe counts VG = 100-300 cm ² wipe counts VI. = 100-300 cm ² wipe counts VG = 100	REMARKS nstrument wa b following it portable G-M re surface of i ed with an ap red with a port ed with a born ed with a gam	t: dpm =s: dpm. Tr net µ erns: I with pencal Calibration I the object. sha detector. able G-M. id scintillation mma spectro	ne LLD ai Ci. No w ce probe (Date:	(locat 95% conf vipes wipe (thin windo	tion) was: mrem/hr. fidence level s showed res	was: novabie	contam	ination	
Bac Bac Surv Surv Surv V V V	kground counting rate at kground counting rate for this in 	REMARKS nstrument was a following it portable G-M re surface of 1 ed with an an ed with a portable ad with a liquited with a ga	t: dpm = s: net µ erns: I with pencal Calibration I the object. sha detector. table G-M. id scintillation mma spectro	ne LLD at Ci. No w ce probe (Date:	(locat 95% conf vipes wipe (thin winck	tion) was: mrem/hr. fidence level s showed res	was: novabie	contarn	instion	

1 1 2	512-2 Fuel Disk # 20393	2/ 3	D				15	mRI	-
1	<i>L</i> i <i>i</i> i	3	~	And in the owner, the owner will also a sub-	And and a second s		12	Inv	Bi
1	11		0	23543	2353	5 380	Bodom	elandras. Contrasta el comun	
2		3	WA	1124	1117	1618	dom/antivi	e surfa	w
	SR-2 Fuel Disk # 20389	2	D				15	mR/hr	Bi
2	11	3	D	21871	21864	3053	0 chm		annad
2	11	3	WA	547	550	787 0	4m/ent	ire qu	Hac
3 5	# 20394	2	D				16 "	nR/low	Br
3	- 1	3	D.	25407	25400	37620) dam		
	e1	3	WA	939	932	7870	frm/aut	e cur	Caro
) Back	ground counting rate at	1205	MEB		(locatio	n) was:			-
) Surve T/	com = net dom = net dom = bove the LLD, except from th of hutkeyround b, Y butkeyround b, Y butkeyround by Instrument Codes: AGM = Technical Associates Serial #: ther: 2 = Ludhun h 3 = Ludhun a y Type Codes: = Direct Survey over the ent	e following ite = 7 cp = 0.02 0 portable G-M Todel 19 4 - scintula ire surface of 1	with pance Calibration 7950 C then preck	The LLD at 9 μCi. No wi ake probe (U Date: a.J. 7/28 >e. Medel)5% confid pes wipes s hin window /89 43 - 1 #	ence level ibowed res '}: PROU 32	was: novable cont	taminatio	193
) Survej D W	$A = 100-300 \text{ cm}^2$ wipe coun	ted with an alp	ha detector	f.,					

AGN COMPONENT RADIATION SURVEY RECORD FORM

									The state of the s
NO.	GENERAL DESCRIPTION	SURVEY INSTR(3)	SURVE	Y GROSS () cpm	NET cpm	NET dom 100 cm ²	<u>α</u>	em/hour () B 7	@ surfa Total
4	572-2 Full Wisk # 20390	2	D				15	mR/hv	· B,7
4	h	3	り	21490	21483	3099	Odpm		
4	<i></i>	3	WA	1232	1225	1773	dpm	Jantie	surf
5	Course Rud Fuel Disk # 20388	2	D				16	mR/hr	Bir
5	1,	3	D	24739	24732	3573	io dpn	n	
5	11	3	WA	451	444	649	dynn	entrie :	surfa
2	Charse Red Fuel Disk # 20372	2	D			All and a second se	16	mR/hr	Br
,	11	3	D 2	2290 3	22283	36910	dom		
,	p	3	WA	487 1	180	649 d	om/e	uties	infac
	kground counting rate at		****		(locatio	ei) was:			
() Bac			chrony an		1711	anna Pres			
/) Bax 2) Bax	cpm =	nstrument wa	s: dpm. 1 net ems:	Γhe LLD at μCi. No w	95% confid ipes wipes i	ience level showed res	was: novable (contamina	tion
 Bac Bac Sur 	cpm =	portable G-M	f with panc Calibration	The LLD at µCi. No w ake probe (i 1 Date:	95% confid ipes wipes i thin window	entral. ience level showed res	was: novable (contamina	tion

WGS = 100-300 cm² wipe counted with a liquid scintillation counter (³H).

ton Beni SURVEY PERFORMED BY:

Surv	ey LocationAGN Rea	actor, Nu	clear Eng	ALLY WALLALS	And Ballans	Survey	Da	te: _	- 2	3/25	789
ITEM NO.	GENERAL DESCRIPTION	SURVEY INSTR(3)	SURVEY TYPE(4)	GROSS	NET	NET dom 100 cm ²	a	mter	m/ho B	υ <u>π (@</u> .) γ	nurface) Total
7	Coarse Red Fuel Disk # 20396	2	D	1979 - Hanney J. Hannis (m. 1979 - 1979) - 1979 - 1979 - 1979 - 1979 - 1979 - 1979 - 1979 - 1979 - 1979 - 1979				15	m	Hur	6.7
7	4	3	0	29093	29084	6 4455	0	im	1		
7	(¹	3	WA	764	757	1100	dyn	n/e	ent	ils	mutar
8	Coarse Rud Fuel Dist # 20385	2	D				1	6 "	n R/	lin	B,7
8	11	3	D.	26912	26905	404	800	Im	2		*
3	<i>li</i>	3	WA	647	640	930	de	m/4	ent	sie	surth
DETE	CTOR USED:	REMARKS			en interesti transa ana	1999 (p.). (d. pil. of south party)	*****			and the second	
DETE	CTOR USED:	REMARKS	2								
DETE	CTOR USED:	REMARKS	2		(locatio	on) was:					
) Ba 2) Ba	ctror USED: ckground counting rate at cpm = cpm = cpm = pet dpm = above the LLD, except from the f	REMARKS	: dpm ~ s: dpm. TT net ; ems:	he LLD at '	(locatio m 95% confis pes wipes	on) was: orem/hr. dence level showed res	was: moval	błe co	miarr	unation	-
7) Ba 2) Ba 3) Sur	ctror USED: ckground counting rate at cpm = ckground counting rate for this ins cpm = net dpm = above the LLD, except from the f vey Instrument Codes: TAGM = Technical Associates pr Serial #: Other:	REMARKS	dpm ~ _ s: dpm. Th net ; ems: { with paraca Calibration	he LLD at 9 ICi. No wi ke probe (t Date:	(location m 95% confis ipes wipes hin window	on) waa: orem/hr. dence level showed res w):	WAS: THOV A	błe co	mian	unation	1
2) Bas 3) Sur 4) Sur	CTOR USED: :kground counting rate as	REMARKS strument wa following its following its followith a so following its following	dpm ~	he LLD at f iCi. No wi ke probe (t Date:	(locations m 95% confis pes wipes hin window (³ H).	on) was: rem/hr. dence level abowed res w):	₩85: moval	ble co	miarr	lination	-

AGN Core Surveys (Fuel) August 24-25, 1989

1. Core Fuse

2. Safety Rod #1 (SR1)

3. Safety Rod #2 (SR2)

4. Coarse Rod #3 (CR3)

August 24, 1989

Core Fuse #20110 6.8 g fixed alpha 72104, 40069 cpm removable 691,639,682 cpm Ludlum α # PRO2152 scalar # 33640 eff. Pu-239 = 69.5%

 β,γ 12 mR/hr @ contact

#1:= TBM - 3S = 087129

 α background = 8 cpm; β , γ = 0.02 mR/hr

SR1: Order of removal.

1. #20386 wt - 79g. removable α 509, 488, 513 cpm = 724 dpm (entire surface) fixed α 28925, 27884 cpm = 41620 dpm #1 β , γ - 18 mR/hr @ contact #2:= Ludlum #7950 Model 19 calibrated 7/28/89

2. #20395 wt - 79g. removable α 496, 526, 491 = 726 dpm (entire surface) fixed α 25263, 24435 = 36350 dpm #2 β , γ - 16 mR/hr @ contact #2

#20391 wt. 79g.
 removable α 658, 610, 625 = 910 dpm (entire surface)
 fixed α 24885, 21093 = 35810 dpm

#3 β,γ - 16 mR/hr @ contact #2

4. #20387 wt. 79g.
removable α 735, 784, 797 = 1111 dpm (entire surface)
fixed α 225224, 25052, = 36290 dpm
#4 β,γ - 16 mR/hr @ contact #2

August 25, 1989 #2 back = 0.02 mR/hr α back = 7 cpm

SR2: Order of Removal:

#20393 wt. 79g.
 removable α 1109, 1118, 1146 = 1618 dpm (entire surface)
 fixed α 20618, 26465 = 38080 dpm
 #1 β,γ - 15 mR/hr max. @ contact #2

#20389 wt. 79g.
 removable α 547, 558, 536, = 787 dpm (entire surface)
 fixed α 25391, 18350 = 36530 dpm
 #2 β,γ - 15 mR/hr max. @ contact #2

3. #20394 wt. 79g. removable α 976, °74, 866 = 1350 dpm (entire surface) fixed α 2466°, 26145 = 37620 dpm #3 β , γ - 10 mR/hr max. @ contact #2

4. #20390 wt. 79g.
removable α 1195, 1261, 1241 = 1773 dpm (entire surface)
fixed α 21440, 21540 = 30990 dpm
#4 β,γ - 16 mR/hr max. @ contact #2

Coarse: Order of Removal:

1. #20388 wt - 79g. removable α 455, 456, 443 = 649 dpm (entire surface) fixed α 24831, 24647 = 35730 dpm #5 β , γ - 16 mR/hr max. @ contact #2
#20392 wt. 79g.
 removable α 463, 513, 486 = 701 dpm (entire surface)
 fixed α 25650, 18930 = 36910 dpm
 #6 β,γ - 16 mR/hr max. @ contact #2

#20396 wt. 79g.
 removable α 4759, 778, 756 = 1100 dpm (entire surface)
 fixed α 30960, 27225 = 44550 dpm
 #7 β,γ - 15 mR/hr max. @ contact #2

4. #20385 wt. 79g.
removable α 665, 661, 614, = 930 dpm (entire surface)
fixed α 28134, 25690 = 40480 dpm
#8 β,γ - 16 mR/hr max. @ contact #2

back $\alpha = 8$ cpm $\beta, \gamma = 0.02$ mR/hr (#2)

obn S. Bennion

AGN COMPONENT RADIATION SURVEY RECORD FORM

TEM IO.	GENERAL DESCR	IPTION	SURVEY INSTR(3)	SURVEY TYPE(4)	GROSS cpm	NET	NET dom 100 cm ²	α	mrem/ho B	υ <u>κ (60</u> γ	surface Tous
1	Equin 1	iet.	THEM	ひ		**************************************			E	nik	- / () () () () () () () () () () () () ()
1	14	11	Linkluis	N D	17	-2	Ó				
/	1.7	1.	()	WA	4	C	0	men oly opkinge		ð .	
	# 20415		Eberline	0					14:	up?	tr.
	11		Ludun	Đ,	24971	2471	7 344(c			-
	11		- ullum	WA	3.8	34	69				
	H 2(471	÷.	tertine	1)					15 0	NE/	1 6
	.11		udlum	DI	5657	1565	3 1525	0			
	11			1. / A		1.4	and the second	-	and a react of the party of the sector		
TEC	TOR USED:		REMARKS:	IVA	64	10	162				
ETEC	TOR USED:	le ш	REMARKS:	205 	64	L C	00) was:				
ETEC) Baci) Baci Surv (Surv I Surv	TOR USED: kground counting ra kground counting ra above the LLD, exce TACIM Etravitute ray Instrument Codes FAGM = Technical Serial #: Dther: Lud luu Etravitute Pope Codes: D = Direct Survey on WA = 100-300 cm ²	te at cpm = te for this cpm = te for this cpm = te for this $0, c \in C$ $0, c \in C$	REMARKS: REMARKS: instrument was: he following items that/h & 3 mve/h &	ith pancake ibration D dom. The net µ0 s: Copen ith pancake bibration D doi:th doi:ect. detector.	ELLD at S CL No with the probe (the tate: the State	$\frac{20}{1000}$	162 on) was: rem/hr. dence level : showed rem w): 727 33646 57	was: was:	ste contam	ination	• •

AGN COMPONENT RADIATION SURVEY RECORD FORM

TEM IO.	GENERAL DESCRIPTION	SURVEY INSTR(3)	SURVEY TYPE(4)	GROSS	NET	NET dpm 100 cm ²	α	mrem/hour (@ 8 y	o suría Tota
4	7 mar 1915k 21 24476	Elxistini	D	**				14 nikth	p.
4	,	Endlum	D	2047	2041	3 3772	0		-
4	11	4	NA	71	67	104			antaine.
5	Frunk 13.5k # 26442	Electrice	D				*******	15 mk/h	6.7
5	4	Ludlur.	D	13707	13703	26370)		
	(i	11	WA	62	58	112			anties.
	Torek Disk Haciles	Ebertine	D					15 milith	ß
							or while the horizon		www.edu
	11	Ludhur	1)	43667	43663	76330			
ETEC	TOR USED:	11 REMARKS:	i) WA	43627	43663 448	76330			_
ETEC	t; TOR USED: kground counting rate at cpm =	II REMARKS: MIEIS	i) WA 1205 dpm ~	4362	43663 448 (locati	76330 721 00) was: srem/br.			
ETEC) Bacl) Bacl	ty TOR USED: tground counting rate as tground counting rate for the cpm = tground counting rate for the cpm = net dpm above the LLD, except from	In It REMARKS: ATETS	i) ₩A <u>1205</u> dpm ~ dpm. Th net µ #:	43667 452 e LLD at 9 CL No wi	<u>448</u> (location 05% confs pes wipes	76330 721 000) was: arem/hr. dence level showed ren	Was: nova	ble contaminati	-
ETEC) Bacl) Bacl	ty TOR USED: tground counting rate as tground counting rate for the tground counting rate for the tground counting rate for the cpm = tground counting rate as tground counting rate for the tground counting rate	Indhum II REMARKS: ATETS is instrument was: = the following item tes portable G-M w	i) WA <u>1205</u> dpm ∞_ dpm. Th net μ s: rith psncak	43.67 45.2 e LLD at 9 Ci. No wi	448 (location m 95% confis pes wipes	76330 721 000) was: arem/hr. dence level showed ren w);	Was:	ble contaminati	-
ETEC) Bacl) Bacl	tror USED: tground counting rate as	I ut line II REMARKS: AIEIS is instrument was: = the following item tes portable G-M w	i) WA 1205 dpm ∞ dpm. Th net µ s: with pencak dibration I	43627 452 e LLD at 9 Ci. No wi ci. No wi	<u>448</u> <u>448</u> <u>(locations)</u> 05% configues wipes wipes	76330 721 000) was: grem/hr. dence level showed ren w/;	Was:	ble contaminati	-

AGN COMPONENT RADIATION SURVEY RECORD FORM

ITEM NO.	GENERAL DESCRIPTION	SURVEY INSTR(3)	SURVEY TYPE(4)	GROSS cpm	NET	NET dom 100 cm ²		nrem/hour (B 7	@ surface Total
-7	Fried Disk # 20473	Elevilia	. D	and for a statement of statement				4 .n1./1	3,7
7	4	Licklass	~ ()	61334	61330	104:4	0		
7	+ 5	11	WA	53,2	528	800			
9	+ cuck Misk 4 26478	eberhice	D				/	H mR/1	5.7
3	4	Lud lun	Ø	46124	46120	73550	5		
3	21	14	WA	580	576	1085		1	
1	Fred Disk # 20470	Eberline	D				1	3 mR/	L E,7
1	4	Ledlum	D	40354	40353	5855	D		
1	1/	11	WA	198	194	alk			
() P									
) 15 ac	cpm *		dram ==	a management of the second	_ (locatio	n) was:			
) Bac	kground counting rate for th cpm = net dpm above the LLD, except from	is instrument was:	_ dpm. Th net µ us:	e LLD at 9: Ci. No wip	5% confid es wipes r	ence level w	vas: ovabi	e contaminal	ion
) Surv	vey Instrument Codes: TAGM = Technical Associa Serial #: Other:	tes portable G-M *	vith pancak alibration I	e probe (thi Date:	n window	r)¢	-		
	The Color								

WGS = 100-300 cm² wipe counted with a gamma spectrometer.

SURVEY PERFORMED BY: _______

AGN COMPONENT RADIATION SURVEY RECORD FORM

TEM IO.	GENERAL DESCRIPTION	SURVEY INSTR(3)	SURVEY TYPE(4)	GROSS	NET	NET dom 100 cm ²	α	mrs	m/hou B	<u>п (G</u> 7	surfs Tota
U	Fuil 1,15K 31 20481	Eberline	D					:4	ALR;	1.	R. 1
ų	4	Lucklum	- 0	43126	431)	2 6315	7			da kine nenga	
0		11	WA	192	188	304			****		Factoria de la constante de la
!	, the disk	TAGIN	D	60	0 4	MAA			***		_
/	n	Ludlum	0	60	55	79				A Conductor of Sala	None.
	, I	11	WA	17	12	18					-
ETEC	TOR USED:	REMARKS:									-4
ETEC	TOR USED:	REMARKS:									
ETEC	TOR USED:	REMARKS:			(locat	ion) was:					
Back	ground counting rate at ground counting rate for thi	REMARKS:	_ dpm *		(loc.ee 1	ion) was: nrem/hr.					
Back	ground counting rate at ground counting rate for thi cpm = pround counting rate for thi	REMARKS:	_ dpm = _ dpm. The	LLD at 5	(loc.er 1 1	ion) was: nrem/hr. idence level :	Was:				
Back	ground counting rate as ground counting rate for thi cpm = ground counting rate for thi cpm = net dpm bove the LLD, except from	REMARKS:	dpm = dpm. The net μC s:	LLD at 9 LLD at 9	(locsu 1 95% conf pes wipe	ion) was: nrem/hr. idence level s showed rem	was: xovab	He co	ntamir	uation	n
Back Back Surve T	TOR USED: ground counting rate at ground counting rate for thi rown = ground counting rate for thi rown = power the LLD, except from bove the LLD, except from ty Instrument Codes: AGM = Technical Associate Serial #:	REMARKS:	dpm = dpm. The net μC s: /ith pancake	LLD at 9 LLD at 9 L No wi		ion) was: nrem/hr. idence level : s showed rem ow):	was: sovab	łe co	ntamir	uation	n
ETEC Back Back Surve T	ground counting rate at ground counting rate for thi cpm = ground counting rate for thi cpm = met dpm bove the LLD, except from bove the LLD, except from the strument Codes: AGM = Technical Associate Serial #: ther:	REMARKS: s instrument was: =	dpm = net μC s: /ith pancake dibration Di	: LLD at 9 71. No wi : probe (tl ate:	(locsu 1 95% conf pes wipes wipes	ion) was: nrem/hr. idence level s showed rem ow):	was: sovab	łe co	ntamir	satio	n

AGN Surveys August 30, 1989

Fission Plate 1. Max. β,γ @ contact #1 = 8mR/hr fixed α = 2 cpm gross = 0 net removable α = 0 wt - 2506 g.

2. #20475 wt. - 2164g. β , γ (#3) 14 mR/hr, 15 mR/hr fixed α 15994, 23948 = 34460 dpm removable α 27, 48 = 69 dpm/100cm²

3. #20471 wt. - 2157g. β , γ (#3) 15 mR/hr max. on contact fixed α 13765, 17549 = 25250 dpm removable α 57, 71 = 102 dpm/100cm²

4. #20476 wt. - 2065g.

β, γ (#3) 14 mR/hr max. on contact fixed α 26215, 15619 = 37720 dpm removable α76, 65 = 109 dpm/100cm²

5. #20442 wt. - 2051g. β , γ (#3) 15 mR/hr max. on contact fixed α 9085, 18328 = 26370 dpm removable α 78, 45 = 112 dpm/100cm²

6. #20469 wt. - 1273g. β , γ (#3) 15 mR/hr max. on contact fixed α 53049, 34284 = 76330 dpm removable α 501, 402 = 721 dpm/100cm² 7. #20473 wt. - 1269g.

β, γ (#3) 14 mR/hr max. on contact fixed α 46848, 75819 = 109090 dpm removable α 461, 602 = 866 dpm/100cm²

8. #20478 wt. - 1267g.

β, γ (#3) 14 mR/hr max. on contact fixed α 51117, 41131 = 73550 dpm removable α 754, 406 = 1085 dpm/100cm²

9. #20470 wt. - 657g. β , γ (#3) 13 mR/hr max. on contact fixed α 40024, 40694 = 58550 dpm removable α 197, 199 = 286 dpm/100cm²

10. #20481 wt. - 652g. β , γ (#3) 14 mR/hr max. on contact fixed α 43894, 42357 = 63157 dpm removable α 173, 211 = 304 dpm/100cm²

 α background at 5 cpm

#3:= Eberline Ion Chamber Model RD-2A Serial # 1263 Calibrated 7/28/89

> Polyethylene disc 473g. background 0.02 β , γ (#1) 0.03, 0.02 mR/hr gross fixed α 0 net, 47 net, 3 net, 55 cpm removable α 9 net, 18 net, 10 net

John S. Bennion

Inspection of AGN Fuel June 15, 1990

All containers secure Radiation levels at surface of containers: Black can: 0.2 mR/hr max. Bottom core: 1.5 mR/hr max. Top core: 1.8 mR/hr max. Fission plate: 0.9 mR/hr max.

Radiation levels, Disk # 20470 @ contact Beta shield closed: 1.4 mR/hr Beta shield open: 28 mR/hr @ 1 foot Beta shield closed: 0.2 mR/hr Beta shield open: 4.0 mR/hr

Instrument: Eberline E-5008 Geiger Counter SN 1015 Calibrated 12/18/89

John S. Bennion

6. Core Component Surveys

Background Readings September 9, 1989

α counter: 6 cpm 4 cpm 4 cpm 3 cpm

(#1) TBM - 35 #087129 Calibrated 6/23/8940 - 60 cpm = 0.015 - 0.02 mR/hr

(#2) Ludlum Model 19 #7950 Calibrated 7/28/89

(#3) Eberline Model RD-2A #1263 Calibrated 7/28/89

AGN Core Can

External Surface

 β , γ (#1): 0.03 mR/hr gross count

fixed α : 8 cpm gross/entire surface 6 dpm/entire surface removable α :

	gross	DPM
1 top	6 cpm, 2 cpm net	3 dpm/100-300cm ²
8 bottom	3 cpm	< MDA
9 middle	11 cpm	10 dpm/100cm ²
2 top	5 cpm	1 dpm/100cm ²
10 middle	7 cpm	4 dpm/100cm ²
5 bottom	4 cpm	< MDA
3 top	5 cpm	1 dpm/100cm ²
11 middle	4 cpm	<mda< td=""></mda<>
4 top	10 cpm	9 dpm/100cm ²
12 middle	12 cpm	12 dpm/100cm ²
6 bottom	6 cpm	3 dpm/100cm ²
inside of glory hole	10 cpm gross	9 dpm/entire inside surface

Bottom Flange

 β,γ (#1): 0.03 mR/hr gross max. on contact removable: 12 cpm gross = 12 dpm/flange surface

Top Flange

 β,γ (#1): 0.03 mR/tr gross max. on contact removable α : 10 cpm gross = 9 dpm/flange surface α background check: 7 cpm, 3 cpm, 7 cpm, 8 cpm, = 6 cpm

Internal Core Can Surveys

 β,γ (#1) Top half = 0.01 mR/hr max. on contact gross Bottom half = 0.025 mR/hr max. on contact gross fixed α : N/A removable α :

	gross	DPM
1 top	5 cpm	<mda< td=""></mda<>
2 middle	6 cpm	< MDA
2 top	8 cpm	3 dpm/100cm ²
10 middle	3 cpm	<mda< td=""></mda<>
12 middle	12 cpm	9 dpm/100cm ²
4 top	4 cpm	< MDA
3 top	5 cpm	1 dpm/100cm ²
11 middle	4 cpm	<mda< td=""></mda<>
7 bottom	6 cpm	<mida< td=""></mida<>
6 bottom	2 cpm	<mida< td=""></mida<>
8 bottom	4 cpm	<mda< td=""></mda<>
5 bottom	8 cpm	3 dpm/100cm ²

Bottom Flange (interior wipe) = 6 cpm gross <MDA Top Flange (interior wipe) = 13 cpm gross 10 dpm /entire surface α background check: 10 cpm, 2 cpm, 7 cpm, 4 cpm, = 6 cpm

Bottom Cover Plate

 β, γ (#1) inside - 0.02 mR/hr max on contact gross outside - 0.025 mR/hr max on contact gross
 fixed α: inside - 8 cpm gross 3 dpm/entire surface
 (entire surface) outside - 6 cpm gross <MDA
 removable α: inside - 12 cpm gross 9 dpm/entire surface
 outside - 3 cpm gross <MDA

Top Cover Plate

 β, γ (#1) inside - 0.03 mR/hr max on contact gross outside - 0.03 mR/hr max on contact gross
 fixed α: inside - 4 cpm gross <MDA outside - 5 cpm gross <MDA
 removable α: inside - 7 cpm gross 1 dpm/300cm² outside - 3 cpm gross 1 dpm/300cm²

Control and Safety Rod Guide Tubes SR1

external surveys

β, γ (#1) 0.03 mR/hr max on contact gross
 fixed α: 5 cpm gross <MDA
 removable α: 6 cpm gross <MDA
 internal surveys

β, γ N/A fixed α: N/A removable α: 4 cpm gross <MDA</p>

CR

external surveys

β, γ (#1) 0.04 mR/hr max on contact gross
 fixed α: 10 cpm gross 6 dpm/entire surface
 removable α: 4 cpm gross <MDA
 external surveys

 β, γ N/A fixed α : N/A removable α : 7 cpm gross 1 dpm/entire surface

SR2

external surveys

β, γ (#1) 0.03 mR/hr max on contact gross
 fixed α: 6 cpm gross <MDA
 removable α: 14 cpm gross 10 dpm/entire surface
 internal surveys

 $\beta, \gamma N/A$ fixed α : N/A removable a: 9 cpm gross 13 dpm/entire surface

FR

external surveys

β, γ (#1) 0.04 mR/hr max on contact gross
 fixed α: 10 cpm gross 4 dpm/entire surface
 removable α: 6 cpm gross <MDA
 internal surveys

β, γ (#1) N/A
fixed α: N/A
removable α: 7 cpm gross <MDA

Thimble

 β , γ (#1) 0.05 mR/hr fixed α : 69 cpm/entire surface 89 dpm/entire surface removable α : 69 cpm gross 89 dpm/ entire surface

Control and Safety Rods

SR1 Fuel Cladding

external surveys

 β , γ (#1) 0.03 mR/hr max on contact gross

fixed α : 4 cpm gross <MDA

removable α : 11 cpm gross 7 dpm/entire surface internal surveys

β, γ (#1) N/A

fixed α : N/A

removable a: 90 cpm 119 dpm/entire surface

Spring

 β , γ (#1) 0.03 mR/hr max on contact gross fixed α : 14 cpm gross 10 dpm

removable α : 40 cpm gross 47 dpm

End Plug

β, γ (#1) 0.03 mR/hr max on contact gross
fixed α: 3 cpm gross <MDA
removable α: 8 cpm gross 1 dpm/entire surface

Washer

 β , γ (#1) 0.03 mR/hr max on contact gross fixed α : 5 cpm gross <MDA removable α : 6 cpm gross <MDA

SR2 Fuel Cladding

external surveys

 β , γ (#1) 0.03 mR/hr max on contact gross

fixed a: 5 cpm gross <MDA

removable α: 6 cpm gross <MDA

 α background check: 3 cpm, 4 cpm, 5 cpm, 7 cpm = 5 cpm internal surveys

β, γ (#1) Ν/Α

fixed α : N/A

removable α : 96 cpm gross 131 cpm/inside surface Washer

 β , γ (#1) 0.02 mR/hr max

fixed α : 3 cpm gross <MDA

removable α: 5 cpm gross <MDA

Graphite

β, γ (#1) 0.04 mR/hr max on contact gross
 fixed α: 12 cpm gross 10 dpm/outside surface
 removable α: 12 cpm gross 10 dpm/outer surface
 Spring

 β , γ (#1) 0.02 mR/hr max on contact gross fixed α : not counted (may injure detector)

removable $\alpha:~9~\text{cpm}$ gross ~6~dpm/outer surface End Plug

β, γ (#1) 0.02 mR/hr max on contact gross
 fixed α: 4 cpm gross <MDA
 removable α: 5 cpm gross <MDA

John S. Bennion

AGN Surveys

9/12/89 Background 2.5,3 cpm: average: 3 cpm Ludlum Model 1000 sn: 33640 and an α probe PR021524 TBM-35 sn: 087129 back= 0.03 mR/hr AGN poly disc β,γ (#1): 0.04 mR/hr removable α (inscribed side): 19 cpm removable α (non inscribed side): 12 cpm fixed α (inscribed side): 40 cpm Washed with micro solution fixed α (inscribed side): 6 cpm fixed α (non-inscribed side): 6 cpm

All wipes approx. 100 cm²

AGN graphite reflector #8 removable α : 7 cpm After wiping with acetone: 5 cpm β,γ : < MDA

graphite reflector #6 removable α: 5 cpm After wiping with acetone: 7 cpm β,γ: < MDA

graphite reflector removable α : 6 cpm After wiping with acetone: 8 cpm β,γ : < MDA Background check: 6,3,6,6 cpm: average 5 cpm

graphite #5

removable α : 3 cpm After wiping with acetone: 6 cpm β,γ : < MDA

graphite #4

removable α : 3 cpm After wiping with acetone: 3 cpm β,γ : < MDA

graphite #3

removable α : 9 cpm After wiping with acetone: 4 cpm β,γ : < MDA

graphite #2

removable α : 5 cpm After wiping with acetone: 7 cpm β,γ : < MDA

graphite #1

removable α : 11 cpm After wiping with acetone: 6 cpm β,γ : < MDA

10/4/89

Fuse Support U-235 approx. 90 dpm removable 9/7/89

Control Rod 1 - Identify 9/7/89 - 130 removable α contamination Ludium α probe sn: PR021524 Model 43-1 Scaler sn: 33640 Background: 3,4,4: average: 4 cpm exterior surface: 5 cpm - 4 cpm = 1 cpm net interior decontaminated by Byron L. Hardy Xetec sn: 11964/021819 Model 318-A2 w/ext 6 M Probe Calibrated 7/13/89 Interior count rate: less than detectable (<1 cps) β,γ : < MDA TBM 35 Background #087129 cal. back=.025mR/hr

Fuse Support

Decontaminated by Bryon L. Hardy

removable α: 2 cpm gross < MDA

fixed a: 14 cpm gross

 β , γ (TRM-35): 0.04 mR/hr gross = 0.015 mR/hr max on contact

2nd Decontamination

fixed a: 8 cpm gross over surface

removable α : 5 cpm gross

 β,γ : .05 mR/hr max gross

3rd Decontamination - soak in dilute HNU3

 β,γ - .05 mR/hr max gross - unremovable

Control Rod 2 (identify) 9/7/89: 120 dpm removable α Decontaminated by Byron L. Hardy interior:

removable α : 5 cpm gross = 1 cpm net fixed α : 2 cps max (Xetec)

2nd Decontamination by Bryon L. Hardy fixed α: less than detectable with Xetec removable α: 6 cpm gross

exterior:

fixed α: 3 cpm gross removable α: 2 cpm gross β,γ: < MDA

Course Rod

interior: removable α : 8 cpm gross fixed α : < MDA (<1 cps) β , γ : < MDA exterior: removable α :

11/21/89

Fine Rod

sealed in plastic:

no detectable contamination:

- 4 polyethylene discs
- 1 graphite disc
- 1 spring
- 1 fastening plug

Coarse Rod

background

Ludlum Model 43-1, Ludlum Model 1000 4,3,4 xetec 0-1 cps background clading:

interior a: 5,6,7 gross

exterior removable a: 11,6,5

interior β, γ: 2 cps max - Xetec # 11964, model 318A, cal. 7/13/89

exterior β, γ: 1 cps max

Spring

removable α : 5,2,5 gross

 β,γ : max 1 cps

fixed α : 5,4,4 gross

Washer

removable α : 3,7,4 gross β , γ : 0 cps

fixed α : 4.3.5

Graphite

removable α : 2,6,6 gross β , γ - 1 cps max

fixed α : 5,7,4

End Cap

removable α : 4,5,6 gross β , γ : 0 cps

fixed a: 6,5,3 gross

Course Rod Sealed in Plastic.

11/22/89

Background

 $\alpha:~6,2,4$ ave. 4 cpm Ludlum Alpha Probe (model 43-1) sn: FR021524 $\beta,\gamma:~0\text{-}1$ cps Xetec

SR1

Graphite

 β,γ : 1 cps max gross removable α : 4,4 cpm gross fixed α : 4,5 cm gross

Spring

β,γ: 1 cps max grossremovable α: 4,3 cpm grossfixed α: 4,4 cpm gross

Washer

 β,γ : 0 cps removable α : 2,5,6 cpm gross fixed α :

End Cap

β,γ: 0 cps
removable α: 6,4 cpm gross
fixed α: 2,5 cpm gross

Cladding

external removable α : 7,4,4 cpm gross/entire surface internal removable α : 5,5 cpm gross/entire surface β,γ int. & ext.: max reading 1 cps gross fixed α ext: 4,5 cpm gross

SR1 Components Sealed in Plastic.

Core Reflector

Bottom:

removable α (entire surface): 14,13,12 cpm gross

Top:

removable α (entire surface): 12,7,9 cpm gross Bottom (surface adjacent to fuel only):

removable α : 10,9,16 cpm gross

SR2

Cladding

external removable α : 4,4 cpm gross/entire surface internal removable α : 64,70,46 cpm gross/entire surface β , γ fixed α ext:

11/24/89

background α: 4,4,5 cpm β,γ: 0-1 cps SR2 Cladding Sealed in Plastic-will either dispose or decontaminated waste End cap, graphite, washer - previously sealed in plastic spring: β,γ: 0 cps Xetex #11964

removable α : 4,5 cpm gross fixed α : 5,3 cpm gross

stores on oto opin gros

Spring was sealed in plastic.

Aluminum Core Support (approx. 14" long, hollow)

removable a: 15,10 cpm gross

Contaminated-sealed in plastic.

Screws, miscellaneous hardwood sealed in plastic.

John S. Bennion

AGN REACTOR DECOMMISSIONING & DISASSEMBLY AGN COMPONENT RADIATION SURVEY RECORD FORM

TEM NO.	GENERAL DESCRIP	SURVEY SURV TION INSTR(3)	VEY GROS TYPE(4)	NET S NET dom dom com 100 cm	<u>mRem/hour (@ sus</u> 1 ² Y B n	rface) Total
1	See Back	GFPC	SPC	LMOA LMDA	0	W. Anterne and all and an an an and discounts
2	11	GFPE	SPC	E MAA EMOR	D	
3	1 f	GFPC	SPC	E mpA EmpA	0	
4	<i>(1</i>	GFPC	SPC	LMOA LMOA	0	
5	31	GFPE	SPC	LMDA LMDA	0	And the second se
6	11	GEPC	SPC	LMOA LMDA	0	
2	<i>D</i>	GEPC	SPC	LMPA LMD	4 0	
8	17	GEPC	5,2	EMOA Li	n Rt o	
9	11	GEPC	SPE	Empt Lmp	14 0	
10	11	GFPC	SPC	EMOA LM	040	
11	11	GFPC	SPC	Lmod Lm.	040	THE REPORT OF CONTRACTOR OF CALLS
12	11	GFPC	SPC	LMDA LM	DA O	Contraction of Society of Society of
ETEC	TOR COUNTING YI	ELD USED:		REMARKS: High	h volrage- 21 yon Flow = me Esma = 0.16	50 Volts 1656/e/se

(1) Background counting rate at

was _____ cpm = _____ dpm = ____ mRem/hr. Direct radiation levels from the (area, item(s)) surveyed (were, were not) ≤ background radiation levels. Exceptions:

(2) Background counting rate for this instrument was _____ cpm = _____ dpm. The LLD at 95% confidence level was _____ net dpm = _____ net μCi. No wipes above the LLD, except from the following items: _____ (3) Survey Instrument Codes:

TAGM = Technical Associates portable GM with pancake probe (thin window). Serial # _____

Back ground court (mdA) #31.0 cpm

CoFPEGAS-Flow proportional Counter

(4) Survey Type Codes:

D = Dirct Survey over the entire surface of the object.

 $SG = 100-300 \text{ cm}^2$ wipe counted with a portable GM. $SL = 100-300 \text{ cm}^2$ wipe counted with a liquid

scintillation counter (3H).

SGS = 100-300 cm² wipe counted with a gamma spectrometer.

SPC - 100 - 3 pocme wipe counted with a Juss flow proportional counter. Shelf any

SURVEY PERFORMEDBY: Joarret Smok

AGN REACTOR DECOMMISSIONING & DISASSEMBLY AGN COMPONENT FADIATION SURVEY RECORD FORM

Surve	y Location <u>A</u>	GN Reactor	Nuclear Engineering Lab.	Survey Form # Survey Date
ITEM NO.	GENERAL DESCRIPT	SURVEY SU	NET RVEY GROSS NET <u>dom</u> 3) TYPE(4) com com 100 cm ²	mRem/hour (@ surface) 7 B n Total
rs	See buck	GFAC	SPC LMDA LMDA 0	en andere en la seconda de
14	11	4	" impA impA p	namen andere en ander
15	11	н	" LMDA LMDA O	
16	"	4	" LMDA EMOA 0	and a province of a second of the second of the second second second second second second second second second
17	11	GEPC	SPC LMOA LMDA 0	nanonani e nana ne ina na ina ana ina ina ina ina ina ina
18	11	11	" Emod Emod o	na ana ing ang ang ang ang ang ang ang ang ang a
19	<i>t1</i>	11	11 LMDALMDAD	
20	H	11	" LMA LMAA 0	nen an a' an
21	h	"	" Lonph Lmph .	nan kan mananan dara menangan dan kanan dara kan kanan dara menangkan dara menangkan dara menangkan dara menan
77	н	GFRC	SPC empt empt o	and an and a second
23	11	GFPC	Spe emot emoto	

DETECTOR COUNTING YIELD USED:

REMARKS:

High Volruge - 2150 Volrs Argon Flavo na ibubble Kee Assume Epimar 0.165 @ I MeV Background count 38 cpm

(1) Background counting rate at _ was _____ cpm = _____ in Rem/hr. Direct radiation levels from the (area, item(s)) surveyed (were, were not) \leq background radiation levels. Exceptions:

(2) Background counting rate for this instrument was _____ cpm = ____ dpm. The LLD at 95% confidence level was _____ net dpm = ____ net µCi. No wipes above the LLD, except from the following items:

(4) Survey Type Codes:

(3) Survey Instrument Codes:

Serial #

D = Dirci Survey over the entire surface of the object.

 $SG = 100-300 \text{ cm}^2$ wipe counted with a portable GM.

GFPC - Gas Flow propertional counter

TAGM = Technical Associates portable GM with pancake probe (thin window).

- SL = 100-300 cm² wipe counted with a liquid
- scintillation counter (3H).
- SGS = 100-300 cm² wipe counted with a gamma spectrometer.

SPC = 100-500 cm² wipe counted with a ges flow propertional county r Shelf & Le Control Smith

From Back of Form NEL-101

ltem	General Description	
1	Lead Shield East 100cm ² T.C. out/Fuel in	
2	Lead Shield West 100cm ² T.C. out/Fuel in	
3	Lead Shield North 100cm ² T.C. out/Fuel in	
4	Lead Shield South 100cm ² T.C. out/Fuel in	
5	Bottom of AGN Thermal Column, just after removal of T.C., fuel, and source in	
6	Sidewall of Thermal Core Receptacle, East Fuel in, Thermal Core out	
7	Sidewall of Thermal Core Receptacle, West Fuel in, Thermal Core out	
8	Sidewall of Thermal Core Receptacle, North Fuel in, Thermal Core out	
9	Sidewall of Thermal Core Receptacle, South Fuel in, Thermal Core out	
10	Graphite Reflector Rim North, Thermal Core out, Fuel in	
11	Graphite Reflector Rim South, Thermal Core out, Fuel in	
12	Graphite Reflector Rim East, Thermal Core out, Fuel in	
13	Graphite Reflector Rim West, Thermal Core out, Fuel in	
14	Fuel Cover, Thermal Core out, Fuel in	
15	Ra-Be Source in core just after removed 5/4/89	
16	Control Rod 1 (CR1) Fuel Element	
17	Control Rod 2 (CR2) Fuel Element	
18	Fine Control Rod Wipe	
19	Spring Assay Wipe (CR2)	
20	Course Control Rod Spring Assay Wipe	
21	CR1 Spring Assay Wipe	
22	Fine Control Rod Spring Assay Wipe	
23	Course Control Rod Fuel Wipe	

John S. Bennion

7. Second Facility Survey

RPR 50C. CONTA	MINATIO	N WIPE	TEST RESU	LTS
User: <u>Sandquest</u> - AGN	_ Group #	: 156 C	ate: 3/25/93	Task #: <u>NA</u>
Bldg/Room(s): 1205-E MEB	Isotope	s used: <u>"</u>	H. Actuation	· liced. (+)
COUN	TING INST	RUMENT DATA	4	
Model, serial #:	200259	Pr	ogram/Setup:	8-2
Preset: minutes or	counts	Units	of Readout: _	CP.W
0 ata attached Counting Channel:	_[1]	[2]	[3]	
or entered here:Background:	9:56	Ptrl		
Isotope: Efficiency:	0.03			
Expected Net Response to 1 RCL:	60			
Isotope: 32 P Efficiency:	0.60	C.G.C.		
Expected Net Response to 1 RCL:	120	WHEN MADE AND ADDRESS	No. of Concession, State of Concession, State	

WIPE TEST COUNTING RESULTS

[A] Enter "100" for a 100 cm² wipe or "300" for a 300 cm² wipe.
[B] Net response in each channel in same units as recorded above. If the net response in any channel exceeds that expected for 1 RCL of any isotope:
[C] enter the likely nuclide and
[D] enter the multiple of the RCL.

lino	Object on Location	[A] Area	Net	[B] hannel Re	sponse	[C] Likely	[D] Multiple
LINE	DOJECT OF LOCATION	<u>[cm-]</u>		[2]		Isotope	of RCL
1	Line numbers	3610	Ø	4			
2	consequend to riviled.	Z.C.	Ø	ų.			
3	numbers on Nil	704-	g'	Ø.			Contraction of the Contraction o
4	survey mp dated	300	Q1	Q1		COMPACTORING COMPACT	*****
5	3125/93 -7	304	¢5	ų.		an and the former of a subsectional street.	NOTES - HEARING TO THE REPORTS
6		760	q.	Q ⁿ	The Workshop Annual Statement Constraints and you	ALT DAY PRODUCTION OF A DAY OF	of BUD English the state over and logs
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8	· · · ·	300	Q3	Ţ.	MARKS IN SECOND STREET, ST		MARK CONTRACTOR OF STREET
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14				www.const.communities.com	600 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100		

2



)	ILIVE				
		SAMPI F	2	CAMPIE	6
NEL	120T-E	PNS	7	PAS	11
INCL			20 H#		42 H.M.
1		ELT	4.63 MIN	ELT	16.40 MIN
3/2	25/93	CH 1		CH 1	MIN
			2.00 CPM		8.00 CPH
			99.99 20X		70.50 20%
		ST	1.00 MIN	ST	1-00 MIN
		CH 2		CH 2	1000 HAN
			13.00 CPM		15.00 004
			55.38 20%		51-60 20W
		EVENDIE.	3	EAMPI F	7
		PAS	8	PAS	12
		100 m	28 Hs		27 44
		ELT	6.88 MIN	ELT	18-65 MTN
		CH 1		CH 1	LOUDD MIN
			7.00 CPM		3.00 000
			75.42 20%		99.00 200
CAL	780 MEM	ST	1.00 MIN	ST	1.00 414
		CH 2		CH 2	MIN
	· · ·		18.00 CPM		13.00 000
89G 8	9		47.11 20%		55.38 200
					00130 KUX
CNT CH	H12 ITIMES				
SCR	NO	CAMPIF	4	SAMPI 5	Q
AQC	NO	BUE	9	PAS	13
CALC	1		45 H#		32
PST	1.00 MIN	ELT	9.25 MIN	ELT	21.00 414
CH 1	2.00 20%	CH 1		CH 1	~****** M1M
	0 L		4.00 CPM		7.00 004
	317 U		99.99 20%		75.02 200
CH 2	2.00 20%	ST	1.00 MIN	ST	1.00 414
	397 L	CH 2		CH 2	TOO MIN
	655 U		17.00 CPM		18.00 000
			48.47 20%		47-11 20%
					EV &
		SAMPI F	5		
EVMENTE	1	POS	10		
POS	б		30 H#		
	21 H#	ELT	11.50 MIN		
ELT	2.37 MIN	CH 1			
CH 1			12.00 CPM		
	6.00 CPM		57.66 20%		
	81.33 20x	ST	1.00 MIN		
ST	1.00 MIN	CH 2			
CH 2			18.00 CPM		
	15.00 CPM		47.11 20%		
	51.60 20%				

8. AGN Component Surveys

Part #	Direct Counting	Alpha cpm	LSC cpm	Description
1	0.02 mR/hr			Safety Rod #2 (Empty)
2	0.02 mR/hr			Course and Fine Control Rod Thimbles
3	0.02 mR/hr	0	0/0	"O" Ring Core Can Top Plate
4	0.02 mR/hr			Paint Chips from Thermal Column
5	0.02 mR/hr			Safety Rod #2 Parts
6	0.02 mR/hr			Core Can Assembly Bolts and Spring
7	0.02 mR/hr			Assembly Bolts And Washers (Core Can)
8	0.02 mR/hr			Core Support Rod
9	0.02 mR/hr			Quantity-2 Safety Rod Thimbles
10	0.02 mR/hr			Safety #1 with Parts
11	0.02 mR/hr			Course Control with Parts
12	0.02 mR/hr			Fine Control Rod with Parts
13	0.02 mR/hr			Core Support
14	0.02 mR/hr	0	0/0	Core Can Top Plate
15	0.02 mR/hr	0	0/0	Core Can Bottom Plate
16	0.02 mR/hr	0	0/0	Polyethylene Disk
17	0.02 mR/hr	0	0/0	Graphite Reflector for Interior Core Can
18	0.02 mR/hr			Aluminum Core Can
19	0.02 mR/hr			Graphite Reflector Plate
20	0.02 mR/hr			Graphite Reflector Plate
21	0.02 mR/hr	0	0/4	Graphite Reflector (Bottom Interior Core Can)
22	0.02 mR/hr	0	-	Internal Thermal Column

23	0.02 mR/hr	0	0/0	External Thermal Column
24	0.02 InR/hr	0	0/0	Top Thermal Column Cover plate
25	0.02 mR/hr	mad	0/0	Bottom Thermal Column Cover plate
26	0.02 mR/hr	0	0/0	Socket and Wrench
27	0.02 mR/hr	0	0/0	Glory Hole/Port Covers Assembly with Covers
28	0.02 mR/hr	0	0/0	Rod Drive
29	0.02 mR/hr	2	0/0	Rod Drive
30	0.02 mR/hr	0	0/0	Rod Drive
31	0.02 mR/hr	0	0/0	Rod Drive
32	0.02 mR/hr	0	0/0	Wood Plug in Access Port
33	0.02 mR/hr	0	0/0	Wood Plug in Access Port
34	0.02 mR/hr	0	0/0	Wood Plug in Access Port
35	0.02 mR/hr	0	0/0	Wood Plug in Access Port
36	0.02 mR/hr	0	0/0	Wood Plug in Access Port
37	0.02 mR/hr	2	0/0	Wood Plug in Access Port
38	0.02 mR/hr	0	0/0	Wood Plug in Access Port
39	0.02 mR/hr	0	0/0	Wood Plug in Access Port
40	0.02 mR/hr	0	0/0	Wood Plug in Access Port
41	0.02 mR/hr	0	0/0	Wood Plug in Access Port
42	0.02 mR/hr	0	0/0	Lead Plug in Access Port
43	0.02 mR/hr	0	0/0	Lead Plug in Access Port
44	0.02 mR/hr	0	0/0	Lead Plug in Access Port
45	0.02 mR/hr	0	0/0	Lead Plug in Access Port
46	0.02 mR/hr	0	0/0	Lead Plug in Access Port

A structure of the second s	the set of	An other advector in the state of the state		
47	0.02 mR/hr	0	0/0	Lead Plug in Access Port
48	0.02 mR/hr	0	0/0	Lead Plug in Access Port
49	0.02 mR/hr	0	0/0	Lead Plug in Access Port
50	0.02 mR/hr	0	0/0	Lead Plug in Access Port
51	0.02 mR/hr	0	0/0	Lead Plug in Access Port
52	0.02 mR/hr	0	0/0	Lead Plug in Access Port
53	0.02 mR/hr	0	0/0	Lead Plug in Access Port
54	0.02 mR/hr	0	0/0	Lead Plug in Access Port
55	0.02 mR/hr	0	0/0	Lead Plug in Access Port
56	0.02 mR/hr	0	0/0	Lead Plug in Access Port
57	0.02 mR/hr	0	0/0	Lead Plug in Access Port
58	0.02 mR/hr	0	0/0	Aluminum Fuse Support
59	0.02 mR/hr	0	0/0	Alignment Screws
60	0.02 mR/hr	0	0/0	Polyethylene Rod
61	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
62	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
63	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
64	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
65	0.02 mR/hr	0	0/0	Cadmium Plug
66	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
67	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
68	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
69	0.02 mR/hr	0	0/0	Graphite Plug in Access Port
70	0.02 mR/hr	0	0/0	Aluminum Access Port Sleeve

	and the second	and the second		
71	0.02 mR/hr	0	0/0	Aluminum Access Port Sleeve
72	0.02 mR/hr	0	0/0	Aluminum Access Port Sleeve
73	0.02 mR/hr	0	0/0	Aluminum Access Port Sleeve
74	0.02 mR/hr	2	0/0	Graphite Reflector Column
75	0.02 mR/hr	0	0/0	Bottom Lead Shield Ring
76	0.02 mR/hr	0	0/0	Bottom Lead Shield Ring w/Access Ports
77	0.02 mR/hr	1	0/0	Top Lead Shield Ring w/Access Ports
78	0.02 mR/hr	0	0/0	Top Lead Shield Ring
79	0.02 mR/hr	0	0/0	Bottom Lead Shield Plate
80	0.02 mR/hr	0	0/0	Fission Gas Canister
81	0.02 mR/hr	0	0/0	Wood Plug in Access Port
82	0.02 mR/hr	0	0/0	Wood Plug in Access Port
83	0.02 mR/hr	0	0/0	Associated Core Assembly Bolts
84	0.02 mR/hr	0	0/0	Control Rod Support Plate
85	0.02 mR/hr	0	0/0	Cadmium Disks
86	0.02 mR/hr	see below	see below	Main Reactor Tank
87	0.02 mR/hr			Reactor Console

9. Unrestricted Component Survey

Parts to be released as unrestricted waste.

		C	ore Can Cover, Top	
Part # 14	Direct Counting	Alpha cpm	LSC cpm	Description
А	0.02 mR/hr	0	0/0	exterior
В	0.02 mR/hr	0	0/0	interior

Core Can Cover, Bottom

Part # 15	Direct Counting	Alpha cpm	LSC cpm	Description
A	0.02 mR/hr	0	0/0	exterior
В	0.02 mR/hr	1(0)	0/0	interior

Polyethylene Disk

Part # 16	Direct Counting	Alpha cpm	LSC cpm	Description
A	0.02 mR/hr	0	0/0	Opposite Disk Sides
В	0.02 mR/hr	0	0/0	Opposite Disk Sides

Thermal Column, Interior (22) And Exterior (23)

Part # 22/23	Direct Counting	Alpha cpm	LSC cpm	Description
А	0.02 mR/hr	0	0/0	1/4 of Wall, Interior (22)
В	0.02 mR/hr	0	0/0	1/4 of Wall, Interior (22)
С	0.02 mR/hr	0	0/0	1/4 of Wall, Interior (22)
D	0.02 mR/hr	0	0/0	1/4 of Wall, Interior (22)

E	0.02 mR/hr	0	0/0	Interior Floor (22)
F	0.02 mR/hr	0	0/0	1/4 of Woll, Exterior (23)
G	0.02 mR/hr	0	0/0	1/4 of Wall, Exterior (23)
Н	0.02 mR/hr	0	0/0	1/4 of Wall, Exterior (23)
I	0.02 mR/hr	0	6/0	1/4 of Wall, Exterior (23)
J	0.02 mR/hr	0	0/0	Exterior Floor (23)

Thermal Column Cover Plate

Part # 24/25	Direct Counting	Alpha cpm	LSC cpm	Description	
А	0.02 mR/hr	0	0/0	Top (24)	
В	0.02 mR/hr	0	0,0	Bottom (25)	

Access	Port	And	Glory	Hole	Parts	

Part # 27	Direct Counting	Alpha cpm	LSC cpm	Description
A	0.02 mR/hr	0	0/0	Access Port Sleeve
В	0.02 mR/hr	0	0/0	Access Port Sleeve
C	0.02 mR/hr	0	0/0	Access Port Sleeve
D	0.02 mR/hr	0	0/0	Access Port Sleeve
E	0.02 mR/hr	0	0/0	Access Port Sleeve
F	0.02 mR/hr	0	0/0	Access Port Sleeve
G	0.02 mR/hr	0	0/0	Access Port Sleeve
Н	0.02 mR/hr	0	0/0	Access Port Sleeve

G78
Ι	0.02 mR/hr	0	0/0	Access Port Cover
J	0.02 mR/hr	0	0/0	Access Port Cover
К	0.02 mR/hr	0	0/0	Access Port Cover
L	0.02 mR/hr	0	0/0	Access Port Cover
М	0.02 mR/hr	0	0/0	Access Port Cover
N	0.02 mR/hr	0	0/0	Access Port Cover
0	0.02 mR/hr	0	0/0	Access Port Cover
Р	0.02 mR/hr	0	0/0	Access Port Cover
Q	0.02 mR/hr	0	0/0	Access Port And Glory Hole "O"-Rings
R	0.02 mR/hr	0	0/0	Glory Hole Sleeve
S .	0.02 mR/hr	0	0/0	Glory Hole Cover
Т	0.02 mR/hr	0	0/0	Glory Hole Cover
U	0.02 mR/hr	0	0/0	Glory Hole Sleeve
V	0.02 mR/hr	0	0/0	Associated Bolts And Nuts

Alignment Screws

Part # 59	Direct Counting	Alpha cpm	LSC cpm	Description
А	0.02 mR/hr	0	0/0	Core Can Alignment Screw
В	0.02 mR/hr	0	0/0	Core Can Alignment Screw

Part #'s	Direct Counting	Alpha cpm	LSC cpm	Description
3	0.02 mR/hr	0	0/0	Core Can "O"-Ring
58	0.02 mR/hr	1(0)	0/0	Aluminum Fuse Support
60	0.02 mR/hr	0	0/0	Polyethylene Rod

G79

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1 000001	ROAL	A 3.25	123/127	Plata
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Part # 84	Direct Counting	Alpha cpm	LSC cpm	Description
A	0.02 mR/hr	0	0/0	Interior Side With Rods
В	0.02 mR/hr	0	0/0	Exterior Side

n.

Part # 86	Direct Counting	Alpha cpm	LSC cpm	Description
A	0.02 mR/hr	0	0/0	1/4 Base Plate, Interior Of Bottom Section
В	0.02 mR/hr	0	0/0	1/4 Base Plate, Interior Of Bottom Section
С	0.02 mR/hr	0	0/0	1/4 Base Plate, Interior Of Bottom Section
D	0.02 mR/hr	0	0/0	1/4 Base Plate, Interior Of Bottom Section
E	0.02 mR/hr	1(0)	0/0	1/4 Wall, Interior Of Bottom Section
F	0.02 mR/hr	1(0)	0/0	1/4 Wall, Interior Of Bottom Section
G	0.02 mR/hr	0	0/0	1/4 Wall, Interior Of Bottom Section
Н	0.02 mR/hr	0	0/0	1/4 Wall, Interior Of Bottom Section
I	0.02 mR/hr	0	0/0	1/4 Rod Drive Cylinder Plus Ceiling
J	0.02 mR/hr	0	0/0	1/4 Rod Drive Cylinder Plus Ceiling
K	0.02 mR/hr	0	0/0	1/4 Rod Drive Cylinder Plus Ceiling
L	0.02 mR/hr	0	0/0	1/4 Rod Drive Cylinder Plus Ceiling
M	0.02 mR/hr	0	3/0	1/8 Base Plate
N	0.02 mR/hr	0	0/0	Bottom Section Door Both Sides
0	0.02 mR/hr	0	0/0	1/8 Bottom Section
Р	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder

G80

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Q	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
Q1	0.02 mR/hr	0	0/0	Top Access Port On Temperature Gage Side
Q2	0.02 mP/hr	1(0)	0/0	Top Access Port On Temperature Gage Side
R	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
R1	0.02 mK	0	0/0	Bottom Access Port On Temperature Gage Side
R2	0.02 mR/nr	1(0)	0/0	Bottom Access Port On Temperature Gage Side
S	0.02 mR/hr	0	0/0	1/8 Base Plate
Т	0.02 mR/hs	0	0/0	1/8 Bottom Section
U	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder
V	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
W	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
X	0.02 mR/hr	1(0)	0/0	1/8 Base Plate
Y	0.02 mR/hr	0	0/0	1/8 Bottom Section
Z	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder
AA	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
BB	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
BB1	0.02 mR/hr	0	2/0	Glory Hole
CC	0.02 mR/hr	0	0/0	1/8 Base Plate
DD	0.02 mR/hr	0	0/0	1/8 Bottom Section
EE	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder
FF	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
GG	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
HH	0.02 mR/hr	0	0/0	1/8 Base Plate
II	0.02 mR/hr	0	0/0	1/8 Bottom Section And Part Of Big Cylinder

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JJ	0.02 mR/hr	1(0)	0/0	Bottom Section Door Both Sides
KK	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
KK1	0.02 mR/hr	0	0/0	Bottom Access Port
KK2	0.02 mR/hr	0	0/0	Bottom Access Port
LL	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
LL1	0.02 mR/hr	0	0/0	Top Access Port
LL2	0.02 mR/hr	0	0/0	Top Access Port
MM	0.02 mR/hr	0	27/0	1/8 Base Plate
NN	0.02 mR/hr	0	0/0	1/8 Bottom Section
00	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder
PP	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
99	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
RR	0.02 mR/hr	0	0/0	1/8 Base Plate
SS	0.02 mR/hr	0	0/0	1/8 Bottom Section
TT	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder
UU	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
UUI	0.02 mR/hr	0	0/0	Glory Hole
VV	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
WW	0.02 mR/hr	1(0)	0/0	1/8 Base Plate
XX	0.02 mR/hr	0	0/0	1/8 Bottom Section
YY	0.02 mR/hr	0	0/0	1/8 Bottom Part Of Big Cylinder
ZZ	0.02 mR/hr	0	0/0	1/8 Bottom Of Big Cylinder Wall
AAA	0.02 mR/hr	0	0/0	1/8 Top Of Big Cylinder Wall
BBB	0.02 mR/hr	0	0/0	1/4 Top Of Big Cylinder

G82

CCC	0.02 mR/hr	0	0/0	1/4 Top Of Big Cylinder
DDD	0.02 mR/hr	0	0/0	1/4 Top Of Big Cylinder
EEE	0.02 mR/hr	0	0/0	1/4 Top Of Big Cylinder
FFF	0.02 mR/hr	0	0/0	1/4 Interior Cylinder Wall
GGG	0.02 mR/hr	0	0/0	1/4 Interior Cylinder Wall
HHH	0.02 mR/hr	0	0/0	1/4 Interior Cylinder Wall
III	0.02 mR/hr	0	0/0	1/4 Interior Cylinder Wall
JJJ	0.02 mR/hr	0	0/0	Interior Cylinder Floor

Appendix H:

Survey Instruments And Operation Data

The following survey instruments were used during the decommissioning process of the AGN 201M reactor.

Liquid Scintillation Counter.

Maks: Beckman LS-7000 Serial Number: 7700259 Background: Ch. 1 = 9+-6 cpm / Ch. 2 = 17+-8 cpm Efficiencies: (wipes) H-3 = .03 / C-14 = .04 / P-32 = .60 / I-125 = .35 Calibration Date: Calibrated monthly Instrument Used: Preliminary Defueling (console wipes), Facility Survey, AGN Components, Unrestricted Release

Windowless Gas Flow Proportional Counter. Make: Ludlum Model 2200 scalar Serial Number: 19788 Background: 0-5 cpm Efficiencies: (wipes) alpha = .35 Calibration Date: 5/21/93 Instrument Used: Core Components, AGN Components, Unrestricted Release

Thin Window G-M. Make: Technical Associates TBM-3S Serial Number: 093127 Background: 50+-20 cpm Efficiencies: C-14 = .05 / P-32 = .27 Calibration Date: 728/92, 7/26/93 Instrument Used: AGN Components, Unrestricted Release

Thin Window G-M. Make: Technical Associates TBM-3S Serial Number: 087129 Background: 60-150 cpm Efficiencies: C-14 = .04 / P-32 = .23 Calibration Date: 12/22/88 (blocks), 6/23/89 (defueling) Instrument Used: Concrete Blocks, Defueling, Core Components

Thin Window G-M. Make: Technical Associates TBM-3S Serial Number: 066164 Background: 70-140 cpm Efficiencies: Cl-36 = .22 Calibration Date: 6/25/87 Instrument Used: Concrete Blocks Thin Window G-M. Make: Technical Associates TBM-3S Serial Number: 092332 Background: 50 cpm (blocks) Efficiencies: Cl-36 = .22 Calibration Date: 12/22/88 Instrument Used: Preliminary Defueling, Concrete Blocks

Pressurized Ion Chamber

Make: Victoreen 450P Serial Number: 172 Background: N/A Efficiencies: N/A Calibration Date: 2/6/89 Instrument Used: Defueling

Micro R Meter

Make: Ludlum Model 19 Serial Number: 7950 Background: .03 mR/hr Efficiencies: N/A Calibration Date: 7/28/89 Instrument Used: Defueling, Core Components

Ludlum Alpha Scintillation Make: Ludlum 43-1 PRO#02132 Serial Number: 33640 Background: 0-1 cpm Efficiencies: alpha 31% Calibration Date: Instrument Used: Defueling

High Purity Ge Crystal Make: EG&G ORTEC Serial Number: 25-P-K72 Background: 10 nCi Efficiencies: Varies with energy Calibration Date: at each use Instrument Used: AGN Shield Water Survey

EPA Detectors: The following detectors have their background and efficiencies determined by the EPA. These detectors are rotated out every year and are no longer on site.

Ion Chamber Make: Eberline Serial Number: 289 Background: N/A Efficiencies: N/A Calibration Date: 1/22/89 Instrument Used: Defueling Ion Chamber

Make: Eberline E-5008 Serial Number: 1015 Background: N/A Efficiencies: N/A Calibration Date: 12/18/89 Instrument Used: Defueling

Ion Chamber

Make: Eberline RD-2A Serial Number: 1263 Background: N/A Efficiencies: N/A Calibration Date: 7/28/89 Instrument Used: Defueling, Core Components