

RETURN TO 396-SS PDR



70-734

GA Technologies Inc.  
P.O. BOX 85608  
SAN DIEGO, CALIFORNIA 92138  
(619) 455-3000

GA Technologies

In Reply  
Refer To: 696-8036

12 November 1985

Mr. William T. Crow  
Office of Nuclear Material  
Safety & Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555



Attention: Dr. E. Shum.

Subject: Docket 70-734: SNM-696; Burial of Slightly Contaminated Asphalt in 1974.

- References:
1. Amendment #60 to State of California Radioactive Material License #0145-59, November 22, 1974.
  2. Frank O. Bold letter to Dr. Simon Kinsman, October 23, 1974.
  3. Earl Ivan White letter to Mr. F. O. Bold, April 26, 1984.
  4. William R. Mowry letter to Dr. Gerard Wong, May 15, 1984 (CAL-6005).
  5. William R. Mowry letter to Mr. Ben R. Kapel, June 29, 1984 (CAL-6030).
  6. Amendment #76 to State of California License #0145-80, July 18, 1984.
  7. Keith Asmussen, GA letter #696-8023, to Mr. William T. Crow, Docket 70-734, dated October 1, 1985.



Dear Mr. Crow:

In 1974, GA Technologies Inc. (GA) was authorized by the State of California to bury on its premises approximately 300 tons of asphalt slightly contaminated with uranium and thorium (Ref. 1). On the basis of information contained in references 2, 3, 4 and 5, the State subsequently amended GA's License #0145-80 removing any restrictions on the use of the area where this material was buried (Ref. 6). This was discussed with Messrs. Buddy Brock and Robert Thomas of Region V during their visit to GA on September 24, 1985. At their request, copies of references 1 through 6 were provided for their information.

On November 7, 1985, I discussed the current status of the buried asphalt with Dr. Shum. Dr. Shum stated that he was expecting a phone call from an official of the State of California regarding this subject. To assist Dr. Shum in his preparations for discussing this material with officials of the State of California, enclosed are copies of references 1 through 6. This information should also be useful in determining whether the buried asphalt may be released to unrestricted use and/or in establishing guidelines regarding its disposal as part of our current plan to obtain release of the area to unrestricted use (Ref. 7).

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William T. Crow

- 2 -

696-8036

If you have any questions, please contact me at (619) 455-2823 or Mr. Frank Bold at (619) 455-2020.

Very truly yours,

*Keith E. Asmussen*

Keith E. Asmussen  
Licensing Administrator

KEA:hc

Enclosures:

References 1 through 6.

STATE OF CALIFORNIA  
DEPARTMENT OF HEALTH

RADIOACTIVE MATERIAL LICENSE

Supplementary Sheet

Page 1 of 1 pages

License Number 0145-59

Amendment Number 60

General Atomic Company  
P. O. Box 608  
San Diego, CA 92112

Attention: Douglas T. Farney  
Licensing Administrator

License No. 0145-59 is hereby amended in part as follows:

To add:

14 (a1) Letter dated October 23, 1974 signed by Frank O. Bold, and attachments thereto.

30. The licensee is authorized to bury approximately 300 tons of asphalt containing approximately 500 microcuries of uranium, 1600 microcuries of thorium, and daughter products of the uranium and thorium, on the licensee's property as described by the letter dated October 23, 1974 signed by Frank O. Bold, and attachments thereto. The asphalt contaminated with radioactive material shall be covered by not less than ten feet of earth. The licensee shall maintain at the burial site a prominent marker containing a durable, clearly visible inscription stating the kinds, amounts, and location of radioactive material buried at the site.

For the State Department of Health

Date November 22, 1974

by

*D. A. Pickler*

Simon Kinsman, Ph.D., Chief

GENERAL ATOMIC COMPANY  
P.O. BOX 81608  
SAN DIEGO, CALIFORNIA 92138  
(714) 453-1000

October 23, 1974

Dr. Simon Kinsman  
Radiologic Health Section  
California Department of Health  
744 "P" Street  
Sacramento, CA 95814

Dear Dr. Kinsman:

General Atomic Company has a need to dispose of approximately 300 tons ( $2.7 \times 10^6$  grams) of broken asphalt contaminated with U-234 and U-235 to an average level of  $1.8 \times 10^{-6}$  uCi/gram. This is a request for permission to bury the asphalt on property owned by General Atomic Company.

Attachment A describes the sampling procedure employed, the results of the sample analysis, and our analysis of the results. Attachments B and C show the location and cross section of the proposed burial site. There is no natural water in the burial area so that little or no leaching will occur. Drainage from the area will be monitored at one of our permanent environmental monitoring stations near the bottom of the canyon.

If you desire additional information, please do not hesitate to contact me.

Very truly yours

*Frank O. Sold*

Frank O. Sold, Manager  
Health Physics Department

POB/sr

Attachments

ATTACHMENT A:

On September 20, 1974, 24 asphalt coring samples and a blank asphalt sample were sent to Controls for Environmental Pollution for isotopic uranium, isotopic thorium, and radium analyses. Each coring sample consisted of three corings of asphalt per sector of the asphalt lot. The lot was divided into 24 equal sectors for sampling. The estimated amount of asphalt in the entire lot is 300 tons.

The results of the isotopic uranium analyses are as follows:

<u>Sample</u>	<u>U-234</u>	<u>U-235</u>	<u>U-238</u>
1	5.1 ± .04	.38 ± .02	.08 ± .02
2	3.34 ± .02	.00 ± .01	.06 ± .01
3	11.0 ± .1	.45 ± .02	.12 ± .01
4	1.1 ± .02	.04 ± .01	.04 ± .01
5	.70 ± .03	.00 ± .01	.03 ± .01
6	1.4 ± .03	.05 ± .01	.03 ± .01
7	5.0 ± .05	.23 ± .02	.02 ± .01
8	.43 ± .02	.00 ± .01	.03 ± .01
9	.09 ± .01	.00 ± .01	.02 ± .01
10	.54 ± .02	.00 ± .01	.04 ± .01
11	.04 ± .01	.00 ± .01	.03 ± .02
12	.05 ± .01	.00 ± .01	.03 ± .01
13	2.42 ± .04	.07 ± .02	.00 ± .01
14	2.62 ± .04	.03 ± .01	.00 ± .01
15	.03 ± .01	.00 ± .01	.00 ± .01
16	.10 ± .01	.00 ± .01	.00 ± .01
17	.40 ± .01	.00 ± .01	.03 ± .01
18	.06 ± .02	.00 ± .01	.04 ± .02
19	.00 ± .01	.00 ± .01	.03 ± .01
20	5.13 ± .05	.11 ± .02	.07 ± .02
21	.00 ± .01	.00 ± .01	.03 ± .01
22	1.76 ± .03	.32 ± .02	.05 ± .01
23	.00 ± .01	.00 ± .01	.00 ± .01
24	.34 ± .03	.02 ± .01	.02 ± .01
Average	1.74 pCi/g	.071 pCi/g	.033 pCi/g
Total/ 300 tons	473 µCi	19 µCi	9.0 µCi

The above results have been computed with background subtracted. Looking at the ratios of U-234:U-235:U-238, it can be shown that the uranium present in the asphalt is enriched, and therefore represents contamination. The total uranium contamination is about 500 microcuries.

The results of the isotopic thorium analyses are as follows:

Sample	Th-232	Th-228	Th-230
1	.30 ± .12	.78 ± .13	<.2
2	.90 ± .09	1.58 ± .10	.19 ± .05
3	1.68 ± .12	2.95 ± .13	.69 ± .10
4	1.68 ± .20	2.77 ± .30	<.2
5	3.06 ± .13	4.82 ± .10	.69 ± .10
6	1.08 ± .12	1.57 ± .13	<.2
7	4.02 ± .11	4.39 ± .13	.89 ± .10
8	5.68 ± .12	5.75 ± .14	.69 ± .06
9	.95 ± .08	1.75 ± .20	.46 ± .06
10	1.77 ± .11	1.77 ± .12	.22 ± .06
11	1.80 ± .10	2.51 ± .13	.73 ± .10
12	2.16 ± .11	2.36 ± .12	.17 ± .06
13	2.04 ± .10	2.72 ± .11	<.2
14	3.25 ± .12	3.98 ± .30	1.26 ± .13
15	7.25 ± .35	5.39 ± .13	.99 ± .10
16	1.67 ± .10	2.45 ± .11	.91 ± .10
17	1.09 ± .09	1.71 ± .12	<.2
18	1.15 ± .10	1.95 ± .11	.81 ± .06
19	1.93 ± .12	3.45 ± .30	.71 ± .06
20	1.94 ± .11	<.2	.23 ± .06
21	2.96 ± .13	5.24 ± .15	.15 ± .08
22	1.53 ± .12	2.02 ± .13	<.2
23	4.81 ± .14	3.41 ± .30	.18 ± .10
24	1.98 ± .20	2.74 ± .06	1.95 ± .03
Average:	2.36 pCi/g	2.84 pCi/g	0.55 pCi/g
Total/ 300 tons	642 µCi	772 µCi	150 µCi

The total thorium present in the 24 sectors is about 1600 microcuries. It would be nearly impossible to determine exactly how much of the thorium is background and how much is contamination. The blank sample gave a Th-228/Th-232 ratio of 1.5. In theory, naturally occurring thorium would have been in complete equilibrium, i.e., the Th-228/Th-232 ratio would be 1. It should never be greater than 1. The sample ratios vary from 0.7 to 1.8. In Sorrento Valley processing, the equilibrium between Th-232 and Th-228 (which takes about 60 years to establish) is disturbed when Ra-228 is driven off in the spherodization step. Th-228, when broken from the chain, decays with a 1.9-year half-life. Th-232 regenerates Th-228, but at a much slower rate (6.7 year half-life). The asphalt storage lot is about 10 years old, so if Th-232 were deposited in the lot 10 years ago, only about 60% of Th-228 would have been regenerated at this time. Unfortunately, thorium could have been deposited at any time during that period, so that the state of equilibrium is completely unknown. In any case, Th-232 would be greater than



Th-228, which is not what we find, even in the blank. We can only assume that, since most of the samples have about the same ratio as the blank, that the majority of the thorium activity is naturally occurring. Why Th-228 should be present in larger amounts than Th-232 is unexplained, but may be a characteristic of the analysis. For those cases (sectors 15 and 23) where the Th-232 is greater than Th-228, the possibility of contamination exists.

The following amounts of Ra-226 were reported to be in the corings by the laboratory performing the analyses:

<u>Sample</u>	<u>Ra-226 (pCi/g)</u>
1	30
2	50
3	26
4	37
5	11
6	14
7	17
8	63
9	11
10	7
11	15
12	15
13	8
14	10
15	16
16	14
17	10
18	6
19	15
20	42
21	34
22	20
23	21
24	2
Blank	6

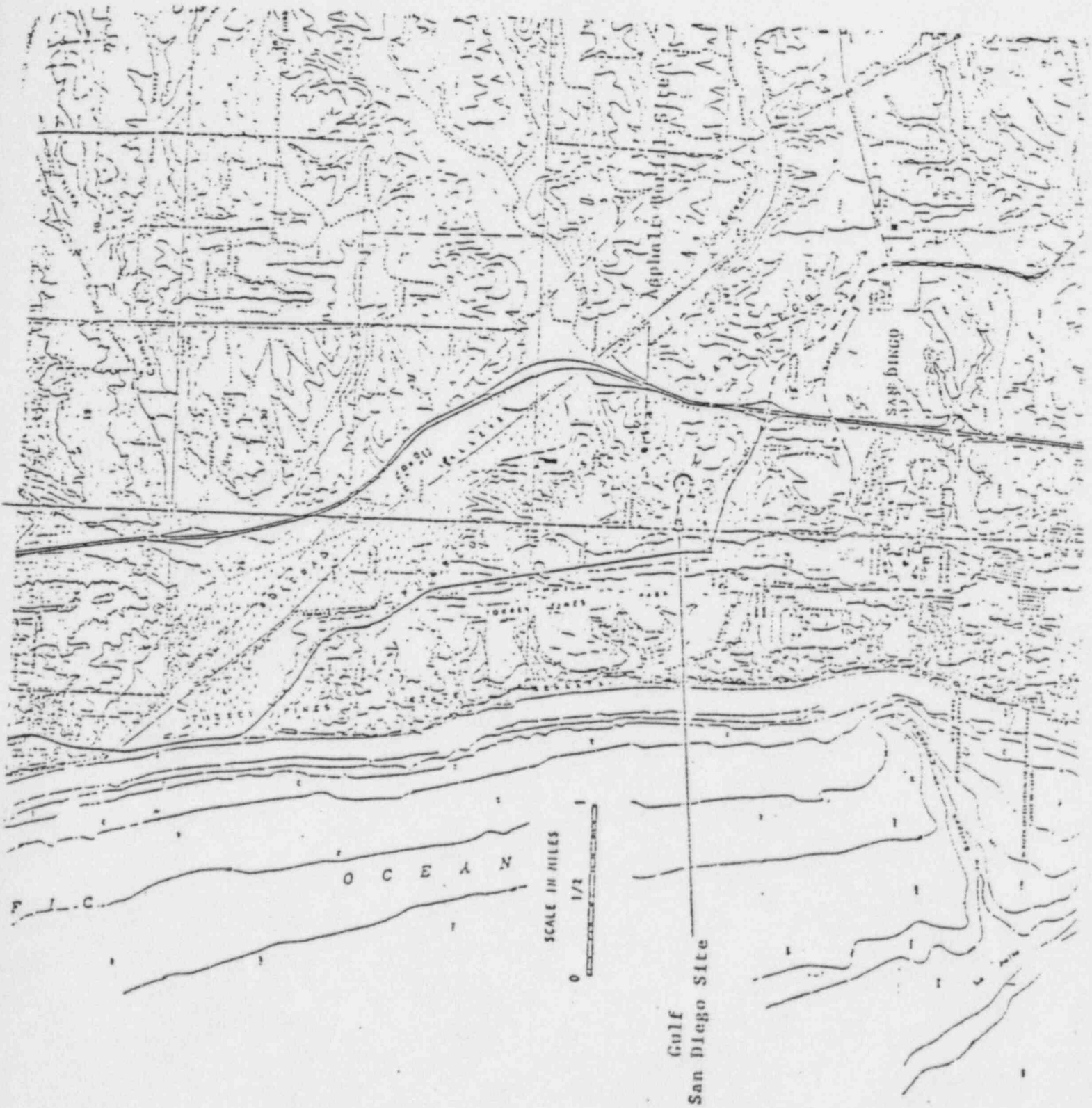
The above results do not have the blank subtracted. The average with the blank subtracted is 15 pCi/g.

Since Ra-226 can only come from the U-238 decay chain, and since the proportion was far too large to have come from the reported U-238, we questioned Controls for Environmental Pollution about the analytical method chosen to do Ra-226. They had done an instrumental gamma-scan using a Ge-Li detector, and had not properly corrected for geometry factors during counting, giving results about 100 times too high (the above results). Subsequent radiochemical separation of Ra-226 from selected samples (tar portion only) gave results of less than 0.5 pCi/g. This could mean that the Ra-226 was really in the rock fraction. The remaining rock portion was gamma-scanned

in the same fashion as the original samples, and though the results are still very high, the analysis was performed in the same manner and the results can be compared. The rocks were found to contain nearly all the Ra-226 present,



ATTACHMENT B



Earl Ivan White  
Environmental Consultant  
785 S.E. Vista  
Gresham, OR 97030  
503-666-8637

April 26, 1984

Mr. F.O. Bold  
Manager, Compliance Control  
CA Technology Inc.  
P.O. Box 85608  
San Diego, CA 92138

Dear Mr. Bold,

I have examined the situation with regard the asphalt from the storage yard, which was buried in 1974, and have reached the following conclusions:

1. The asphalt core samples indicate that the uranium present is enriched, however, the average concentration of uranium in the 300 tons is approximately 1.8 pCi/g. While the natural thorium and uranium soil concentration can vary widely around the San Diego site, it appears to be around 3 pCi/g for the burial area.
2. The conclusion from the asphalt samples as regards thorium and radium, was that they were probably naturally occurring, and I concur with that.
3. Even if the uranium levels were above normal values, there is no permanent water flow on the site and any runoff goes into the flood control channel. There is also no use of the runoff water as it flows to the ocean. The burial site is about 75 feet above the brackish ground water under the area.

Based on the above conclusions, I cannot see how the asphalt could represent any threat to anyone, especially when compared to the normal conditions with respect to soil radioactivity.

To keep the site from being permanently classified as a hazardous waste site by the EPA, I would recommend that you request the asphalt burial be reclassified by the state.

Yours truly,

*Earl Ivan White*  
Earl Ivan White



GA Technologies Inc.  
P.O. BOX ~~2444~~ 55608  
SAN DIEGO, CALIFORNIA 92138  
(619) 455-3000

In Reply  
Refer To: CAL-6005

15 May 1984

Dr. Gerard Wong  
State of California  
Department of Health Services  
Radiologic Health/Licensing  
744 P Street  
Sacramento, CA 95814

Subject: Removal of Certain Radioactive Waste Burial Requirements.

Reference: (a) GA letter dated 10/23/74.  
(b) R/A Mtl. License #0145-59 Amendment 60 dtd 11/22/74.

Dear Dr. Wong:

GA Technologies Inc. (formerly General Atomic) requested, ref.(a), authority to dispose on its premises approximately 300 tons of asphalt slightly contaminated with uranium and thorium. Approval to do so was given by amendment to our license, ref. (b). GA has complied with the conditions imposed by the amendment since the material was disposed of.

We now have need to do additional grading, backfilling, and soil compacting in the area to accommodate new facility construction. This may involve renovating and recompacting the area where the previous waste and rubble was disposed of. It may be necessary to remove certain materials which are not suitable for recompacting.

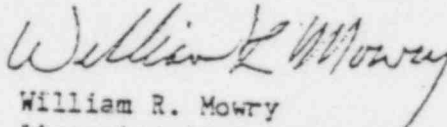
Since the levels of contamination for materials initially buried are so low ( $1.8 \times 10^{-9}$  uCi/gm average) we request that the materials be released from radioactive material control and the area no longer be retained as a marked hazardous disposal site because any movement of the material will only result in dilution toward values found in general environs of southern California. Further, any compacting and area renovations will provide added stabilization of the soil around the material, thus ensuring against egress of material via ground water or release of radiation to the surface in a manner potentially exposing individuals.

We believe this request is consistent with current NRC and EPA requirements to protect the public health from the subject radioactive material.

It is noteworthy that the material contamination limits are (1) the same order of magnitude for materials which may be released via water to unrestricted areas under 10 CFR 20 Appendix A; (2) Five orders of magnitude below the 100 mCi/gm expressed in Table 1 of 10 CFR 61.55; (3) orders of magnitude below concentration of the same elements averaged over the earth crust; and (4) any resultant soil contamination will be small compared to the criteria established for remedial action in EPA's 40 CFR 192 sub-part B or E (copy attached). Note specifically the standards in 40 CFR 190.12 and the fact that they exceed substantially our levels of contamination.

The facility and grading plans are to be submitted to San Diego City Planning Department and Coastal Commission soon. Consequently we look forward to your early approval of the request so we may finalize our plans regarding the area planned for construction of a new fusion research facility.

Very truly yours,

  
William R. Mowry  
Licensing Administrator

WRM:hmc

Attachment:  
40 CFR 192

GA Technologies

In Reply  
Refer To: CAL-6030

GA Technologies Inc.  
P.O. BOX 2444  
SAN DIEGO, CALIFORNIA 92128  
(619) 455-3000

29 June 1984

Mr. Ben R. Kapel, Health Physicist  
State of California Dept. of Health Services  
Radioactive Material Licensing  
Radiologic Health Branch  
714/744 P Street  
Sacramento, CA 95814

Subject: Docket 05-5303.

Dear Mr. Kapel:

Attached are two copies of the NRC policy paper which I mentioned in our recent discussion. I call your attention to the first paragraph of the discussion section of the SECY-31-576 memo and its enclosure 2 (Summary of Disposal and Storage Options), page 3. Please note that our material has less activity associated with it than the first option below which EPA standards do not warrant clean up or control.

We anxiously await your official approval allowing us to remove any restrictions on the regrading of the area with this material in it.

Very truly yours,

*William R. Mowry*  
William R. Mowry  
Licensing Administrator

WRM:hc

Enclosure:

NRC Policy Issue SECY-31-576  
dtd 10/5/81, 2 copies

# RADIOACTIVE MATERIAL LICENSE

Supplementary Sheet

License Number 0145-80

Amendment Number 76

GA Technologies, Inc.  
P. O. Box 35608  
San Diego, CA 92138

Attention: William R. Mowry  
Licensing Administrator

In response to the letters dated February 2, 1984 and June 4, 1984, signed by William R. Mowry; License Number 0145-80 is hereby amended in part as follows:

To read:

2. Address: P. O. Box 85608  
San Diego, CA 92138

To delete:

Condition No. 30 is deleted in its entirety.

To read:

9. Authorized use:

BG. To be used in a modified (see Condition 14(a)) Tech/Ops. projector Model 680 for industrial radiography, scattering and other related experimentation.

13. The licensee will permit no person to act as a radiographer until that person has successfully completed the training described in the application dated October 30, 1962.

14. (a) The letter with attachments dated October 23, 1974 signed by Frank O. Bold and the letter with attachment dated March 28, 1975, signed by Douglas T. Farney.

(cont'd)



## RADIOACTIVE MATERIAL LICENSE

## Supplementary Sheet

continued

To add:

14. (cont'd)

- (ap) The letter dated July 3, 1979, signed by William R. Mowry and letter dated July 26, 1979, signed by A. Neeseman.
- (aq) The telegrams dated April 11, 1980 from Frank Bold of General Atomics Co. and from Paul Sunde of MDR Industries.
- (ar) The letter dated March 28, 1980 signed by William R. Mowry and attachments thereto as supplemented by the letter dated May 22, 1980, signed by William R. Mowry and attachments thereto.
- (as) The letter dated October 14, 1982 signed by William R. Mowry
- (at) The letter dated October 29, 1982 signed by J. P. Hogan.
- (au) The letter dated August 11, 1983, as supplemented by the letter with attachments dated August 23, 1983, signed by William R. Mowry.
- (av) The letter with attachment dated May 15, 1984, signed by William R. Mowry and the letter dated June 29, 1984 with attached WRC "Policy Issue" signed by William R. Mowry (with respect to deletion of Condition 30).

For the State Department of Health Services

Date July 18, 1984by 

Radiologic Health Branch

714 P Street, Sacramento, CA 95814

DOCKET NO. 70-734  
CONTROL NO. 26041  
DATE OF DOC. 11/12/85  
DATE RCVD. 11/15/85  
PCUF ☒ PDR ☒  
PCAF ☐ LPDR ☐  
WM ☐ I&E REF. ☒  
WMUR ☐ SAFEGUARDS ☒  
PCTC ☐ OTHER ☐

DESCRIPTION:

Burial of slightly  
Contaminated  
Asphalt in 1974

11/15/85 INITIAL Cec