INTERIM REPORT

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for the
Department of Energy

INTERIM REPORT

MONTHLY PROGRESS REPORT FOR APRIL 1980

EVALUATION OF DOCKET FILES OF TERMINATED LICENSES
(189 No. A9085-7)

PRINCIPAL SCIENTISTS: C. F. Holoway and H. W. Dickson

Objectives:

The technical objective of this project is to review terminated licenses in the Nuclear Regulatory Commission (NRC) Docket File System, extract pertinent data, create a computer file of these data and identify which previously licensed sites potentially could constitute residual radiological safety hazards.

Major Accomplishments:

During April, 46 dockets were group analyzed as shown in Table 1.

Table 1. Group analysis of docket files for month of April

Category	Categorization before group analysis	Categorization after group analysis
No	18	32
Un	28	3
OK	0	11
Total	46	46

The 35 questionables remaining after group analysis are tabulated in Attachment 1. The total group analyzed thus far are shown in Table 2.

Table 2. Total group analysis of docket files (February-April)

Category	Categorization before group analysis	Categorization after group analysis
No	35	57
Un	76	13
OK	0	41
Total	111	111

These 111 dockets represent 4.2% of the total dockets screened. After group-analysis, the percentage of No's plus Un's was reduced to 2.7%. Assuming about 7,000 Part 30 dockets, if this percentage holds, one can anticipate a total of perhaps 200 questionable (No's and Un's) dockets. Since several dockets may be assigned to one site, the number of questionable sites will probably be less than 200.

As part of quality control, 4 dockets categorized as OK were reviewed at random from each of 7 boxes screened in April by Evaluation Research Corporation (ERC) analysts. The results of the 5% sampling are tabulated in Attachment 2. This monthly sampling of folders categorized as OK in the screening process is important, since folders initially categorized as OK are not then seen by other analysts.

The number of radionuclides found in licenses screened thus far is 149, an increase of 10 over last month's total. The annual limits on intake (ALI), as the term is defined by ICRP,* are tabulated in Table 3 for the new radionuclides.

Table 3. Annual limits on intake (ALI) and permissible initial quantities in megabecquerels (MBq)

Isotope	Critical organ(s)	Half-life (years)	ALI (MBq)	Permissible amounts after time t (years) (MBq) t=0	t=5	t=10	t=20
Ge-77	a	1.? -3)	0.27	27	>3.7(7)		
Br-80m/80	a	5(-4)	0.27	27	>3.7(7)		
Te-121	a	4.7(-2)	0.27	27	>3.7(7)		
I-128	a	4.8(-5)	0.27	27	>3.7(7)		
Dy/Ho-166	GI (LLI)	9.3(-3)	12	1.2(3)	>3.7(7)		
Re-188	GI (LLI)	1.9(-3)	8.9	8.9(2)	>3.7(7)		
Am-243	Bone, kidney	7380	5.6(-4)	5.6(-2)	5.6(-2)	5.6(-2)	5.6(-2)
Cm-244	Bone	18.1	8.1(-4)	8.1(-2)	0.10	0.12	0.17
Bk-249	Bone	0.88	8.1(-2)	8.1	420	2.1(4)	>3.7(7)
Cf-252	Bone	2.64	5.6(-4)	5.6(-2)	0.21	0.78	11

[a]DAC values not available, in which case the DAC for an unknown radionuclide mixture was used to calculate permissible initial level of nuclide [DAC = (ALI/2400)Bq/m^3].

Although 149 radionuclides have been identified in licenses screened to date, only 5 nuclides have residual levels sufficient to give a calculated screening factor greater than 100. These are: ^{3}H, ^{36}Cl, ^{60}Co, ^{90}Sr, and ^{137}Cs. In addition, broad scope licenses for activation products or by-products have produced screening factors in excess of 100.

The ERC was requested to undertake further review of licenses for possession of sealed sources (primarily ^{137}Cs, ^{60}Co, and ^{90}Sr). In consultation with R. G. Page of the NRC staff, the decision was made to use operational factors of 0.01 and 1 in calculating the

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*International Commission on Radiological Protection, Publication No. 30, Part 1, *Limits for Intake of Radionuclides by Workers*, pp. 8-9, Pergamon Press, Oxford, 1979.

screening factors for sealed gamma and sealed beta sources, respectively. Dockets licensing such sealed sources were rescreened accordingly, with the following results:

No	18
Un	83
Total	101

Because the task is to identify present or future potential radiological hazard due to likely presence of residual radioactivity on the site, rather than past occupational exposure during operations or past releases which have now dispersed from the site, it was agreed between NRC and ORNL that an operational factor of 1 (instead of 100) for radioactive gases is now justifiable. At recent NRC suggestion, however, documented overexposures are now being included in the computer records in a comment field.

As a result of conversations with D. A. Nussbaumer of the NRC staff, two factors in the searchable (INFO) field have been added: (1) number 09 in the (INFO) field will be checked when the docket contains information [letter, phone conversation, etc., other than (2)] confirming that all radioactive material actually left the site on or before termination of the license; and/or (2) number 10 in the (INFO) field will be checked when the docket contains a "Certificate of Status" form (sample shown in Attachment 3) giving official confirmation that all by-product materials were transferred, decayed, and/or disposed of in compliance with 10 CFR 20.

Factors 09 and 10 in the (INFO) field as defined above have replaced the former meanings of 09 and 10 which were to indicate TSF's at 100 and 1,000 years, respectively (ORNL/HASRD-70, Attachment 1), but which were never used except as indicated below.

As of April, the only retrievable 09 under the field (INFO), is accession number 1827 (Doc. No. 30-42-0579-02), and for 10, the accession number 1888 (Doc. No. 30-42-1068-06) which may represent input errors not yet corrected as of the 04-23-80 update. Since the original 09 and 10 definitions were not used, no retroactive changes in records are needed.

It has been noted that there are two Part 30 boxes marked box no. 15. One box originally marked 19 was renumbered 15 by the Atomic Energy Commission. This box (106 docket folders) has been renumbered 15B and an inventory sheet prepared since one was not found on the inventory originally conducted by ORNL. In addition, Box 44 was not inventoried, but has now been and Box 46 which had been marked 44 is now marked 46.

Since the use of SV IRR instead of S.I. for Service Irradiation is more explanatory, all computer files have been changed accordingly. The use of F.P. for Fission Products, and of B.P. for By-Products and Activation Products, remain unchanged.

Status of Project

A preliminary screening has been made of 31 of the total 101 boxes of terminated Part 30 docket files sent to ORNL. Data analysis/ computer input forms have been prepared for 2,633 docket folders and 1,915 docket records are presently searchable by computer. Assuming an average of 85 dockets per box (2633/31), this would represent about 8,585 total folders in the 101 boxes. The original inventory of 7,000 dockets did not take into account the fact that there were hundreds of non-docket folders marked "General File," without corresponding docket files. If these latter are to be analyzed in addition to the docket folders, then additional effort will be required with a corresponding increase in time and funding.

The project is on schedule and completion of 7,000 dockets is expected by December 1980.

Manpower and Cost Summary:

Efforts in Man Months			Cost K$			
Apr. 1980	FY 1980	Total to date	Apr. 1980	FY 1980	Total cost to date K$	Additional cost to completion (est.)
0.2	8.2	63.1	10.9	107.0	395.0	154,000

Attachment 1.

ERC/ORNL Group Docket Analysis Date: April 26, 1980

No.	Record No.	License No.	Licensee	Orig. Cat.	Analyst					Group Cat.	Comments
					DGJ	LEB	JSE	HWD	CFH		
55	1200	22-0519-01	Mayo Clinic Rochester, MN	2Un	No	No	No	No	No	2No	Possible to have had large amounts of hazardous material. Presently hold 22-0519-02, -03, -06
56	1289	04-0348-01	Lockheed Aircraft Corp., 7701 Woodley Ave. Van Nuys, CA	2Un	Un	Un	Un	OK	OK	2Un	20 mCi of Sr-90 possessed - probably OK but borderline.
57	1292	10-1425-03	Lockheed Aircraft Corp., 86 S. Cobb Dr. Marietta, GA	2Un	OK	OK	No	No	No	2No	Were all light sources sold or are large amounts of tritium still there? High exposure rate; group analysts had prior knowledge of unsatisfactory conditions at the site. Presently hold 10-1425-16
58	1347	12-0621-02	Abbott Labs 1400 Sheridan Rd. N. Chicago, IL	2Un	No	No	No	No	No	2No	Possibly held large amounts of hazardous material. License shows 200 mCi possession limit of each B.P. 3-84 whereas inspection report done on a later shows 5Ci possession limit for each. Presently hold 12-0621-02, -03, -05E, -06MD, -07MA, -08G
59	1349	41-0593-01	Abbott Labs Oak Ridge, TN	2Un	No	No	No	No	No	2No	Closed out in 1964. Have done some decontamination work. Still say no because of large quantities. Site closed in 1964.
60	1364	31-0387-06	Alco Products, Inc. 1 Nott St. Schenectady, NY	2Un	No	No	No	OK	Un	2No	50 mCi of mixed fission products could include Sr-90. High radiation levels in unrestricted areas, therefore probably sloppy handling.

Attachment 1. (continued)

ERC/ORNL Group
Docket Analysis

Date: April 26, 1980

No.	Record No.	License No.	Licensee	Orig. Cat.	Analyst					Group Cat.	Comments
					DGJ	LEB	JSE	HWD	CFH		
61	1377	17-1977-01	Alton Ochsner Med Found. Hospital, 1516 Jefferson Hy. New Orleans, LA	2Un	No	No	No	No	No	2No	50 mCi of Sr-90 is categorized as No.
63	1386	31-0324-10	American Cyanamid Co., Pearl River, NY	2Un	No	No	No	Un	No	2No	Prepared organic tritium compounds which are more hazardous than form in which isotope procured.
70	1561	13-0155-11	American Oil Co., Standard Oil Co. 2500 New York Ave. Whiting, IN	2Un	No	No	Un	No	No	2No	Possibility of large amounts of hazardous materials possessed. Presently hold 13-0155-10.
71	1562	13-0155-03	American Oil Co., Standard Oil Co. Box 431 Whiting, IN	2Un	OK	No	Un	No	No	2No	Large quantities licensed; Whiting could also use materials licensed. Presently hold 13-0155-10
72	1563	13-0155-05	American Oil Co., Standard Oil Co. Whiting, IN	2Un	OK	OK	No	No	No	2No	When licenses from sites are considered together large amounts may be possessed and the sites may be a problem. Presently hold 13-0155-10
73	1568	32-0813-05	University of North Carolina Chapel Hill, NC	2Un	No	No	Un	No	No	2No	What is final disposition of Sr-90 source?

Attachment 1. (continued)

ERC/ORNL Group Docket Analysis Date: April 26, 1980

No.	Record No.	License No.	Licensee	Orig. Cat.	Analyst					Group Cat.	Comments
					DGJ	LEB	JSE	HWD	CFH		
74	1575	04-0860-01	Northrop Aircraft Inc., Hawthorne, CA	2Un	No	No	Un		No	2No	What is disposition of Sr-90 source?
75	1584	12-0382-02	Northwestern U. Medical School, Chicago, IL	2Un	Un	OK	Un		Un	2Un	½ Curie of any B.P. material could be a possible hazard. Presently hold 12-0382-05, -03, 12-0094-06
76	1587	12-0094-02	Northwestern U. Chicago, IL	2Un	No	No	No	No	No	2No	No on basis of ½ Curie of B.P. material possession limit. Presently hold 12-0382-05, -03, 12-0094-06
77	1595	12-2904-01	Nuclear Chemical Co. 1952 W. Irving Park Rd. Chicago, IL	2Un	No	No	No	No	No	2No	Tritium and C-14 used in labeling organic compounds. Went bankrupt - what was the inventory at time of bankruptcy? Fabricating this large a quantity can be very messy.
78	1596	12-2904-02	Nuclear Chemical Co., Isotope Chemical Co. 1952 W. Irving Park Rd. Chicago, IL	2Un	No	No	No	No	No	2No	Same as above.
79	1597	31-6122-01	Nuclear Consultants Long Island City, NY	2Un	Un	No	Un	No	Un	2Un	Full license not in folder, could possess 50 mCi sealed Sr-90 source.

Attachment 1. (continued)

ERC/ORNL Group
Docket Analysis

Date: April 26, 1980

No.	Record No.	License No.	Licensee	Orig. Cat.	Analyst					Group Cat.	Comments
					DGJ	LEB	JSE	MWD	CFH		
80	1599	31-6122-03	Nuclear Consultants Long Island City, NY	2Un	No	No	No	No	No	2No	Possessed 100 mCi Sr-90 sealed source.
82	1614	21-1184-01	Nucor Research Inc. Radioactive Prod. Inc. 2421 Wolcott Ave. Ferndale, MI	2Un	No	No	No	No	No	2No	Large and diverse sealed sources.
83	1232	29-0117-01	Merck-Sharp and Dohme Research Lab Scott Ave. Rahway, NJ	2No	OK	No	No	No	No	2No	Tritium used in labeling organics. Presently hold 29-0117-06, -07.
85	1353	29-6177-01	Adelman, Stuart Lee 58 Spier Dr. S. Orange, NJ	2No	No	No	No	No	No	2No	No because of Am-241.
86	1382	31-0324-06	American Cyanamid Co. Pearl River, NY	2No	No	No	No	No	No	2No	Large amount of Sr-90 and disposal on-site.
87	1384	31-0324-08	American Cyanamid Co., Pearl River, NY	2No	No	No	No	No	No	2No	Same as above.

Attachment 1. (continued)

ERC/ORNL Group Docket Analysis Date: April 26, 1980

No.	Record No.	License No.	Licensee	Orig. Cat.	Analyst					Group Cat.	Comments
					DGJ	LEB	JSE	HWD	CFH		
88	1391	31-0324-15	American Cyanamid Co., Pearl River, NY	2No	No	No	No	No	No	2No	Tritium used in labeling organic compounds.
89	1472	20-0320-02	New England Nuclear Boston, MA	2No	No	No	No	No	No	2No	Tritium used in labeling organic compounds. Several over-exposures, sloppy handling. Presently hold 20-0320-18MD, -09, -13, 20-11868-01
90	1478	20-0320 01	New England Nuclear Boston, MA	2No	No	No	No	No	No	2No	Same as above. Presently hold 30-0430-18MD,-09,-13,-14E,-15G,-17HA,-06MD,-19, 20-11868-01
92	1558	13-0155-04	American Oil Co., Standard Oil Co. Whiting,IN	2No	No	No	No	No	No	2No	200 mCi of Sr-90 possessed. Presently hold 13-0155-10.
94	1603	04-2314-01	Nuclear Engineering Co, San Francisco CA	2No	No	No	No	No	No	2No	Sloppy operation. Possible contamination at storage sites. A lot of potentially hazardous material.
95	1604	04-2314-02	Nuclear Engineering Co., San Francisco CA	2No	Un	No	No	OK	No	2No	Also could have some special nuclear material. Byproduct levels probably OK. Tend to be sloppy operation.
96	1604	37-4456-02	Nuclear Materials & Equip. Corp. Apollo, PA	2No	Un	No	No	OK	No	2No	Same as above plus comment by Joe Delaney "Old license has kilos of stuff".

Attachment 1. (continued)

ERC/ORNL Group
Docket Analysis

Date: April 26, 1980

No.	Record No.	License No.	Licensee	Orig. Cat.	Analyst					Group Cat.	Comments
					DGJ	LEB	JSE	HWD	CFH		
97	1608	37-0345-03	Nuclear Science & Eng. Corp. Homestead, PA	2No	No	No	No	No	No	2No	Very sloppy handling. Possibility of large amounts of hazardous material.
98	1615	21-1184-02	Nuclear Corp. of America, Nucor Research Inc., Radioactive Prod. Inc., Wolcott Ave. Ferndale, MI	2No	No	No	No	No	No	2No	Major worry is the Sr-90 sealed sources.
99	1644	04-0672-03	McCullough Tool Co. Los Angeles, CA	2No	No	No	OK	No	No	2No	Large amounts of tritium. Use of tritium is unknown.
100	1645	04-0672-04	McCullough Tool Co. Los Angeles, CA	2No	No	No	No	No	No	2No	Large amounts of material possessed.

Attachment 2

Sampling of "OK" Dockets for Quality Control

Box No.	No. of folders	License No.	Comment
21	99	19-1398-8	OK
		20-3914-4	OK
		20-1537-5A60	OK
		31-1299-2	OK
27	52	33-6769-3	OK
		12-94-5	OK
		37-345-1	OK
		41-127-1	OK
22	96	41-3851-1	OK
		4-2107-1	OK
		20-1266-1	OK
		21-1297-2	UN, Large sealed sources of ^{60}Co (32 Ci) and ^{137}Cs (6000 Ci).
29	58	32-1562-4	OK
		42-4666-1	OK
		26-6086-1	OK
		43-2760-1	OK
26	90	20-3857-1	OK
		20-320-5	OK
		31-234-9	OK
		4-2117-1	OK
30	73	31-5997-1	OK
		8-4681-1	OK
		41-5828-1	OK
		34-1334-1	OK
20	104	48-3020-1	OK
		31-5688-1	OK
		26-384-1	OK
		20-595-4	OK

Total folders screened in April: 572.

Percent sampling in April: $\frac{28}{572} \times 100 = 5\%$.

Attachment 3.

CERTIFICATION OF STATUS OF RADIOISOTOPE (BYPRODUCT MATERIAL) PROGRAM UNDER UNITED STATES ATOMIC ENERGY COMMISSION BYPRODUCT MATERIAL LICENSE

NUMBER _____

Licensee _____
(Institution, firm, hospital, person, etc.)

ADDRESS

DEPARTMENT(S)

INDIVIDUAL RADIOISOTOPE USER(S)

The licensee and any individual executing this certification on behalf of the licensee certify that (check appropriate item(s) below):

____ No byproduct materials have been procured and/or possessed by licensee.

All byproduct materials procured and/or possessed by licensee under Byproduct Material License No. _____ have:

____ (1) been transferred to _____
(Institution, firm, hospital, person, etc.)
which has Byproduct Material License No. _____.
(if known)

____ (2) been disposed of by decay.

____ (3) been disposed of in compliance with 10-CFR-20.

_____
Certifying Official

9004

_____
Date

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