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Title: REPORT ON ATOMIC ENERGY ACTIVITIES OF BUSHIPS (5/15/47)

LAS VEGAS Serial No: 109087

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Notes: RADIOLOGICAL WORK

109087

NAVY DEPARTMENT
BUREAU OF SHIPS
WASHINGTON, 25, D.C.

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Ser A3-47

15 May 1947

A eyJAD
X-000255
with Enclosure
A-G

From: The Secretary of the Navy.

Subj: Atomic Energy Activities of the Navy Department - Report on.

Ref: (a) SecNav. OP-36C ltr. Ser. 31P36 to all Bureaus and Offices of the Navy Dept. and the Comdt., U.S. Marine Corps. (n.r.)

Encl:
(A) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Radiological).
(B) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Power Production).
(C) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Instrument Development project, Westinghouse Electric Corporation, 1625 K Street, N.W., Washington, D. C.).
(D) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Instrument Development Project, Sylvania Electric Products Co., 70 Forsyth Street, Boston, Mass.)
(E) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Naval Research Laboratory Proble- [illegible]-08).
(F) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Navy Electronics Laboratory).
(G) ✓ Report on Atomic Energy Activities of the Bureau of Ships (Naval Research Laboratory - Heat Transfer).

1. Enclosures (A), (B), (C), (D), (E), (F), and (G) are forwarded herewith as requested by reference (a).

CLASSIFICATION CANCELLED *
BY AUTHORITY OF DOE/OC

Carl Ulsh 3/22/88
REVIEWED BY DATE

* Ltr DNA Varello To DOE, OC dated 6/16/87

/s/ C. D. WHEELOCK
Deputy and Assistant
Chief of Bureau

cc:
Military Liaison Committee
New War Building (2 copies with encls.)
CNO (OP-36) (1 copy with encls.)

X-000255 A
Copy 1 AD

Report on Atomic Energy Activities of
the Bureau of Ships (Radiological)

(1) Code Name of Project

Radiation Laboratory, San Francisco Naval Shipyard (Code 390)

(2) Official Sponsorship

(A) Navy Department, Bureau of Ships
Interested Agencies: BuAer, BuYard & Docks, BuMed.

(B) Not applicable.

(C) Capt. Logan McKee, Director of Design and Coordinator of Nuclear Matters, Bureau of Ships.

(3) Contractor or Working Agency

(A) Radiation Laboratory, San Francisco Naval Shipyard.

(B) None at present.

(C) Not applicable.

(D) Lt. Preston (OINC Radiation Laboratory)
Comdr. J. J. Fee will assume OINC duties about 5 May 1947.

(E) Lt. Comdr. Skow (M.C.) Mr. G. Brown
Lt. Preston
Lt. Morton (M.C.)
Dr. W. W. Hawes (Technical Director (acting))
Dr. Condit

All personnel are engaged at this Laboratory on a full time basis.

(4) Nature of Work

(A) The principal objectives of the Laboratory will be the research and studies of radiological contaminants and their removal as they apply to naval craft and the development of protective measures and equipment for shipboard use.
Develop test procedure for protective devices and equipment.
Develop specifications for evaluation and testing of protective equipment.

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end. (1)

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(B) The Bureau of Ships has been directed to:

(a) Develop instruments for the detection of radioactivity.
(b) Develop methods and equipment for the protection of personnel on shipboard.
(c) Develop methods and means for the decontamination of ships.

(1) The principal parts of the program will be the studies of the physical and chemical properties of the contaminants, their affinity for the exposed surfaces of present type naval craft, the development of suitable field type instruments for detection of radioactivity and the development of techniques and equipment for safely accomplishing decontamination as expeditiously as possible.

(2) The major technical problems confronting the Laboratory at present are:

(a) Assistance and field tests in the development of suitable instruments for the long range and directional indication of radioactivity.
(b) The rapid decontamination of naval craft both at sea and in naval shipyard.
(c) The development of adequate protective equipment for personnel, gas or dust masks, etc., procedures for decontamination of personnel.
(d) The studies leading to development (for naval craft) of exposed surface coatings impervious to radiological contamination.

(3) Approach to such problems that have already shown success are:

(a) The decontamination of salt water systems by the chemical cleaning processes as outlined in BuShips-BuMed letter of 22 November All/Crossroads C-S(99)-(0) and the sand-blasting of underwater bodies to reduce high levels of radioactivity has been successful on the non target vessels of JTF-1, all of which have been granted final radiological clearance.

(b) Studies are being made on the first of the Crossroads target ships to determine the degree and nature of contamination of the various surfaces and materials exposed on these vessels. The studies are designed to exhaust the target vessels of all factual data on radiological conditions which may be of significance. Complete radiation surveys of the target vessels will be made and representative surface samples will be collected for further study, these samples being taken at areas of varying radiation intensities. Experimental decontamination of limited topside areas will be conducted on the various types of surfaces exposed after suitable experimental techniques for the accomplishment of this have been developed in the Laboratory.

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(c) Continuation of (b).

(4) Bureau of Ships, Code 945, is at present contemplating negotiations with Westinghouse Electric Corporation and the Sylvania Electric Products Co., to provide research engineering development and design of instrumentation for the detection, measurement and location of nuclear radiation.

(5 & 6) The Laboratory has been established and engaged in hiring adequate personnel and procuring equipment to perform its mission. A definite program of employment has not yet been prepared but arrangements are in process for the return of various CROSSROADS ex-target vessels to naval shipyards to serve among other items as research subjects for further radioactivity investigation work coordinated by the Laboratory.

(5) Funds.

(a) Source

Installation of necessary equipment and facilities BuShips Project Order 595/46 Maintenance and Operation BuShips Project Order 286/47.

(b) P. O. 595/46 - $50,000
P. O. 286/47 - 25,000

Total $75,000

(c) No accounts of expenditures are available due to the recent establishment of the Laboratory, however the approximate funds expended December incident to the establishment of the Laboratory are estimated at $5000.00.

(d) None.

(e) No funds have been definitely appropriated to this project because of the impossibility of preparing reasonable estimates. Pay of employees will be covered by general Shore Facilities Budget and new projects undertaken will be allocated from Research Funds appropriated for BuShips use.

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Report on Atomic Energy Activities of the
Bureau of Ships (Power Production)

(1) Code Name of Project

General

(2) Official Sponsorship

(A) Bureau of Ships

(B) By letter to Manhattan District from Bureau of Ships.

(C) Captain Logan McKee, U.S.N.
Captain A. G. Mumma, U.S.N.

(3) Contractor or Working Agency

(A) General Electric Company

(B) None

(C) Mr. H. A. Winne, Vice President
Mr. C. W. La Pierre

(D) Captain Harry Burris, U.S.N.
A. E. C., Schenectady, N. Y.

(E) Names available through Captain Logan McKee, U.S.N.
Bureau of Ships.

(4) Nature of Work

(A) Ships propulsion

(B) (1)(a) Survey of information available through A.E.C. and other sources.
(b) Production of a design proposal based on the most promising possibilities.
(c) Construction.
(d) Tests
(2)(a) Shielding
(b) Control
(c) Fuel form
(d) Heat transfer
(3)(a) Accomplishments to date by A.E.C. on operation of heat producing piles and their control and shielding.
(b) Same as (b) (3) (a) above plus studies of liquid heat transfer metals as regards their physical, chemical and nuclear properties, and means

for containing and pumping them when radioactive.

(c) Construction and tests of a nuclear power plant in a naval vessel.

(4)(b)(4) Studies of Heat Transfer Metals

(b)(5) Preliminary studies incorporating the various pieces of equipment in a naval vessel.

(4)(b)(6a) NRL studies on heat transfer metals.

(6b) Report on conferences with General Electric Company dated 30 January 1947, by Captain H G Hickover.

(5) Funds

(A) A.E.C. (Manhattan District)
(B) Approximately $300,000 to date.
(C) Unknown
(D) Unknown
(E) $2,500,000

ENCLOSURE (B)

X-000255C
Copy 1 A

1. No Code Name

2. (A) Bureau of Ships

(B)

(C) Comdr. G. Hunter, USN, Bureau of Ships, Code 945.

3. (A) Westinghouse Electric Corp.

(B), (C), (D), (E). This is a contemplated project only; negotiations are now underway for a task type development contract but none has been let. If one is let the work will probably be done under the direction of Dr. J. A. Hutcheson at Westinghouse Research Laboratory, East Pittsburgh, Pa.

4. (A) Provide research, engineering, development and design services, materials and models as required by the assignment of specific BuShips problems in the field of instrumentation for the detection, measurement and location of nuclear radiation. This is expected to be a continuing development program under which the first task will be the development of a system for fixed or mobile installation (primarily for shipboard) which will comprise a multiplicity of radiation monitoring instruments of very wide intensity range with remote indication at one or more central stations. Other tasks may later include design of specific radiation instruments

(B)

(1) Not yet begun.

(2) The detection and measurement of radioactivity in widely varying degrees of intensity, on ship or shore, incident to the use of atomic weapons, and the remote indication of the existence and extent of such radioactivity.

(3)

(a) Not yet begun.
(b) Not yet begun.
(c) To be developed by contractor.

(4) None

(5) Not yet begun.

(6) None

ENCLOSURE (C)

encl. (3)
7

[redacted]

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5. (A) Maintenance, Bureau of Ships.

(B) None specifically for it.

(C) None

(B) None

(E) None

ENCLOSURE (C)

4

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2. No code name.

3. (A) Bureau of Ships

(B)

(C) Comdr. G. Hunter, Bureau of Ships, Code 945.

3. (A) Sylvania Electric Products Co.

(B) None.

(C),(D) (E). This is a contemplated project only; negotiations are now underway for a task type development contract but none has yet been let.

4. (A) Provide research, engineering, development and design services, materials and models as required by the assignment of specific BuShips problems in the field of instrumentation for the detection, measurement and location of nuclear radiation. This is expected to be a continuing development program under which the individual tasks will require the development of improved Geiger tubes, proportional counters, or similar detecting elements, having improved characteristics, longer life, interchangeability, rugged structure and adaptibility to mass production techniques. Other tasks may later include design of specific radiation instruments.

(B)(1) Not yet begun.
(2) Present Geiger tubes and proportional counters are essentially a familiar laboratory tool unsuited to large-scale use in the naval service, not adapted to mass production and, while relatively short-lived, not well suited to replacement by spares when a tube in use fails.

(3) (a) Not yet begun.
(b) Not yet begun.
(c) To be developed by contractor.

(4) None.
(5) Not yet begun.
(6) None.

5. (A) Maintenance, Bureau of Ships.
(B) None specifically for it.
(C) None.
(D) None.
(E) None.

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encl. (4)

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1. NRL Problem No. N02-08.

2. (A) Bureau of Ships.

(B)

(C) Comdr. G. Hunter, USN, Bureau of Ships, Code 945.

3. (A) Naval Research Laboratory.

(B)

(C) Dr. H. Friedman.

(D) Dr. H. Friedman.

(E)

4. (A) Improvement of present detecting devices and development of new devices, circuits and techniques for the detection, measurement and identification of nuclear radiation for incorporation in standard radiation instruments for naval applications. Such instruments will be for the protection of naval personnel against harmful radiations.

(B) Improvement of Geiger tubes to give higher efficiency, stability of operation, greater length of life, ready interchangeability and to enable them to meet service operating conditions is directed towards improvement of instruments for naval use. Investigations will be made of possible n methods of detecting radiation with the hope of discovering new devices lacking the many disadvantages for military applications of the present Geiger tube, ionization chamber, etc. Development of certain electronic circuits such as the required high-voltage supply for portable Geiger tube instruments is intended to improve military instruments of this type The Laboratory further acts as special technical consultant to Bureau of Ships engineering personnel responsible for the design of naval radiological safety instruments.

(2) Indicated by (1) above.

(3) (A)
(B) Study of optimum gas filling for Geiger tubes to meet service conditions. Study of several methods of obtaining high voltage in portable instruments with minimum size and weight.
(C) Study of detecting elements of new and untried types.

ENCLOSURE (E) * Ltr. DNA Varallo To DOE, OC dated 6/16/87 encl. (5)

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5. This problem had largely gotten underway by 31 December 1946 although the Naval Research Laboratory already possessed several years' experience in laboratory work with radiation detection instruments and particularly with Geiger tubes of various types.

(6) None
(5) (A) Maintenance, Bureau of Ships.

(B) None specifically for this project.

(C) Actual figures not available; estimate $6,000.

(D) Estimated only, $2,000.

(E) Not specifically budgeted for.

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1. No Code name.

2. (A) Bureau of Ships.
(B) Comdr. G. Hunter, USN, Bureau of Ships, Code 946.

3. (A) Navy Electronics Laboratory, San Diego, Cal.
(B) None.
(C), (D), (E). This is a contemplated project only; steps are now underway to set it up but it has not been accepted officially by the Laboratory and work has not yet begun.

4. (A) Investigation of phenomena affecting design and operation of equipment, systems and accessories for the detection, measurement and location of sources of nuclear radiation looking in particular to the adaptation and design of survey instruments for monitoring radioactivity in liquids, both unconfined and confined in pipes or other containers. This work is to be directed toward the development for naval use of such devices as underwater probes, water samplers and devices to monitor liquids contained within a ship's piping and machinery.

(B) (1) Parts of progras have not yet been developed, other than planned preliminary study of the general field by laboratory personnel.
(2) Detection and measurement of radioactive contamination on ships' underwater bodies, in sea water, on harbor or other bottoms, in salt water piping, condensers, evaporators, fresh water systems, etc., including continuous monitoring and special survey.
(3) (A), (B), (C) Work not yet begun.
(4)
(5) Not begun
(6) None

5. (A) Maintenance, Bureau of Ships (from funds provided for the support of all work at this laboratory.
(B) None specifically.
(C) None.
(D) None.
(E) None specifically.

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encl (6)

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1. Minnie

2. a. Bureau of Ships.

   b. Not applicable.

   c. Capt. A. C. Mumma, USN, Code 401, or Comdr. W. W. Brown, USN, Code 432.

3. a. Naval Research Laboratory, prime project holder.

   b. Mine Safety Appliance Company, subcontractor for handling and storage.

   c. Capt. J. B. Cochran, USN, at Naval Research Laboratory.

   d. Capt. J. B. Cochran, USN, at Naval Research Laboratory.

   e. Dr. Jackson, Mine Safety Appliance Company, is proper contact man for subcontractor.

4. a. Obtain physical and chemical data on which to base application of low-melting alloy of sodium and potassium to high-temperature level high capacity heat transfer systems.

   b. (1) Program:

      A. Develop methods of handling and shipping.

      B. Determine physical properties for heat transfer design calculations.

      C. Heat transfer research work.

   (2) Problems

Program directed towards design of heat transfer equipment of improved size and possibilities of arrangement so as to be incorporated into compact ship propulsion machinery arrangements. Such equipment to operate at temperatures in excess of 1000°F without necessity for high pressures of the heat transfer medium. Technical problems are as in 4b(1) above.

   (3) Approach

The avenue of approach now used and planned for future work is the modification, development, and employment of general laboratory methods for determining the physical, chemical, and heat transfer characteristics of materials. Modifications and development necessitated by the highly reactive nature of K_2a compounds and the high experimental temperatures. Development of techniques also necessary. The subcontract covers methods of handling the material on large scale.

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(4) None

(5) Partial determination of physical and chemical properties as of 21 December 1946. Estimated completion, June 1948.

(6) Bibliography

I. Report on Vapor-Liquid Equilibria for Mixtures of Alkali Metals (Sodium Potassium)

NDRC - Division B for Naval Research Laboratory
Report P-2958 10 April 1941

II. Preliminary Report on Viscosity Determination on a Potassium - Sodium Alloy

Naval Research Laboratory Report
P-2931 14 August 1946

III. Quarterly Progress Report on the Measurement of the Physical and Chemical Properties of the Sodium-Potassium Alloy, No. 1

Naval Research Laboratory Report
P-3010 30 September 1946

IV. Quarterly Progress Report on the Measurement of the Physical and Chemical Properties of the Sodium-Potassium Alloy, No. 2

Naval Research Laboratory Report
P-3057 January 1947

V. Third quarterly report now in preparation.

5. Funds

a. Appropriation MBS 1946, project order 990/46.

b. Total appropriated $300,000

c. No record

d. No record

e. Included in (b) above.

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