

117TH CONGRESS
1ST SESSION

S. 1065

To increase collaboration between offices within the Department of Energy to develop and deploy technology to assist the mission of the Office of Environmental Management.

IN THE SENATE OF THE UNITED STATES

MARCH 25, 2021

Mrs. MURRAY (for herself and Mr. MANCHIN) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To increase collaboration between offices within the Department of Energy to develop and deploy technology to assist the mission of the Office of Environmental Management.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Environmental Man-
5 agement Liability Reduction and Technology Development
6 Act of 2021”.

7 **SEC. 2. PURPOSE.**

8 The purpose of this Act is to establish programs—

1 (1) to develop and deploy technologies in a
2 timely manner to better fulfill the mission of the Of-
3 fice of Environmental Management of the Depart-
4 ment of Energy;

5 (2) to coordinate available technologies with re-
6 mediation projects to enable the start, and cost-effi-
7 cient and economical completion, of remediation
8 projects;

9 (3) to establish a consistent process for tech-
10 nology development to achieve long-term solutions
11 rather than developing technologies to address 1
12 phase of a project at a time, which potentially in-
13 creases the long-term cleanup costs;

14 (4) to reduce aggregate cost, better protect
15 workers, and complete the mission more effectively
16 and safely; and

17 (5) to develop new technology and to train a
18 skilled workforce to enable the Secretary of Energy
19 to address the significant challenges the Department
20 faces.

21 **SEC. 3. DEFINITIONS.**

22 In this Act:

23 (1) **COMPLEX.**—The term “complex” means all
24 sites managed in whole or in part by the Office.

1 (2) DEPARTMENT.—The term “Department”
2 means the Department of Energy.

3 (3) INSTITUTION OF HIGHER EDUCATION.—The
4 term “institution of higher education” has the
5 meaning given the term in section 101(a) of the
6 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

7 (4) MISSION.—The term “mission” means the
8 mission of the Office.

9 (5) NATIONAL LABORATORY.—The term “Na-
10 tional Laboratory” has the meaning given the term
11 in section 2 of the Energy Policy Act of 2005 (42
12 U.S.C. 15801).

13 (6) OFFICE.—The term “Office” means the Of-
14 fice of Environmental Management of the Depart-
15 ment.

16 (7) SECRETARY.—The term “Secretary” means
17 the Secretary of Energy, acting through the Assist-
18 ant Secretary for Environmental Management.

19 (8) SMALL BUSINESS CONCERN.—The term
20 “small business concern” has the meaning given the
21 term in section 3 of the Small Business Act (15
22 U.S.C. 632).

23 **SEC. 4. INDEPENDENT ASSESSMENT AND MANAGEMENT.**

24 (a) INDEPENDENT ASSESSMENT.—

1 (1) IN GENERAL.—The Secretary shall obtain
2 from the Corps of Engineers an independent assess-
3 ment of the lifecycle costs and schedules of the
4 cleanup programs of the Office.

5 (2) FOCUS OF ASSESSMENT.—The assessment
6 under paragraph (1) shall be focused on identifying
7 key remaining technical risks and uncertainties of
8 the cleanup programs.

9 (3) USE OF ASSESSMENT.—The Office shall use
10 the assessment under paragraph (1)—

11 (A) to reevaluate the major cleanup chal-
12 lenges faced by the Office, including the
13 timeline and costs associated with addressing
14 those challenges with existing science and tech-
15 nology investments;

16 (B) to make any adjustments to the
17 science and technology development program of
18 the Office that are necessary to address those
19 major cleanup challenges;

20 (C) to evaluate potential savings from the
21 development of new technologies over the life of
22 the cleanup programs of the Office; and

23 (D) to provide recommendations to Con-
24 gress with respect to the annual funding levels
25 for the Incremental Technology Development

1 Program established under section 5(a), the
2 High-Impact Technology Development Program
3 established under section 6(a), and the Funda-
4 mental Research Program established under
5 section 7(a) that will ensure maximum cost-sav-
6 ings over the life of the cleanup programs of
7 the Office.

8 (4) NO EFFECT ON PROGRAM IMPLEMENTA-
9 TION.—Nothing in this subsection affects the estab-
10 lishment, implementation, or carrying out of any
11 project or program under any other provision of law,
12 including this Act, during the time period in which
13 the assessment under paragraph (1) is carried out.

14 (b) MANAGEMENT PROCESS.—The Secretary shall
15 design and implement a science and technology manage-
16 ment process for identifying, prioritizing, selecting, devel-
17 oping, and deploying the new knowledge and technologies
18 needed to address the cleanup challenges faced by the Of-
19 fice, including the technical risks and uncertainties identi-
20 fied by the assessment under subsection (a).

21 (c) PEER REVIEW.—The Secretary shall use inde-
22 pendent peer review to evaluate—

23 (1) the science and technology management
24 process designed under subsection (b) before that
25 process is implemented;

1 (2) any science and technology projects before
2 those projects are funded; and

3 (3) the overall effectiveness and impact of the
4 science and technology efforts of the Office.

5 **SEC. 5. INCREMENTAL TECHNOLOGY DEVELOPMENT PRO-**
6 **GRAM.**

7 (a) ESTABLISHMENT.—The Secretary shall establish
8 a program, to be known as the “Incremental Technology
9 Development Program” (referred to in this section as the
10 “program”), to improve the efficiency and effectiveness of
11 the cleanup processes of the Office.

12 (b) FOCUS.—

13 (1) IN GENERAL.—The program shall focus on
14 the continuous improvement of new or available
15 technologies for—

16 (A) decontamination chemicals and tech-
17 niques;

18 (B) remote sensing and wireless commu-
19 nication to reduce manpower and laboratory ef-
20 forts;

21 (C) detection, assay, and certification in-
22 strumentation;

23 (D) packaging materials, methods, and
24 shipping systems; and

1 (E) improving the overall efficiency and ef-
2 fectiveness of the Office.

3 (2) OTHER AREAS.—The program may include
4 mission-relevant development, demonstration, and
5 deployment activities unrelated to the focus areas
6 described in paragraph (1).

7 (c) USE OF NEW AND EMERGING TECHNOLOGIES.—

8 (1) IN GENERAL.—In carrying out the program,
9 the Secretary shall ensure that site offices of the Of-
10 fice conduct technology development and demonstra-
11 tion of new and emerging technologies to establish a
12 sound technical basis for the selection of tech-
13 nologies for cleanup or infrastructure operations.

14 (2) COLLABORATION REQUIRED.—The Sec-
15 retary shall collaborate with the heads of other Fed-
16 eral agencies, the National Laboratories, other Fed-
17 eral laboratories, appropriate State regulators and
18 agencies, and the Department of Labor in the devel-
19 opment, demonstration, and deployment of new tech-
20 nologies under the program.

21 (d) GRANT PROGRAM.—

22 (1) IN GENERAL.—In carrying out the program,
23 the Secretary may provide to eligible entities grants
24 for technology development, demonstration, and de-

1 ployment projects to improve technologies in accord-
2 ance with subsection (b).

3 (2) ELIGIBLE ENTITIES.—Entities eligible to
4 receive a grant under the program include—

5 (A) the National Laboratories;

6 (B) other Federal laboratories;

7 (C) institutions of higher education;

8 (D) contractors; and

9 (E) small business concerns.

10 (3) SELECTION.—The Secretary shall select eli-
11 gible entities for grants under the program through
12 a rigorous process that involves—

13 (A) transparent and open competition; and

14 (B) an independent peer review process de-
15 scribed in paragraph (4).

16 (4) PEER REVIEW PROCESS.—

17 (A) IN GENERAL.—Each technology devel-
18 opment, demonstration, and deployment project
19 of an eligible entity under consideration for a
20 grant under the program shall undergo an inde-
21 pendent peer review process by a panel of not
22 fewer than 3 peer reviewers selected in accord-
23 ance with subparagraph (C), who shall evaluate
24 the project in accordance with the criteria de-

scribed in subparagraph (B), with the goal of maximizing—

- (i) returns on the research and development expenditures of the Office; and
- (ii) the return on investment of grant funds awarded under the program.

(B) CRITERIA.—The general criteria for peer review under subparagraph (A) shall include, with respect to each project, including any technology to be developed, demonstrated, or deployed by the project, an evaluation of—

- (i) mission relevancy;
- (ii) scientific and technical validity;
- (iii) ability to meet an existing mission void;
- (iv) superiority to alternatives;
- (v) cost effectiveness;
- (vi) ability to reduce risk;
- (vii) regulatory acceptance;
- (viii) public acceptance; and
- (ix) likelihood of implementation.

(C) PEER REVIEWERS.—

- (i) IN GENERAL.—A peer reviewer for a project under subparagraph (A) shall be selected—

1 (I) through a systematic ap-
2 proach to accessing peer reviewer in-
3 formation that ensures the appro-
4 priate range of expertise for the peer
5 review panel; and

6 (II) from among—

7 (aa) contractors;

8 (bb) the National Labora-
9 tories;

10 (cc) other Federal Labora-
11 tories;

12 (dd) institutions of higher
13 education; and

14 (ee) members of relevant
15 professional societies.

16 (ii) MINIMIZATION OF DOE PARTICIPA-
17 TION.—To the maximum extent prac-
18 ticable, the peer reviewer selection process
19 under clause (i) shall minimize the partici-
20 pation of staff of the Department as peer
21 reviewers.

22 (iii) MINIMIZATION OF CONFLICTS OF
23 INTEREST.—A peer reviewer selected under
24 clause (i) to review the project may not be

1 affiliated with the eligible entity or the
2 project being reviewed.

3 (D) REVIEW PROCESS.—Each panel of
4 peer reviewers shall review the project—

5 (i) using a process of regular review
6 and staged decision making that is com-
7 parable to other peer review programs; and

8 (ii) with rigorous attention to—

9 (I) the collection of activity; and

10 (II) the achievement of perform-
11 ance metrics.

12 (5) COST-SHARING.—The Federal share of the
13 costs of the development, demonstration, and deploy-
14 ment of new technologies carried out using a grant
15 under this subsection shall be not more than 70 per-
16 cent.

17 (e) FUNDING.—There is authorized to be appro-
18 priated to carry out the program—

19 (1) \$30,000,000 for each of fiscal years 2022
20 through 2024; and

21 (2) \$50,000,000 for fiscal year 2025 and each
22 fiscal year thereafter.

1 **SEC. 6. HIGH-IMPACT TECHNOLOGY DEVELOPMENT PRO-**
2 **GRAM.**

3 (a) ESTABLISHMENT.—The Secretary shall establish
4 a program, to be known as the “High-Impact Technology
5 Development Program” (referred to in this section as the
6 “program”), under which the Secretary shall make grants
7 to eligible entities for projects that pursue technologies
8 that, with respect to the mission—

9 (1) holistically address difficult challenges;

10 (2) hold the promise of breakthrough improve-
11 ments; or

12 (3) align existing or in-use technologies with
13 difficult challenges.

14 (b) WORKSHOP.—The Secretary shall commence the
15 program with a workshop to identify, with respect to the
16 technologies developed pursuant to the program—

17 (1) the challenges that need to be addressed;

18 and

19 (2) how—

20 (A) to maximize the impact of existing re-
21 sources of the Office; and

22 (B) to ensure that the technology develop-
23 ment targets challenges across the complex.

24 (c) AREAS OF FOCUS.—Areas of focus of a project
25 receiving a grant under this section may include—

1 (1) developing and demonstrating improved
2 methods for source and plume characterization and
3 monitoring, with an emphasis on—

4 (A) real-time field acquisition; and

5 (B) the use of indicator species analyses
6 with advanced contaminant transport models to
7 enable better understanding of contaminant mi-
8 gration;

9 (2) developing and determining the limits of
10 performance for remediation technologies and inte-
11 grated remedial systems that prevent migration of
12 contaminants, including by producing associated
13 guidance and design manuals for technologies that
14 could be widely used across the complex;

15 (3) demonstrating advanced monitoring ap-
16 proaches that use multiple lines of evidence for mon-
17 itoring long-term performance of—

18 (A) remediation systems; and

19 (B) noninvasive near-field monitoring tech-
20 niques;

21 (4) developing and demonstrating methods to
22 characterize the physical and chemical attributes of
23 waste that control behavior, with an emphasis on—

24 (A) rapid and nondestructive examination
25 and assay techniques; and

1 (B) methods to determine radio-nuclide,
2 heavy metals, and organic constituents;

3 (5) demonstrating the technical basis for deter-
4 mining when enhanced or natural attenuation is an
5 appropriate approach for remediation of complex
6 sites;

7 (6) developing and demonstrating innovative
8 methods to achieve real-time and, if practicable, in
9 situ characterization data for tank waste and proc-
10 ess streams that could be useful for all phases of the
11 waste management program, including improving
12 characterization of residual waste in tanks;

13 (7) adapting existing treatment technologies or
14 demonstrating new treatment technologies at the
15 pilot plant scale using real wastes or realistic surro-
16 gates—

17 (A) to address engineering adaptations;
18 and

19 (B) to enable successful deployment at full-
20 scale and in support of operations;

21 (8) developing and demonstrating rapid testing
22 protocols that—

23 (A) are accepted by the Environmental
24 Protection Agency, the Nuclear Regulatory

1 Commission, the Department, and the scientific
2 community;

3 (B) can be used to measure long-term
4 waste form performance under realistic disposal
5 environments;

6 (C) can determine whether a stabilized
7 waste is suitable for disposal; and

8 (D) reduce the need for extensive, time-
9 consuming, and costly analyses on every batch
10 of waste prior to disposal;

11 (9) developing and demonstrating direct sta-
12 bilization technologies to provide waste forms for
13 disposing of elemental mercury; and

14 (10) developing and demonstrating innovative
15 and effective retrieval methods for removal of resid-
16 ual materials from tanks and connecting pipelines.

17 (d) PROJECT SELECTION.—

18 (1) ELIGIBLE ENTITIES.—Entities eligible to
19 receive a grant under the program include—

20 (A) the National Laboratories;

21 (B) other Federal laboratories;

22 (C) institutions of higher education;

23 (D) contractors; and

24 (E) small business concerns.

1 (2) SELECTION.—The Secretary shall select eli-
2 gible entities for grants under the program through
3 a rigorous process that involves—

4 (A) transparent and open competition; and

5 (B) an independent peer review process de-
6 scribed in paragraph (3).

7 (3) PEER REVIEW PROCESS.—

8 (A) IN GENERAL.—Each project of an eli-
9 gible entity under consideration for a grant
10 under the program shall undergo an inde-
11 pendent peer review process by a panel of not
12 fewer than 3 peer reviewers selected in accord-
13 ance with subparagraph (B).

14 (B) PEER REVIEWERS.—

15 (i) IN GENERAL.—A peer reviewer for
16 a project under subparagraph (A) shall be
17 selected—

18 (I) through a systematic ap-
19 proach to accessing peer reviewer in-
20 formation that ensures the appro-
21 priate range of expertise for the peer
22 review panel; and

23 (II) from—

24 (aa) a relevant database,
25 such as a database of chemical

engineers, geologists, physicists,
materials scientists, or biologists;
or

(bb) among members of relevant professional societies.

(ii) MINIMIZATION OF DOE PARTICIPATION.—To the maximum extent practicable, the peer reviewer selection process under clause (i) shall minimize the participation of staff of the Department as peer reviewers.

(iii) MINIMIZATION OF CONFLICTS OF INTEREST.—A peer reviewer selected under clause (i) to review the project may not be affiliated with the eligible entity or the project being reviewed.

(C) REVIEW PROCESS.—Each panel of peer reviewers shall review the project—

(i) using a process of regular review and staged decision making that is comparable to other peer review programs; and

(ii) with rigorous attention to—

(I) the collection of activity; and

(II) the achievement of performance metrics.

1 (e) FUNDING.—There is authorized to be appro-
 2 priated to carry out the program \$150,000,000 for fiscal
 3 year 2022 and each fiscal year thereafter.

4 **SEC. 7. FUNDAMENTAL RESEARCH PROGRAM.**

5 (a) ESTABLISHMENT.—The Director of the Office of
 6 Science (referred to in this section as the “Director”) shall
 7 establish a program, to be known as the “Fundamental
 8 Research Program” (referred to in this section as the
 9 “program”), under which the Director shall make grants
 10 to eligible entities for projects focused on developing new
 11 knowledge and capabilities that are associated with the
 12 challenges of the mission.

13 (b) ADMINISTRATION.—The Director shall—

14 (1) manage the program in close coordination
 15 with the Assistant Secretary of Energy for Environ-
 16 mental Management;

17 (2) specifically tailor the program to the mis-
 18 sion; and

19 (3) align the program with long-term, 5- to 10-
 20 year site milestones agreed to by Federal regulators
 21 and the States, so that the science developed pursu-
 22 ant to the program can—

23 (A) progress effectively; and

1 (B) provide the understanding necessary to
2 develop solutions that align with the site
3 timelines.

4 (c) AREAS OF FOCUS.—Areas of focus of a project
5 receiving a grant under this section may include research
6 on—

7 (1) the atomic- and molecular-scale chemistries
8 of waste processing;

9 (2) contaminant immobilization in engineered
10 and natural systems;

11 (3) developing innovative materials, with an em-
12 phasis on nanomaterials or biomaterials, that could
13 enable sequestration of challenging hazardous or ra-
14 dioactive constituents such as technetium and iodine;

15 (4) elucidating and exploiting complex specia-
16 tion and reactivity far from equilibrium;

17 (5) understanding and controlling chemical and
18 physical processes at interfaces;

19 (6) harnessing physical and chemical processes
20 to revolutionize separations;

21 (7) tailoring waste forms for contaminants in
22 harsh chemical environments; or

23 (8) predicting and understanding subsurface
24 system behavior and response to perturbations.

25 (d) PROGRAM REQUIREMENTS.—

1 (1) ELIGIBLE ENTITIES.—Entities eligible to
2 receive a grant under the program include—

- 3 (A) the National Laboratories;
4 (B) other Federal laboratories;
5 (C) institutions of higher education;
6 (D) contractors; and
7 (E) small business concerns.

8 (2) SELECTION.—The Secretary shall select eli-
9 gible entities for grants under the program through
10 a rigorous process that involves—

- 11 (A) transparent and open competition; and
12 (B) an independent peer review process de-
13 scribed in paragraph (3).

14 (3) PEER REVIEW PROCESS.—

15 (A) IN GENERAL.—Each project of an eli-
16 gible entity under consideration for a grant
17 under the program shall undergo an inde-
18 pendent peer review process by a panel of not
19 fewer than 3 peer reviewers selected in accord-
20 ance with subparagraph (B).

21 (B) PEER REVIEWERS.—

22 (i) IN GENERAL.—A peer reviewer for
23 a project under subparagraph (A) shall be
24 selected—

1 (I) through a systematic ap-
2 proach to accessing peer reviewer in-
3 formation that ensures the appro-
4 priate range of expertise for the peer
5 review panel; and

6 (II) from—

7 (aa) a relevant database,
8 such as a database of chemical
9 engineers, geologists, physicists,
10 materials scientists, or biologists;
11 or

12 (bb) among members of rel-
13 evant professional societies.

14 (ii) MINIMIZATION OF DOE PARTICIPA-
15 TION.—To the maximum extent prac-
16 ticable, the peer reviewer selection process
17 under clause (i) shall minimize the partici-
18 pation of staff of the Department as peer
19 reviewers.

20 (iii) MINIMIZATION OF CONFLICTS OF
21 INTEREST.—A peer reviewer selected under
22 clause (i) to review the project may not be
23 affiliated with the eligible entity or the
24 project being reviewed.

1 (C) REVIEW PROCESS.—Each panel of
 2 peer reviewers shall review the project—

3 (i) using a process of regular review
 4 and staged decision making that is com-
 5 parable to other peer review programs; and

6 (ii) with rigorous attention to—

7 (I) the collection of activity; and

8 (II) the achievement of perform-
 9 ance metrics.

10 (e) FUNDING.—There is authorized to be appro-
 11 priated to carry out the program \$30,000,000 for fiscal
 12 year 2022 and each fiscal year thereafter.

13 **SEC. 8. ENVIRONMENTAL MANAGEMENT UNIVERSITY PRO-**
 14 **GRAM.**

15 (a) ESTABLISHMENT.—The Secretary shall establish
 16 a program, to be known as the “Environmental Manage-
 17 ment University Program” (referred to in this section as
 18 the “program”)—

19 (1) to engage faculty, post-doctoral fellows or
 20 researchers, and graduate students of institutions of
 21 higher education on subjects relating to the mission
 22 to show a clear path for students for employment
 23 with the Department;

24 (2) to provide to institutions of higher edu-
 25 cation—

1 (A) a source of new ideas; and

2 (B) access to advances in engineering and
3 science;

4 (3) to clearly identify to institutions of higher
5 education the tools necessary to enter into the envi-
6 ronmental management field professionally; and

7 (4) to encourage current employees of the De-
8 partment to pursue advanced degrees.

9 (b) AREAS OF FOCUS.—Areas of focus of a project
10 receiving a grant under this section may include—

11 (1) the atomic- and molecular-scale chemistries
12 of waste processing;

13 (2) contaminant immobilization in engineered
14 and natural systems;

15 (3) developing innovative materials, with an em-
16 phasis on nanomaterials or biomaterials, that could
17 enable sequestration of challenging hazardous or ra-
18 dioactive constituents such as technetium and iodine;

19 (4) elucidating and exploiting complex specia-
20 tion and reactivity far from equilibrium;

21 (5) understanding and controlling chemical and
22 physical processes at interfaces;

23 (6) harnessing physical and chemical processes
24 to revolutionize separations;

1 (7) tailoring waste forms for contaminants in
2 harsh chemical environments; or

3 (8) predicting and understanding subsurface
4 system behavior and response to perturbations.

5 (c) INDIVIDUAL RESEARCH GRANTS.—In carrying
6 out the program, the Secretary may make individual re-
7 search grants, in the amount of not less than \$150,000
8 but not more than \$300,000 per year, to faculty, post-
9 doctoral fellows or researchers, and graduate students of
10 institutions of higher education for 3-year research
11 projects, with an option for an extension of 1 additional
12 period of 2 years.

13 (d) GRANTS FOR INTERDISCIPLINARY COLLABORA-
14 TIONS.—In carrying out the program, the Secretary may
15 make research grants, in the amount of not more than
16 \$400,000 per year for each grant, for strategic partner-
17 ships among scientists, faculty, post-doctoral fellows or re-
18 searchers, and graduate students of institutions of higher
19 education for 3-year research projects.

20 (e) HIRING OF UNDERGRADUATES.—In carrying out
21 the program, the Secretary may establish a summer in-
22 ternship program for undergraduates of institutions of
23 higher education to work on projects relating to environ-
24 mental management.

1 (f) WORKSHOPS.—In carrying out the program, the
2 Secretary may hold workshops with the Office of Environ-
3 mental Management, the Office of Science, and members
4 of academia and industry concerning environmental man-
5 agement challenges and solutions.

6 (g) FUNDING.—There is authorized to be appro-
7 priated to carry out the program \$7,000,000 for fiscal
8 year 2022 and each fiscal year thereafter.

○