

## U. S. DEPARTMENT OF ENERGY, OFFICE OF SCIENCE

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)  
ENVIRONMENTAL EVALUATION NOTIFICATION

**To be completed by "Applicant," i.e., organization with responsibilities for a "Federal action" involving application to DOE for a permit, license, exemption or allocation, or other similar actions. For assistance, refer to "Instructions for Preparing Environmental Evaluation Notification."**

Solicitation/Award No. (if applicable): DE-FC02-04ER54698

Organization Name: General Atomics

Proposed Action Title: DIII-D National Fusion Program Research and Facility Operations and Advanced Fusion Technology Research and Development

Total DOE Funding/Total Funding: \$475,287,677.89 Proposed

I. Project Description: **(Use explanation pages if additional space is required)**

A. Proposed Project/Action (if applicable, delineate Federally funded/Non-Federally funded portions)

This proposal is for a 5-year extension (2024-2029) to the Cooperative Agreement DE-FC02-04ER54698 "DIII-D National Fusion Program Research and Facility Operations and Advanced Fusion Technology Research and Development". The proposal includes General Atomics' role as host to the DIII-D National Fusion Program, safe and reliable operation of the DIII-D National Fusion Facility for fusion science research, facility enhancements, Advanced Fusion Technology research and development, and management of the U.S. Burning Plasma Organization. The DIII-D 5-year Program Plan was developed by the DIII-D International Team, consisting of over 600 scientific and technical staff from over 100 institutions worldwide that carry out research at the DIII-D Fusion Facility.

B. Would the project proceed without Federal funding?

Yes  No

**If "yes," use explanation page.**

II. Description of Affected Environment: **(Use explanation pages if additional space is required)**

The research conducted as part of this proposal will be carried out in an existing dedicated building on the General Atomics Torrey Pines campus in San Diego, California. Approximately 130 staff supporting operation of the DIII-D facility work in, or in close proximity to this building. DIII-D operations and scientific research will be conducted in a similar manner to the last five year period of performance and involves fusion research on an existing experiment not using tritium as fuel. As a private company operating in San Diego, GA conducts all activities in accordance with all city, State and Federal laws and regulations.

III. Preliminary Questions:

- |   | Yes                      | No                                  |
|---|--------------------------|-------------------------------------|
| A. <u>Is the DOE-funded work routinely administrative or <i>entirely</i> advisory or a “paper study?”</u> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

***If “Yes”, ensure that the description in Section I reflects this and go directly to Section V.***

- B. Is there any potential whatsoever for: (*Provide an explanation for each “Yes” response*)

- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| 1. Work to be performed outdoors?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 2. Major modification of a building facade or interior?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Threat of violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health?        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Siting, construction or major expansion of waste treatment, storage, or disposal facilities?                                | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Disturbance to hazardous substances, pollutants, or contaminants preexisting in the environment?                            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 6. The presence of any environmentally-sensitive resources?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Any potential whatsoever for high consequence impacts to human health or the environment?                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8. The work being connected to another existing/proposed activity that could potentially create a significant impact?          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Nearby past, present, and/or reasonably foreseeable future actions such that collectively significant impacts could result? | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10. Scientific or public controversy, uncertainty over potential impacts, or conflicts regarding resource usage?               | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

***If “No” to ALL Section III.B. questions, go directly to Section V.***

IV. Potential Environmental Effects: (*Provide an explanation for each “Yes” response*)

- A. Environmentally Sensitive Resources: Could the proposed action potentially result in changes and/or disturbances to any of the following resources?

- |  | Yes                                 | No                                  |
|--|-------------------------------------|-------------------------------------|
| 1. Threatened/Endangered Species and/or Critical Habitats                          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 2. Other Protected Species (e.g., Burros, Migratory Birds, Pollinators)            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Tundra, Coral Reefs, or Rain Forests  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Cultural or Historic Resources  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Important Farmland  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 6. Non-Attainment Areas for Ambient Air Quality Standards                          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Class I Air Quality Control Region  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8. Special Sources of Groundwater (e.g. Sole Source Aquifer)                       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Navigable Air Space   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10. Coastal Zones  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 11. Areas with Special National Designation (e.g. National Forests, Parks, Trails) | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 12. Floodplains and/or Wetlands  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

- B. Regulated Substances/Activities: Would the proposed action involve any of the following regulated items or activities?

- |  |                          |                                     |
|--|--------------------------|-------------------------------------|
| 13. Natural Resource Damage Assessments  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 14. Invasive Species or Exotic Organisms   | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 15. Noxious Weeds  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 16. Clearing or Excavation greater than one acre or Removal of Trees Governed by Local Requirement | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 17. Dredge or Fill (under Clean Water Act, Section 404, greater than one acre)                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

B. Regulated Substances/Activities: Would the proposed action involve any of the following regulated Items or activities? (continued)

	Yes	No
18. Noise (in excess of regulations)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
19. Asbestos Removal	<input type="checkbox"/>	<input checked="" type="checkbox"/>
20. Polychlorinated biphenyls (PCBs)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
21. Import, Manufacture, or Processing of Toxic Substances	<input type="checkbox"/>	<input checked="" type="checkbox"/>
22. Chemical Storage/Use	<input checked="" type="checkbox"/>	<input type="checkbox"/>
23. Pesticide Use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
24. Hazardous, Toxic, or Criteria Pollutant Air Emissions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
25. Liquid Effluents	<input type="checkbox"/>	<input checked="" type="checkbox"/>
26. Spill Prevention/Surface Water Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>
27. Underground Injection	<input type="checkbox"/>	<input checked="" type="checkbox"/>
28. Hazardous Waste	<input checked="" type="checkbox"/>	<input type="checkbox"/>
29. Underground Storage Tanks	<input type="checkbox"/>	<input checked="" type="checkbox"/>
30. Radioactive or Radioactive Mixed Waste	<input checked="" type="checkbox"/>	<input type="checkbox"/>
31. Radiation Exposure	<input checked="" type="checkbox"/>	<input type="checkbox"/>
32. Nanoscale Materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33. Genetically Engineered Microorganisms/Plants or Synthetic Biology	<input type="checkbox"/>	<input checked="" type="checkbox"/>
34. Ozone Depleting Substances	<input checked="" type="checkbox"/>	<input type="checkbox"/>
35. Greenhouse Gas Generation/Sustainability	<input type="checkbox"/>	<input checked="" type="checkbox"/>
36. Off-Road Vehicles	<input type="checkbox"/>	<input checked="" type="checkbox"/>
37. Biosafety Level 3-4 Laboratory	<input type="checkbox"/>	<input checked="" type="checkbox"/>
38. Research on Human Subjects or other Vertebrate Animals	<input type="checkbox"/>	<input checked="" type="checkbox"/>
39. Facility footprint exceeds 5,000 Square Feet	<input checked="" type="checkbox"/>	<input type="checkbox"/>

C. Other Relevant Information: Would the proposed action involve the following?

	Yes	No
40. Disproportionate Nearby Presence of Minority and/or Low Income Populations	<input type="checkbox"/>	<input checked="" type="checkbox"/>
41. Existing, Modified, or New Federal/State Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>
42. Involvement of Another Federal Agency (e.g. license/permit, funding, approval)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
43. Action in a State with NEPA-type law	<input checked="" type="checkbox"/>	<input type="checkbox"/>
44. Expansion of Public Utilities/Services	<input checked="" type="checkbox"/>	<input type="checkbox"/>
45. Depletion of a Non-Renewable Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>
46. Subject to an Existing Institutional Work Planning and Control Process	<input checked="" type="checkbox"/>	<input type="checkbox"/>
47. Other Pertinent Information Which Could Impact Human Health or the Environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>

V. Applicant certification that to the best of their knowledge all information provided on this form is accurate:

Does this disclosure contain: classified, sensitive business, or other exempt information that DOE would not be obligated to disclose pursuant to the Freedom of Information Act. Yes  No

A. Organization Official (Name and Title): Carlos Munoz, Sr. Contract Administrator

Signature: Carlos Munoz Digitally signed by Carlos Munoz  
Date: 2023.06.07 07:33:23 -07'00' Date: 06/07/2023

e-mail: carlos.munoz-pelaez@ga.com Phone: 858-455-2364

B. Optional Secondary Approval (Name and Title): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

e-mail: \_\_\_\_\_ Phone: \_\_\_\_\_

Remainder to be completed by DOE

VI. DOE Concurrence/Recommendation/Determination:

A. DOE Project Director/Program Manager or Contract/Grant Management Specialist:

	Yes	No
Has the Applicant completed this Form correctly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Does an existing generic categorical exclusion apply?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If yes, indicate: \_\_\_\_\_

Name and Title: Matthew J. Lanctot, Program Manager, Office of Science

Signature: MATTHEW LANCTOT Digitally signed by MATTHEW LANCTOT  
Date: 2023.06.07 15:03:38 -04'00' Date: \_\_\_\_\_

B. DOE NEPA Team Review (if requested):

	Yes	No
Is the class of action identified in the DOE NEPA Regulations (Appendices A-D to Subpart D (10 CFR § 1021))?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

If yes, specify the class(es) of action: B3.6, B3.12

Name and Title: Peter Siebach

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

C. DOE Counsel (if requested):

Name and Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

D. DOE NEPA Compliance Officer:

The preceding pages are a record of documentation required under DOE Final NEPA Regulation, 10 CFR § 1021.410.

- Action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for Categorical Exclusion referenced above.
- Action requires approval by Head of the Field Organization. Recommend preparation of an Environmental Assessment.
- Action requires approval by Head of the Field Organization or a Secretarial Officer. Recommend preparation of an Environmental Impact Statement.

Comments/limitations if any:

NEPA Compliance Officer:

Name: \_\_\_\_\_

Signature: PETER SIEBACH Digitally signed by PETER SIEBACH  
Date: 2023.06.09 11:42:07 -05'00' Date: \_\_\_\_\_

## NEPA ADDITIONAL NARRATIVE

### III.B.1 Work to be performed outside

Auxiliary equipment (Motor Generators, Power Supplies, Transformers, Cooling Towers, water pumps), gas storage, materials and equipment are in the yard surrounding the Tokamak and Diagnostic laboratory buildings. Maintenance performed on this equipment is done at the site of the equipment. Repairs are done both on-site or shipped to off-site vendors. New installations involving outside work include: cabling and installation of new power supplies, installation of a new air-cooled transformer, installation of new water cooling pumps, installation of a replacement cooling tower, and two building additions are planned.

### III.B. 2 Major modifications of a building interior

Modification of the interior space of the Tokamak Building is always a possibility should a rearrangement of equipment or major upgrade require it, however, based on the research and operations planned and upgrades proposed during this renewal period of performance, no major modification of the building interior are anticipated. As part of the two proposed building extensions, the exterior walls of the buildings will be disturbed, although the basic wall structure will not be affected.

### IV.A.10 Changes, disturbances to Coastal Zones

General Atomics Torrey Pines site which houses the DIII-D National Fusion Facility is within the California Coastal Commission jurisdiction. Activities associated with the research and operation of the DIII-D Tokamak will have no impact on the Coastal zone. Proposed building expansions will require Coastal Commission approval. Building expansion activities requiring review and approval by the California Coastal Commission will receive such approval prior to start.

### IV.B.22 Chemical Storage/Use

General Atomics has reviewed the chemical inventory against the list of PFAS and there are no PFAS at the location.

Small quantities of the following chemical listed in 29 CFR 1910.1000 table as listed below:

Approximate maximum storage at any given time:

Acetone (cleaning – flammable, toxic) – 5 gallons

Ethyl Alcohol 200 proof (cleaning - flammable) – 5 gallons

Isopropyl Alcohol (cleaning - flammable) – 5 gallons

Sulphur Hexafluoride (waveguide insulator – compressed gas) – 9 bottles, 11.5 pounds each

Mercury (inside Ignitrons - toxic) 1-2 ounces

Potassium Silver Cyanide (silver plating - toxic) – 1 pint

### IV.B.26 Spill Prevention/surface water protection

A Spill Prevention Control & Countermeasure Plan and an Oil Spill Contingency plan has been prepared in accordance with Part 112 and Part 109 of 40CFR 112. The Plan has been reviewed and certified as meeting the requirements of 40CFR112.

### IV.B.28 Hazardous Waste

Hazardous waste is generated and collected per County of San Diego, DEH, Hazmat Permit. The waste is transported off site by a licensed transportation company specializing in chemical and radiologic waste. Hazardous wastes (with the exception of waste oil) are shipped to a licensed TSDF in Albuquerque, NM (approximately 750 miles). Waste oils are shipped to a TSDF in Compton, CA (approximately 120 miles).

GA has federal EPA ID #CAR000198143 for transportation of such waste. Waste generated is from general cleaning and tooling process pertaining to the fusion activities.

#### **IV.B.30 Radioactive or radioactive mixed waste?**

Although tritium is not used as a fuel in the DIII-D experiment, small quantities of tritium are produced as a natural byproduct of the fusion of deuterium nuclei in DIII-D experiments. Radioactive mixed waste is thus generated from tritium contaminated vacuum pump oil. See above IV.B.28 for details on handling and disposal. Tritium is also released to the environment as a gaseous effluent at a maximum rate of 0.9 Curies/year in the form of HTO, HT, DT, and DTO. See below (IV.B.31) for effective dose at the site boundary resulting from this release.

#### **IV.B.31 Radiation Exposure**

The major source of radiation drives from prompt neutron emission from the fusion reaction, x-rays from high energy electrons, and gamma rays from decay of material made radioactive by the fusion neutrons. Additional radioactive sources are used for equipment calibration and include the following isotopes: AM-241, Fe-255, Cf-252, Sr-90, Co-60, and Po-210. Exposures from these additional sources is minimal compared to neutron and gamma dose rates. The facility adheres to pertinent State and Federal regulations and DOE guidance. The site ALAEA plan calls for keeping both Public and Staff exposure levels to less than the limits set by State and Federal regulations. Site boundary limits are set by California regulations. A monitoring program has been established for both site boundary and staff exposure levels. Typical public site boundary doses are 5 – 10 mrem/quarter and always below our administrative limit of 20 mrem/quarter. Employee dose rates are typically 100 mrem/quarter and always below the California limits of 5000 mrem/year and below our administrative limits of 1600 mrem/year and 400 mrem/quarter.

For Tritium release, calculations of effective dose at the site boundary (using distance from site boundary, height of exhaust, and local meteorological conditions) yield total effective dose equivalent (TEDE) and effluent concentrations a factor of 1000 less than the limits (10 mrem; 1E-7 microCurie/ml) listed in 10CFR20 for tritium. The California Code of Regulations defer to the Federal Regulations, specifically 10CFR20, for dose limits to radiation workers, members of the public and effluent from licensed operations.

#### **IV.B.34 Ozone Depleting Substances**

Small amounts of R404a used in four Vacuum Pump Heat Exchanger Refrigerant units. Serviced internally by facilities department and managed through Refrigerant Management Program.

#### **IV.B.39 Facility footprint exceeds 5,000 Square Feet**

The DIII-D facility is approximately 121,000 sq ft. This includes: diagnostic labs, office trailers, ECH lab, control room, conference rooms, Tokamak vessel with all associated diagnostic equipment, and tool room.

#### **IV.C.41 Existing, modified or new federal/state permit requirements**

The following permits are currently in effect and will continue:

-APCD (Air Pollution Control District of SD County); Emergency generators, vapor degreasers, fiberglass machining room.

-County of SD, DEH (Dept. of Env. Health): Unified Program Facility Permit: Permit for Facilities

that have reportable quantities of hazardous materials and that generate hazardous waste.

-San Diego Fire Department: Permits for Hazardous Materials and Compressed gas systems.

-State of California Dept. of Industrial Relations, Div of Occupational Safety and Health (DOSH):

Pressure vessels (air tanks).

-California CHP: Haz Mat Transportation license.

-California DMV (Dept. of Motor Vehicles): Motor carrier permit.

-US Dept of Transportation: Hazardous Materials Cert of Registration.

-US EPA: Federal EPA ID# CA R000198143

#### **IV.C.43 Action in a State with NEPA-type law**

General Atomics Torrey Pines site which houses the DIII-D National Fusion Facility is within the California Environmental Protection Agency (CalEPA) jurisdiction. Activities associated with the research and operation of the DIII-D Tokamak are in full compliance with CalEPA program requirements.

#### **IV.C.44 Expansion of Public utilities/services involvement**

Under normal line usage, electrical line capacity is sufficient for DIII-D operation. The line was designed to be compatible with DIII-D power demands (peak and average). No significant expansion of power usage is anticipated and existing line capacity will be sufficient. A fault condition, e.g. failure of primary protective device (circuit breaker), could result in loss of power to other utility uses sharing the line. Normal water and sewer public services are utilized by the staff of the facility. Most cooling systems are operated closed loop but occasional sewer discharges occur, but are within sewer system handling capacity.

#### **IV.C.46 Subject to an Existing Institutional Work Planning and Control Process**

General Atomics' Hazardous Assessment/ Hazardous Work Authorization (HWA) procedure sets forth the requirements to comply with Federal, State and local regulations governing authorization to perform hazardous work activities. This procedure ensures that all hazardous work activities are properly planned, categorized, and controlled and is commensurate to the identified environment, safety, and health hazards; job complexities; and job coordination needs.

Prior to performing work, the responsible manager or the manager's designee must complete an HWA (GA form 754) and provide all of the following:

- (a) the Requestor's contact information;
- (b) an HWA number obtained from the LSNC Department;
- (c) a description of the work activity to be performed under the HWA;
- (d) whether the work: (1) is import/export controlled and/or (2) involves radioactive materials;
- (e) a description of the major tasks or steps to complete the work activity;

- (f) a description and assessment of each hazard applicable to the work activity;
- (g) a listing of chemicals to be used in, and hazardous waste to be generated by, the work activity described in the HWA; the location of each; and the name and phone number of the custodian of each  
(if applicable);
- (h) a description of environmental permits and licenses, if any, that may be required for the work activity;
- (i) a description of personal protective equipment (PPE) required for the work activity;
- (j) a description of training requirements for the work activity;
- (k) a listing of all personnel performing the work activity;
- (l) a signed acknowledgment by each person performing the work activity;
- (m) the approval of the Requestor's supervisor;
- (n) the approval of the responsible Level 5 manager (or higher); and
- (o) the approval of the business unit's or department's designated safety representative.

Copies of the Hazard Assessment/ Hazardous Work Authorization Procedure and applicable Hazardous Work Authorization approvals for the proposed work activities are available upon request.