EXHIBIT 1B (10-91)

(Ref.: DOEPR 9-9.107-5)

PATENT RIGHTS (Long Form)

- (a) <u>Definitions</u>. (1) "Subject Invention" means any invention or discovery of the Seller conceived or first actually reduced to practice in the course of or under this subcontract, and includes any art, method, process, machine, manufacture, design, or composition of matter, or any new and useful improvement thereof, or any variety of plants, whether patented or unpatented under the Patent Laws of the United States or any foreign country.
- (2) "Contract" means any contract, grant, agreement, understanding or other arrangement, which includes research, development, or demonstration work, and includes any assignment or substitution of parties.
- (3) "States and domestic municipal governments" means the States of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, and any political subdivisions and agencies thereof.
- (4) "Government agency" includes an executive department, independent commission, board, office, agency, administration, authority, Government corporation, or other Government establishment of the Executive Branch of the Government of the United States.
- (5) "To the point of practical application" means to manufacture in the case of a composition or product, to practice in the case of a process, or to operate in the case of a machine and under such conditions as to establish that the invention is being worked and that its benefits are reasonably accessible to the public.
 - (6) "Patent Counsel" means the Department of Energy (DOE) Patent Counsel at the DOE Field Office, Oak Ridge.
- (b) <u>Allocation of principal rights.</u> (1) <u>Assignment to the Government.</u> The Seller agrees to assign to the Government the entire right, title, and interest throughout the world in and to each subject invention, except to the extent that rights are retained by the Seller under paragraphs (b)(2) and (c) of this clause.
- (2) <u>Greater rights determinations.</u> The Seller or the employee-inventor with authorization of the Seller may request greater rights than the nonexclusive license and the foreign patent rights provided in paragraph (c) of this clause on identified inventions in accordance with 41 CFR 9-9.109-6(d). Such requests must be submitted to the Company for transmission to the Patent Counsel at the time of the first disclosure pursuant to paragraph (e)(2) of this clause, or not later than 9 months after conception or first actual reduction to practice, whichever occurs first, or such longer period as may be authorized by the Patent Counsel (with notification by the Patent Counsel to the Company) for good cause shown in writing by the Seller.
- (c) Minimum rights to the Seller. (1) Seller license. The Seller reserves a revocable, nonexclusive, paid-up license in each patent application filed in any country on a subject invention (except inventions and patent applications classified as Restricted Data) and any resulting patent in which the Government acquires title. The license shall extend to the Seller's domestic subsidiaries and affiliates, if any, within the corporate structure of which the Seller is a part and shall include the right to grant sublicenses of the same scope to the extent the Seller was legally obligated to do so at the time this subcontract was awarded. The license shall be transferrable only with approval of DOE except when transferred to the successor of that part of the Seller's business to which the invention pertains.
- (2) <u>Revocation limitations.</u> The Seller's nonexclusive license retained pursuant to paragraph (c)(1) of this clause and sublicenses granted thereunder may be revoked or modified by DOE, either in whole or in part, only to the extent necessary to achieve expeditious practical application of the subject invention under DOE's published licensing regulations (10 CFR 781), and only to the extent an exclusive license is actually granted. This license shall not be revoked in that field of use and/or the geographical areas in which the Seller, or its sublicensee, has brought the invention to the point of practical application and continues to make the benefits of the invention reasonably accessible to the public, or its expected to do so within a reasonable time.
- (3) Revocation procedures. Before modification or revocation of the license or sublicense, pursuant to paragraph (c)(2) of this clause, DOE shall furnish the Seller a written notice of its intention to modify or revoke the license and any sublicense thereunder, and the Seller shall be allowed 30 days, or such longer periods as may be authorized by the Patent Counsel for good cause shown in writing by the Seller, after such notice to show cause why the license or any sublicense should not be modified or revoked. The Seller shall have the right to appeal, in accordance with 10 CFR 781, any decision concerning the modification or revocation of his license or any sublicense.
- (4) <u>Foreign patent rights.</u> Upon written request to Patent Counsel, and subject to DOE security regulations and requirements, there shall be reserved to the Seller, or the employee-inventor with authorization of the Seller, the patent rights to a subject invention in any foreign country where the Government has elected not to secure such rights, provided:
- (i) The recipient of such rights, when specifically requested by DOE and three years after issuance of a foreign patent disclosing said subject invention, shall furnish DOE a report setting forth:
 - (A) The commercial use that is being made, or is intended to be made, of said invention, and
 - (B) The steps taken to bring the invention to the point of practical application or to make the invention available for licensing.
- (ii) The Government shall retain at least an irrevocable, nonexclusive, paid-up license to make, use, and sell the invention throughout the world by or on behalf of the Government (including any Government agency) and States and domestic municipal governments, unless the Head of the Agency or his designee determines that it would not be in the public interest to acquire the license for the States and domestic municipal governments.
- (iii) Subject to the rights granted in (c)(1), (2), and (3) of this clause, the Head of the Agency or designee shall have the right to terminate the foreign patent rights granted in this paragraph (c)(4) in whole or in part unless the recipient of such rights demonstrates to the satisfaction of the Head of the Agency or designee that effective steps necessary to accomplish substantial utilization of the invention have been taken or within a reasonable time will be taken.
- (iv) Subject to the rights granted in (c)(1), (2), and (3) of this clause, the Head of the Agency or designee shall have the right, commencing four years after foreign patent rights are accorded under this paragraph (c)(4), to require the granting of a nonexclusive or partially exclusive license to a responsible applicant or applicants, upon terms reasonable under the circumstances and in appropriate circumstances to terminate said foreign patent rights in whole or in part, following a hearing upon notice thereof to the public, upon a petition by an interested person justifying such hearing:

- (A) If the head of the agency or designee determines, upon review of such material as he deems relevant, and after the recipient of such rights or other interested person has had the opportunity to provide such relevant and material information as the Head of the Agency or designee may require, that such foreign patent rights have tended substantially to lessen competition or to result in undue market concentration in any section of the United States in any line of commerce to which the technology relates; or
- (B) Unless the recipient of such rights demonstrates to the satisfaction of the Head of the Agency or designee at such hearing that the recipient has taken effective steps, or within a reasonable time thereafter is expected to take such steps, necessary to accomplish substantial utilization of the invention.
- (d) Filing of patent applications. (1) With respect to each subject invention in which the Seller or the inventor requests foreign patent rights in accordance with paragraph (c)(4) of this clause, a request may also be made for the right to file and prosecute the U.S. application on behalf of the U.S. Government. If such request is granted, the Seller or inventor shall file a domestic patent application on the invention within 6 months after the request for foreign patent rights is granted, or such longer period of time as may be approved by Patent Counsel for good cause shown in writing by the requester. With respect to the invention, the requester shall promptly notify the Patent Counsel of any decision not to file an application.
- (2) For each subject invention on which a domestic patent application is filed by the Seller or inventor, the Seller or inventor shall:
- (i) Within 2 months after the filing or within 2 months after submission of the invention disclosure if the patent application previously has been filed, deliver to the Patent Counsel a copy of the application as filed including the filing date and serial number;
- (ii) Within 6 months after filing the application or within 6 months after submitting the invention disclosure if the application has been filed previously, deliver to the Patent Counsel a duly executed and approved assignment to the Government, on a form specified by the Government:
 - (iii) Provide the Patent Counsel with the original patent grant promptly after a patent is issued on the application; and
- (iv) Not less than 30 days before the expiration of the response period for any action required by the Patent and Trademark Office, notify the Patent Counsel of any decision not to continue prosecution of the application.
- (3) With respect to each subject invention in which the Seller or inventor has requested foreign patent rights, the Seller or inventor shall file a patent application on the invention in each foreign country in which such request is granted, in accordance with applicable statutes and regulations, and within one of the following periods:
- (i) Eight months from the date of filing a corresponding United States application, or if such an application is not filed, six months from the date the request was granted;
- (ii) Six months from the date a license is granted by the Commissioner of Patents and Trademarks to file the foreign patent application where such filing has been prohibited by security reasons; or
 - (iii) Such longer periods as may be approved by the Patent Counsel for good cause shown in writing by the Seller or inventor.
- (4) Subject to the license specified in paragraphs (c)(1), (2) and (3) of this clause, the Seller or inventor agrees to convey to the Government, upon request, the entire right, title, and interest in any foreign country in which the Seller or inventor fails to have a patent application filed in accordance with paragraph (d)(3) of this clause, or decides not to continue prosecution or to pay any maintenance fees covering the invention. To avoid forfeiture of the patent application or patent the Seller or inventor shall, not less than 60 days before the expiration period for any action required by any Patent Office, notify the Patent Counsel of such failure or decision, and deliver to the Patent Counsel the executed instruments necessary for the conveyance specified in this paragraph.
- (e) <u>Invention identification</u>, <u>disclosures</u>, <u>and reports</u>. (1) The Seller shall establish and maintain active and effective procedures to ensure that subject inventions are promptly identified and timely disclosed. These procedures shall include the maintenance of laboratory notebooks or equivalent records and other records that are reasonably necessary to document the conception and/or the first actual reduction to practice of subject inventions, and records which show that the procedures for identifying and disclosing the inventions are followed. Upon request, the Seller shall furnish the Patent Counsel a description of these procedures so that he may evaluate and determine their effectiveness.
 - (2) The Seller shall furnish the Patent Counsel (through the Company), on a DOE-approved form:
- (i) A written report containing full and complete technical information concerning each subject invention with 6 months after conception or first actual reduction to practice whichever occurs first in the course of or under this subcontract, but in any event prior to any sale, public use, or public disclosure of such invention known to the Seller. The report shall identify this subcontract and inventor and shall be sufficiently complete in technical detail and appropriately illustrated by sketch or diagram to convey to one skilled in the art to which the invention pertains a clear understanding of the nature, purpose, operation, and to the extent known, the physical, chemical, biological, or electrical characteristics of the invention. The report should also include any request for foreign patent rights under paragraph (c)(4) of this clause and any request to file a domestic patent application made within the period set forth in paragraph (b)(2) of this clause. When an invention is reported under this paragraph (e)(2)(i), it shall be presumed to have been conceived or first actually reduced to practice in the course of or under this subcontract unless the Seller contends it was not so made, in accordance with paragraph (g)(2)(ii) of this clause.
- (ii) Upon request, but not more than annually, interim reports on a DOE-approved form listing subject inventions and lower-tier subcontracts awarded containing a Patent Rights clause for that period and certifying that:
- (A) The Seller's procedures for identifying and disclosing subject inventions as required by this paragraph (e) have been followed throughout the reporting period;
 - (B) All subject inventions have been disclosed or that there are no such inventions;
- (C) All lower-tier subcontracts containing a Patent Rights clause have been reported or that no such subcontracts have been awarded; and
 - (iii) A final report on a DOE-approved form within three months after completion of the work under this subcontract listing all

subject inventions and all subcontracts awarded containing a Patent Rights clause and certifying that:

- (A) All subject inventions have been disclosed or that there were no such inventions; and
- (B) All lower-tier subcontracts containing a Patent Rights clause have been reported or that no such subcontracts have been awarded.
- (3) The Seller shall obtain patent agreements to effectuate the provisions of this clause from all persons in its employ who perform any part of the work under this subcontract except nontechnical personnel, such as clerical employees and manual laborers.
- (4) The Seller agrees that the Government may duplicate and disclose subject invention disclosures and all other reports and papers furnished or required to be furnished pursuant to this clause. If the Seller is to file a foreign patent application on a subject invention, the Government agrees, upon written request, to use its best efforts to withhold publication of such invention disclosures until the expiration of the time period specified in paragraph (d)(1) of this clause, but in no event shall the Government or its employees be liable for any publication thereof.
- (f) <u>Publication.</u> It is recognized that during the course of the work under this subcontract, the Seller or its employees may from time to time desire to release or publish information regarding scientific or technical developments conceived or first actually reduced to practice in the course of or under this subcontract. In order that public disclosure of such information will not adversely affect the patent interest of DOE or the Seller, patent approval for release or publication shall be secured from the Patent Counsel prior to any such release or publication.
- (g) <u>Forfeiture of rights in unreported subject inventions.</u> (1) The Seller shall forfeit to the Government, at the request of the Head of the Agency or designee, all rights in any subject invention which the Seller fails to report to the Patent Counsel within 6 months after the time the Seller:
 - (i) Files or causes to be filed a United States or foreign patent application thereon; or
 - (ii) Submits the final report required by paragraph (e)(2)(iii) of this clause, whichever is later.
- (2) However, the Seller shall not forfeit rights in a subject invention if, within the time specified in (1)(i) or (1)(ii) of this paragraph (q), the Seller:
- (i) Prepares a written decision based upon a review of the record that the invention was neither conceived nor actually reduced to practice in the course of or under this subcontract and delivers the same to Patent Counsel; or
- (ii) Contending that the invention is not a subject invention, the Seller nevertheless discloses the invention and all facts pertinent to this contention to the Patent Counsel; or
 - (iii) Establishes that the failure to disclose did not result from the Seller's fault or negligence.
- (3) Pending written assignment of the patent application and patents on a subject invention determined by the Head of the Agency or designee to be forfeited, the Seller shall be deemed to hold the invention and the patent applications and patents pertaining thereto in trust for the Government. The forfeiture provision of this paragraph (g) shall be in addition to and shall not supersede other rights and remedies that the Government may have with respect to subject inventions.
- (h) Examination of records relating to inventions. (1) DOE or its authorized representative, until the expiration of 3 years after final payment under this subcontract, shall have the right to examine any books (including laboratory notebooks), records, documents, and other supporting data of the Seller that DOE or its authorized representative reasonably deem pertinent to the discovery or identification of subject inventions or to determine compliance with the requirements of this clause.
- (2) DOE or its authorized representative shall have the right to review all books (including laboratory notebooks), records and documents of the Seller relating to the conception or first actual reduction to practice of inventions in the same field of technology as the work under this subcontract to determine whether any such inventions are subject inventions, if the Seller refuses or fails to:
 - (i) Establish the procedures of paragraph (e)(1) of this clause; or
 - (ii) Maintain and follow such procedures; or
- (iii) Correct or eliminate any material deficiency in the procedures within 30 days after DOE or its authorized representative notifies the Seller of such a deficiency.
- (i) <u>Subcontracts.</u> (1) For the purpose of this paragraph the term "Seller" means the party awarding a subcontract and the term "Subcontractor" means the party being awarded a subcontract, regardless of tier.
- (2) The Seller will include the clause at 952.227-71 "Patent Rights-Small Business Firms or Nonprofit Organizations" of the Department of Energy Acquisition Regulation 48 CFR Part 952 suitably modified to identify the parties, in all subcontracts regardless of tier, for experimental, developmental, demonstration or research work to be performed by a small business firm or domestic nonprofit organization. In all other subcontracts, regardless of tier, for experimental, developmental, demonstration, or research work, the Seller will include the Patent Rights clause of 41 CFR 9-9.107-5(a) or 9-9.107-6 as appropriate, modified to identify the parties. In the event of a refusal by a Subcontractor to accept this clause, or if in the opinion of the Seller this clause is inconsistent with DOE's patent policies, the Seller:
- (i) Shall promptly submit written notice to the Company setting forth reasons for the Subcontractor refusal and other pertinent information which may expedite disposition of the matter; and
 - (ii) Shall not proceed with the subcontract without the written authorization of the Company.
- (3) Except as may be otherwise provided in this clause, the Seller shall not, in any subcontract or by using a subcontract as consideration therefor, acquire any rights in its Subcontractor's subject invention for the Seller's own use (as distinguished from such rights as may be required solely to fulfill the Seller's contract obligations to the Company or Government in the performance of this subcontract).
- (4) All invention disclosures, reports, instruments, and other information required to be furnished by the Subcontractor to DOE, under the provisions of a Patent Rights clause in any subcontract hereunder may, in the discretion of the Company, be furnished to the Company or the Seller for transmission to DOE.
 - (5) The Seller shall promptly notify the Company in writing upon the award of any subcontract containing a Patent Rights clause by

identifying the Subcontractor, the work to be performed under the subcontract, and the dates of award, and estimated completion. Upon the request of the Company the Seller shall furnish a copy of the subcontract.

- (6) The Seller shall identify all subject inventions of the Subcontractor of which it acquires knowledge in the performance of this subcontract and shall notify the Company promptly upon the identification of the inventions.
- (7) It is understood that the Government is a third party beneficiary of any subcontract clause granting rights to the Government in subject inventions, and the Seller hereby assigns to the Government all rights that the Seller would have to enforce the Subcontractor's obligations for the benefit of the Government with respect to subject inventions. The Seller shall not be obligated to enforce the agreements of any Subcontractor hereunder relating to the obligations of the Subcontractor to the Government regarding to Subject Inventions.
- (j) <u>Background Patents</u>. (1) "Background Patent" means a domestic patent covering an invention or discovery which is not a subject invention and which is owned or controlled by the Seller at any time through the completion of this subcontract:
 - (i) Which the Seller, but not the Government, has the right to license to others without obligation to pay royalties thereon, and
- (ii) Infringement of which cannot reasonably be avoided upon the practice of any specific process, method, machine, manufacture or composition of matter (including relatively minor modifications thereof) which is a subject of the research, development, or demonstration work performed under this subcontract.
- (2) The Seller agrees to and does hereby grant to the Government a royalty-free, nonexclusive license under any background patent for purposes of practicing a subject of this subcontract by or for the Government in research, development, and demonstration work only.
- (3) The Seller also agrees that upon written application by DOE, it will grant to responsible parties for purposes of practicing a subject of this subcontract, nonexclusive licenses under any background patent on terms that are reasonable under the circumstances. If, however, the Seller believes that exclusive or partially exclusive rights are necessary to achieve expeditious commercial development or utilization, then a request may be made to DOE for DOE approval of such licensing by the Seller.
- (4) Notwithstanding the foregoing paragraph (j)(3), the Seller shall not be obligated to license any background patent if the Seller demonstrates to the satisfaction of the Head of the Agency or designee that:
- (i) a competitive alternative to the subject matter covered by said background patent is commercially available or readily introducible from one or more other sources; or
- (ii) the Seller or its licensees are supplying the subject matter covered by said background patent in sufficient quantity and at reasonable prices to satisfy market needs, or have taken effective steps or within a reasonable time are expected to take effective steps to so supply the subject matter.
- (k) <u>Atomic Energy.</u> (1) No claim for pecuniary award or compensation under the provisions of the Atomic Energy Act of 1954, as amended, shall be asserted by the Seller or its employees with respect to any invention or discovery made or conceived in the course of or under this subcontract.
- (2) Except as otherwise authorized in writing by the Company, the Seller will obtain patent agreements to effectuate the provisions of paragraph (I)(1) of this clause from all persons who perform any part of the work under this subcontract, except nontechnical personnel, such as clerical employees and manual laborers.
- (I) <u>Limitation or rights.</u> Nothing contained in this Patent Rights clause shall be deemed to give the Government any rights to any invention other than a subject invention except as set forth in the Patent Rights clause of this subcontract with respect to background patents and, if included, the facilities license.