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## Department of Energy

Oak Ridge Field Office

P.O. Box 2001

Oak Ridge, Tennessee 37831—

July 19, 1993

Mr. Robert N. Bernero, Director  
Office of Nuclear Material Safety  
and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Mr. Bernero:

This is in response to your letter of June 10, 1993, requesting information from the Department of Energy (DOE) relating to the regulatory approach that the Nuclear Regulatory Commission (NRC) is considering in the development of nuclear safety standards for both the Paducah and Portsmouth Gaseous Diffusion Plants (GDP's). In particular, you requested additional information regarding three specific issues. First, you requested information regarding the use of the framework of 10 CFR Part 70 as well as information regarding the incorporation of existing NRC regulations governing major materials and fuel cycle activities licensed by NRC in developing the GDP standards. As you stated, the purpose of this additional information is to assist NRC staff in determining the feasibility of applying these requirements to the GDP's. Secondly, you requested information regarding the current QA program at the GDP's to aid NRC staff in drafting the QA provisions of the new GDP standards. Lastly, you requested information regarding requirements for an analysis of anticipated occurrences and accidents, focusing on 10 CFR Part 50, information related to conducting an integrated safety assessment of operations, as well as information related to incorporation of other requirements associated with criticality accidents modeled after 10 CFR Part 70.

In response to the first request, we have reviewed the regulatory approach which your letter indicates that NRC staff is considering and have identified no aspects of the design or operation of the GDP's that would preclude the use of 10 CFR Part 70 as a general framework for the development of GDP standards. DOE order requirements under which the GDP's have been operating incorporate many of the same standards mandated by the regulations cited in your letter. However, in many cases, NRC requirements mandate that the documents used to demonstrate compliance (e.g., the emergency plan and radiation exposure records) employ a different format than that specified by DOE orders. In the interest of a smooth transition, it would be appropriate for the GDP standards to incorporate these requirements in a manner that permits interim use of compliance documents in the DOE-mandated format until there is adequate time for an orderly revision to bring them into NRC-mandated format. We also note

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that the procedural aspects of 10 CFR Part 70 (e.g., those relating to the application for and approval of licenses) may require modification to enhance the efficacy of the process of certifying compliance with the GDP standards or approving a DOE plan to achieve compliance with the GDP standards.

Existing NRC regulations governing major materials and fuel cycle activities licensed by NRC, particularly 10 CFR Parts 19, 20, and 21, appear to be appropriate for incorporation into NRC standards for the GDP's without substantive change. However, we note that the provisions of 10 CFR Part 26 are currently applied only to nuclear power reactors and that similar requirements will be applied to licensees authorized to possess and transport formula quantities of strategic special nuclear material effective November 30, 1993. It is not clear that the hazard posed by the GDP's is sufficiently great or unique to justify the incorporation of this regulation into the GDP standards. The occurrence reporting requirements in 10 CFR 70.50, 70.52, and 73.71; the special nuclear material status and transfer reporting requirements in 10 CFR 70.53 and 10 CFR 70.54; and the environmental monitoring reporting requirements in 10 CFR 70.59 appear to be appropriate for incorporation into NRC standards for the GDP's without substantive change. The standards in 10 CFR Part 71 are already mandated by DOE orders; however, DOE orders permit use of DOE-certified containers. Therefore, in the interest of a smooth transition, it would be appropriate for the GDP standards to incorporate 10 CFR Part 71 in a manner that permits use of DOE-certified containers for a transition period until any that are not NRC-certified can either be certified or be replaced with NRC-certified containers.

The special nuclear material control and accountability requirements in 10 CFR 70.22(b) appear appropriate for incorporation into the GDP standards without substantial change. The special nuclear material control and accountability requirements in 10 CFR 74.33 appear appropriate for application, without substantial change, to the Paducah GDP which will produce, possess, and use only special nuclear material of low strategic significance. The Portsmouth GDP may also, under the Energy Policy Act of 1992 and the Regulatory Oversight Agreement that is part of the lease agreement, produce, possess, or use special nuclear material of moderate strategic significance. The special nuclear material control and accountability requirements in 10 CFR 70.57 and 70.58 could be applied to the Portsmouth GDP if special nuclear materials (SNM) of moderate strategic significance were produced, possessed, or used there. However, under such circumstances, it would appear to be more appropriate to develop enrichment plant-specific requirements analogous to those in 10 CFR 74.33 with appropriate performance standards for an enrichment plant that produces, possesses, or uses special nuclear material of moderate strategic significance.

The physical security requirements of 10 CFR 73.67 appear to be appropriate for application to the GDP's to protect against theft or diversion of special nuclear material of low or moderate strategic significance that will be

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produced and used at the GDP's. In addition to this material, the Portsmouth GDP will possess formula quantities of strategic special nuclear material (SSNM) in the form of residual deposits within process equipment. These individual deposits that contain only small amounts of SSNM (generally 10s to 100s of grams) are widely distributed throughout large items of process equipment and cannot be accessed without opening the process equipment, which, when the equipment is in operation, would release uranium hexafluoride gas and would be detected by process controls. Furthermore, the SSNM deposits are intermingled with, and not readily separable from, residual deposits of low enriched uranium, which makes theft or diversion of the SSNM even more difficult. As this process equipment continues to be used for the processing of low enriched uranium, the proportion of low enriched uranium in the residual deposits is expected to increase, further reducing the risk of theft or diversion of SSNM. DOE considers the SSNM residual deposits in the GDP process equipment to be of much lower safeguards significance than any SSNM found elsewhere in the licensed fuel cycle, with the possible exception of low concentration SSNM bearing wastes, and believes that any GDP safeguards standards established for such material in NRC rulemaking should reflect its relatively low safeguards significance and the reduction of the associated safeguards risk as the production of SSNM of low or moderate strategic significance continues at the Portsmouth GDP.

There are also two additional safeguards issues that the Commission may wish to address. The first of these is radiological sabotage. The GDP's may have sufficient inventory of special nuclear material in dispersible, toxic form that requirements for protection against radiological sabotage are appropriate, though not addressed within the current 10 CFR 73 requirements. The second potential issue is the protection of information concerning the physical security program at the GDP's. This material is currently protected as classified information or unclassified controlled nuclear information (UCNI). It is not clear that this information may remain in these categories now that the responsibility for the operation of the GDP's has been transferred to the U.S. Enrichment Corporation (USEC) and they are no longer associated with DOE defense activities. Therefore, it may be necessary and appropriate to protect some of the information concerning the physical security program at the GDP's as safeguards information. However, this is not possible under the current 10 CFR 73.21 requirements because the GDP's are neither power reactors nor facilities that possess or use formula quantities of strategic special nuclear material or irradiated reactor fuel. You may wish to address these issues in your rulemaking for the GDP's.

Secondly, you requested information regarding the current QA program at the GDP's in order to "provide a reference point for the staff in formulating the QA provisions of the new GDP standards." DOE recommends that the new GDP standards incorporate a more performance oriented approach to QA similar to the requirements of DOE Order 5700.6C, Quality Assurance, rather than either a less prescriptive regulatory approach based upon 10 CFR 50 Appendix B or a more prescriptive approach similar to that employed in 10 CFR 72. This graded approach should incorporate the philosophy that recognizes the purpose of

quality assurance is to provide management controls that provide confidence that measures taken to achieve safe, reliable facility operations remain effective and that operations remain safe. The DOE Order 5700.6C approach, which is consistent with the requirements of ASME NQA-1, "Quality Assurance Program Requirements for Nuclear Facilities," and 10 CFR 50 Appendix B, is designed to ensure that: (1) senior management provides planning, organization, direction, control, and support to achieve quality; (2) the line organization achieves quality; and (3) overall performance is reviewed and evaluated using a rigorous assessment process. If this approach is employed, the general requirements of DOE 5700.6C will need to be appropriately tailored to GDP's. The implementation requirements in Section 3.6.2 of Safety Basis and Framework for DOE Oversight of the Gaseous Diffusion Plants describe the manner that DOE believes appropriate for tailoring the first nine criteria of DOE Order 5700.6C to the design and operation of the GDP's. The tenth and final criterion, independent assessment, which is currently addressed through the DOE oversight program, can be incorporated into a standard similar to 10 CFR 20.1101(c), but it needs to be recast to address the effectiveness of programs and activities important to nuclear safety. DOE also concludes that such an approach would provide the USEC with the requisite operational flexibility to modify its quality assurance program in ways and areas where the modifications enhance operational effectiveness without decreasing facility safety. Even if a more prescriptive or less performance oriented set of regulations were based upon current practices at the GDP's, this could create unnecessary regulatory impediments to such modifications.

DOE also believes that the development of the quality assurance provisions of the GDP standards needs to recognize that the GDP's were constructed in the 1950's--more than 10 years before the formulation of ASME NQA-1 and the 10 CFR 50 Appendix B criteria. Therefore, the records relating to the initial facility design bases and quality assurance program, although adequate for their time, would not meet the current requirements. The full reconstruction of the GDP design bases is neither cost-effective nor required to achieve an acceptable level of safety, in light of the nearly 40 years of safe operation that the GDP's have exhibited. Thus, the quality assurance provisions of the GDP standards should require that design controls be applied only to the extent necessary to ensure that the plants continue to meet the design-related commitments made in the application for certification.

Last, you requested information regarding requirements for an analysis of anticipated occurrences and accidents, focusing on 10 CFR 50, information related to conducting an integrated safety assessment of operations, as well as information relating to incorporation of other requirements associated with criticality accidents modeled after 10 CFR 70. In requesting information regarding the formulation of requirements for an analysis of anticipated occurrences and accidents with a focus on 10 CFR 50, you stated that "such an analysis might include an operational safety objective of ensuring that no individual at the site boundary will receive (1) a total radiation dose to the whole body in excess of 25 rem (total effective dose equivalent) or (2) an

intake of greater than 10 milligrams of uranium in soluble form." In addition, you stated that "such an accident analysis might also consider credible external events and natural phenomena but not a postulated nonmechanistic hypothetical source term."

We have identified no aspects of the design or operation of the GDP's that would preclude the development of an integrated safety assessment to establish operating limits for the GDP's. We believe that the current effort to upgrade the GDP safety analyses and bases will provide all the information that should be required for such an integrated safety assessment. This effort includes analyses of the possible consequences of anticipated occurrences and possible accidents, including those involving natural phenomena and external events. The safety analysis approach focuses on credible events and the development of mechanistic accident sequences and source terms. The program also takes advantage of site-specific studies performed to define the hazards associated with seismic activity, wind, flooding, and other natural phenomena. These site-specific studies, adjusted based upon the risk reduction associated with the limited remaining operational life of the GDP's, provide a basis for establishing the credible natural phenomena events to be considered in such an integrated safety assessment.

DOE does not consider it appropriate for the certification standards to impose siting criteria, such as the 10 CFR 100 dose criterion of 25 rem or a maximum intake of 10 milligrams of soluble uranium, upon facilities that were sited, designed, and constructed decades before these criteria were established. The adequate safety of the GDP's has been continually confirmed since their design through: (1) the initial Atomic Energy Commission reviews and approvals of GDP design and construction; (2) the performance, review, and approval of numerous additional safety analyses and assessments performed to support continued operations under increasingly stringent standards; and (3) nearly 40 years of safe operation--a longer history of safe operation than any licensed facility. The combination of this continuing confirmation of adequate safety and the commitments to specific protective measures and safety programs in the application for certification provide a much more convincing demonstration of safety than would the comparison of very uncertain accident analysis modeling results with siting criteria.

Therefore, we recommend that the certification process for the GDP's be oriented toward the identification and evaluation of significant safety issues rather than the demonstration of compliance with siting criteria. We further recommend that, should the certification process identify areas in which safety enhancements may be desirable, the candidate enhancements should be evaluated using a structured backfit evaluation process similar to that established by 10 CFR 50.109. In our judgment, the certification process for the GDP's should more nearly resemble a backfitting process for an existing facility rather than the licensing process for a facility not yet completely designed or constructed.

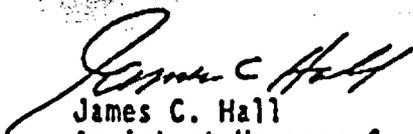
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We appreciate the opportunity to provide information to NRC in support of this rulemaking process and will be pleased to schedule staff-level meetings to provide any further explanation or supplementary information related to this response. Should you wish to schedule a meeting or have specific questions, please call me or J. Dale Jackson (615-576-4749). We are pleased that you find this interagency dialogue constructive and look forward to continuing to work with you and your staff throughout the rulemaking process.

Sincerely,



James C. Hall  
Assistant Manager for  
Enriching Operations