functions with acceptable accuracy, they must be based upon appropriate conceptual, mathematical, and numerical models.

In order to ensure that the conceptual, mathematical, numerical, and computer models used to support compliance applications are appropriate for use in certifying whether the WIPP complies with the disposal regulations, EPA proposes to require that detailed information about these models be submitted to the Agency as part of any compliance certification applications. EPA proposes to assess the appropriateness of the models and any computer codes used to represent them based on the following factors: Whether conceptual models reasonably represent the disposal system; whether mathematical models incorporate equations and boundary conditions which reasonably represent mathematical formulations of the conceptual models; whether numerical models provide numerical schemes which enable mathematical models to obtain stable solutions; whether computer models accurately implement the numerical models (i.e., are free of coding errors and produce stable and accurate solutions); and whether the models, data, and computer codes have been properly peer reviewed. EPA solicits comment on these factors and whether other factors should be included. For instance, should EPA require information which demonstrates that there is agreement between the model results and any measured and observed data? Or, if it can be demonstrated that models and computer codes are sufficiently conservative, is such demonstration unnecessary?

In addition, EPA is proposing to require that the American Society of Mechanical Engineer's NQA-2a-1990 addenda (part 2.7 to ASME NQA-2-1989 edition) be used to help ensure that models and codes are fully and clearly documented.

In order to determine whether the conceptual models used to support a compliance certification application offer the best representation of the disposal system, EPA is proposing to require a complete listing and description of conceptual models considered but not used to support such application. In addition, EPA is proposing to require a complete listing of conceptual model(s) considered but not used to support compliance certification applications, a description of such model(s), and an explanation of the reason(s) why such model(s) was/ were not used. An examination of conceptual models requires an assessment as to whether the theories

represented in conceptual models are appropriate and whether other theories may be more or equally appropriate. For this reason, EPA is proposing that the DOE identify and describe all conceptual models that the Department considered and provide justification why some were selected and others were not. The Agency solicits comments on this approach and on whether any particular theories should be represented in conceptual models used to support compliance certification applications.

ÈPA is proposing to require that documentation include such items as: Descriptions of the theoretical backgrounds of each model, the method of analysis and assessment, scenario construction. data collection procedures, and code structures and source codes. In addition, the Agency is proposing that user's manuals be submitted that include the following information: discussions of the limits of applicability of each model; detailed instructions for running the codes including hardware and software requirements; input and output formats with detailed explanations of each input and output variable and parameter; listings of input and output files with a sample computer run; reports on code verification, benchmarking, validation and quality assurance procedures. The Agency is also proposing to require the submission of programmer's manuals and any necessary licenses. Programmer's manuals typically include such things as the mathematical formulations included in the model, computational algorithms and modeling structures.

In addition, because the WIPP disposal system is very complex, it is likely that some of its characteristics correlate to one another. If this correlation is not reflected in modeling efforts, then the models may fail to portray the realities of the system and significant errors in performance assessment results can occur. Covariance, a measurement of the tendency of random variables to vary together, is used to evaluate this possibility. Therefore, EPA is proposing that information be provided which indicates whether and how models and codes handle covariance of model input parameters. If models do not consider covariance, EPA would expect to be provided with an explanation of why covariance was not considered and the potential impact of instead treating variables independently. EPA solicits comments on this approach and on the alternatives of (1) requiring covariance to be included in models and codes and, (2) requiring covariance to be included

unless justification can be provided that the independent treatment of variables would cause models to predict greater releases than if covariance is taken into account.

Finally, EPA proposes that copies of the models and software, data files, source codes, licenses, or other materials necessary to run the models on EPA's own computers (or on DOE computers if EPA computers are unable to run the models) be provided to the Agency within 30 days of a request by the Administrator or the Administrator's authorized representative. Additional requirements for models are covered in the quality assurance and peer review sections of today's proposal.

Waste Characterization

In order to make meaningful predictions about the performance of the WIPP over long periods of time, it is necessary to have a good understanding of the characteristics of the waste proposed to be emplaced in the disposal system. The potential for releasing radionuclides from the disposal system can be directly affected by the chemical, radiological, and physical composition of the waste. These factors, therefore, can affect the ability of the WIPP to comply with the 40 CFR part 191 disposal standards and, consequently, must be examined as part of any certification or determination of compliance.

Currently, the waste inventory to be potentially disposed of at the WIPP consists of: (1) A large volume of stored ("existing") waste with varying degrees of adequacy of accompanying documentation regarding its composition and properties; and (2) an estimated larger volume of "to-begenerated" waste about which there is uncertain knowledge of its expected composition and properties.

For the purpose of gaining a complete understanding of the waste proposed for disposal at the WIPP, EPA is proposing to require submittal of a detailed description of the waste's chemical, physical, and radiological contents including a description of the activity in curies of each radionuclide contained in such waste. Such description shall be used in assessing compliance with subparts B and C of 40 CFR part 191.

To identify waste characteristics important to the containment of waste in the disposal system, EPA is proposing that DOE undertake a study to determine the effect of various characteristics on the performance of the disposal system. The characteristics studied shall include, but need not be limited to: (1) waste form; (2) free liquid content and liquid saturation; (3)