66 FR 12820
(2)

NUCLEAR ENERGY INSTITUTE

Dr. Ronald L. Simard
Senior Director, Business
Services Department
Business Operations Division

May 10, 2001

Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Comments on Draft Regulatory Guide DG-1101, *Site Investigations for Foundations of Nuclear Power Plants* **(66 *Fed Reg* 12820)**

PROJECT NUMBER: 689

Attention: Rules and Directives Branch

The Nuclear Energy Institute[1] is offering comments in response to a *Federal Register* notice that solicited public comments on Draft Regulatory Guide DG-1101, *Site Investigations for Foundations of Nuclear Power Plants.*

Our detailed comments are provided in Enclosure 1. Most of our comments are suggestions for clarification or improvement in the document. In general, the guidance is well written and comprehensive.

We appreciate the opportunity to comment on the draft regulatory guide. Please contact Doug Walters at (202) 739-8093 if you have any questions on this submittal or wish to discuss our comments in more detail.

Sincerely,

R. Simard

Ronald L. Simard

[1] NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including regulatory aspects of generic operational and technical issues. NEI members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

Template = ADM-013

E-RIDS = ADM-03
Add = A. Bellavek (AFB)
E. Zurfluh (LEEZ)

1776 I STREET, NW SUITE 400 WASHINGTON, DC 20006-3708 PHONE 202.739.8000 FAX 202.785.4019 www.nei.org

NEI Comments
Draft Regulatory Guide –1101
Site Investigations For Foundations Of Nuclear Power Plants

Page No.	Section	Comment
6	3.3	Recommend including a geotechnical engineer on the reconnaissance team.
6	3.4	Swelling soils are generally not in the same category as fault displacement, underground cavities, landslides, etc. since they are commonplace in many areas of the country and can be improved or removed fairly easily. They should be removed from the list.
6	4.1	In second paragraph, insert "drilling and sampling" before "in situ testing". In fourth paragraph, insert "in situ tests (CPTs, etc.)" before "piezometers."
8	4.3	In second paragraph, after "engineering geologic cross-sections", add "and/or subsurface profiles (including N-values, CPT values, etc.)". In third paragraph, even for less critical structures, the borings should be structure-specific rather than spaced to define general geologic conditions.
8	4.3.1	It would be more reasonable to have the one continuously sampled boring based on either the d_{max} or the 10 m below the foundation level depending on which would result in the deeper boring. As an alternative, the depth of the continuously sampled boring should be tied to the dimensions of the building; for example the boring should be as deep as the least dimension of the building.
9	4.3.1.1	In first paragraph, remove the word "favorable". In second paragraph, add the phrase "beneath the major structures" to the end of the last sentence.
9	4.3.1.2	In second paragraph, use 30 mm instead of 3 cm (SI system). In same paragraph, there seems to be no basis for measuring vertical deviation of >100 ft boreholes unless there is a particular reason, e.g. rods are being bent/diverted by obstruction, near-vertical rock bedding, etc.
10	4.3.2	This section refers to taking split spoon samples. The proper name for these samples is split-barrel samples. Although alternating split-barrel and undisturbed samples may be advantageous in certain soils (e.g., stiff clays), it will not work under many circumstances, e.g., dense sands (tubes won't work) or

NEI Comments
Draft Regulatory Guide –1101
Site Investigations For Foundations Of Nuclear Power Plants

Page No.	Section	Comment
		very soft clays (SPTs will give weight of rods or weight of hammer).
11	4.3.2.3	At end of second paragraph, drill holes should be at least 3.5 inches (90 mm) in diameter to accommodate 3 inch diameter tube.
13	4.3.4	This section should contain a separate subsection on cone penetrometer testing since this has become a major tool for subsurface exploration. The subsection would describe the various attachments now available for the CPT, e.g., piezocone, seismic, inclinometer, electrical resistivity, videocone, etc. Possibly also include a separate subsection for the pressuremeter.
15	5	Need to clarify the use of pumping tests noted in the text. For individual wells, permeability can be estimated using rising head, falling head or constant head tests – either by filling or emptying the well or using slug tests. Pumping tests are normally where we pump from one well and measure drawdown in a series of surrounding wells to estimate permeability.
16	6	Although we agree that construction mapping is important, it should not be included in this guide. Obviously construction mapping, if performed, will be completed long after the site investigation and foundation design is completed.
17	7.1	Should the vertical control be referenced to NAVD 88?
23	Appendix A	First entry under Influence on Project references Item 13. What is Item 13?
24	Appendix A	Area Subsidence, Office Studies: "Oil fields" should be modified to include "Oil and gas fields". Also, "Past mineral extraction" should be added to this item to include any underground mining such as coal.
24	Appendix A	Abnormally low pore pressure..., Questions to Answer: "possible cause the past" should read "possible cause from past" (typo).
25	Appendix A	Varved clays, Office Studies: "Prehis toric" should be "prehistoric" (typo).
25	Appendix A	Dispersed clays, Office Studies: "behav ior" should be "behavior" (typo).
31	Appendix C	Hollow Stem Auger Boring, Limitations: Add – Not recommended below the groundwater level in cohesionless soils.

NEI Comments
Draft Regulatory Guide –1101
Site Investigations For Foundations Of Nuclear Power Plants

Page No.	Section	Comment
34	Appendix C	Cone Penetrometer Test, Limitations: "verification of by other" should read "verification by other" (typo).
34	Appendix C	The procedure and applicability sections for the cone penetrometer should be expanded to include downhole seismic testing, porewater measurements, and dissipation testing. California Bearing Ratio (CBR) is a common in situ test that is not included.
38	Appendix D	Depth of boring must be related to size, loading and importance of structure
39	Appendix D	Deep cuts, canals, MINIMUM DEPTH OF PENETRATION: "ground-water" should be "groundwater" to be consistent with other usage in the document.
41	Appendix E	Refraction, Limitations: The phrase "Rapid, accurate, and relatively economical technique. Interpretation theory generally straightforward and equipment readily available." is used under both headings Advantages and Limitations. It should not be both. It appears that this statement should only be an advantage. Hence, delete the statement from the Limitations column.
41	Appendix E	Reflection, Limitations: The phrase "Rapid, thorough coverage of given site area. Data displays highly effective." is used under both headings Advantages and Limitations. It should not be both. It appears that this statement should only be an advantage. Hence, delete the statement from the Limitations column
41	Appendix E	Rayleigh wave dispersion, Limitations: The phrase "Rapid technique which uses conventional refraction seismographs." is used under both headings Advantages and Limitations. It should not be both. It appears that this statement should only be an advantage. Hence, delete the statement from the Limitations column and state "None of importance".
41	Appendix E	Vibratory (Seismic), Limitations: The phrase "Controlled vibratory source allows selection of frequency, hence

Page No.	Section	Comment
		wavelength and depth of penetration [up to 60 m (200 ft.)]. Detects low-velocity zones underlying strata of higher velocity." is used under both headings Advantages and Limitations. It should not be both. It appears that this statement should only be an advantage. Hence, delete the statement from the Limitations column and state "None of importance".
42	Appendix E	Should note that GPR generally performs poorly in heavy loamy soils. If high voltage electrical cables are buried, should measure thermal resistivity of the soil to estimate heat dissipation. Should note that electrical resistivity can now be measured at specific depths using a cone penetrometer attachment.
48	Appendix F	The CPT as applicable as SPT for bearing capacity and mass deformability estimations. At the bottom of Table F-4, there is an equation for static shear modulus supplied as follows: $G_{eff.} = 1960\ N^{0.51}$ It is assumed that the static shear modulus refers to the large strain shear modulus. This particular equation is unknown to us; it would be good to include a reference for this equation. In addition, when we checked this equation against other similar equations, it appears the calculated shear modulus is more in the range of dynamic (small strain) shear modulus values. It is suggested that this equation be checked to ensure it is meant to be a static and not a dynamic shear modulus.
51	Regulatory Analysis	STATEMENT OF PROBLEM, 2nd paragraph: This is the first general reference to the ASTM standards. Only ASTM D 5092 is cited in the text. Is there a specific reason why only the Engineering Manuals (EM) are specifically cited? Since the ASTM procedures are commonly used, there should be at least a general listing of this reference in the REFERENCES on page 20.