

FORMAT OF SITE ASSESSMENT REPORT FOR GAMMA RADIATION PROCESSING FACILITY (GRAPF)

Geological and Geotechnical Investigations

1. Site investigations for Gamma Irradiators are necessary to determine the geotechnical characteristics of the site that affect the design, performance and safety of the irradiators. The investigations should produce the information needed to define the overall site geology to a degree that is necessary for an understanding of the subsurface conditions in order to ensure stability against natural hazards like earthquake, flood etc.
2. Site investigations should also provide information needed to define ground water conditions as well as the geotechnical parameters needed for analysis and design of foundations. These include parameters to evaluate the subsurface characteristics for safe engineering of irradiators, such as bearing capacity of foundation material, lateral earth pressure, the stability of cuts and slopes in rock, the effects of earthquake induced motions transmitted through underlying deposits on the response of soils and structure (including the potential for inducing liquefaction in soils) and also those needed to estimate the expected settlement of the structure.
3. Requirements of geotechnical investigations depend on the site specific conditions. However, the following investigations are the minimum, which should be carried out for the evaluation of parameters required for safe design:
 - (a) Field Work
 - (i) Drilling of bore holes, excavation of trial pits
 - (ii) Collection of disturbed/undisturbed soil and water samples
 - (iii) Standard penetration tests
 - (iv) Plate load tests
 - (v) Electrical resistivity tests
 - (vi) Permeability tests
 - (b) Laboratory Tests on Soil Samples
 - (i) Grain size analysis (coarse and fine)
 - (ii) Consistency limit test
 - (iii) Specific gravity of soil
 - (iv) Proctor density test
 - (v) Permeability test
 - (vi) Consolidation test
 - (vii) Modulus of elasticity and poisons ratio
 - (viii) Unconfined/confined compression test
 - (ix) Direct shear test (consolidated drained)
 - (x) Chemical tests on soil

- (c) Laboratory Tests on Rock Samples
 - (i) Petrographic study
 - (ii) Porosity
 - (iii) Unconfined/confined compression test
 - (iv) Modulus of elasticity and Poisson's ratio
- (d) Test on Ground Water Samples
- (e) Chemical analysis of ground water sample

4. Following requisites should be met in connection with geotechnical investigations:

- (i) Prior to commencement of geotechnical investigation, a comprehensive plan of the work should be chalked out. Geological status of the site should be examined based on available information. Additional investigation may be required if site specific conditions warranted so for the safety of the plant.
- (ii) Minimum depth of bore holes should be three times the larger dimension of the footing.
- (iii) Number of bore holes should be such that subsurface profile of the plant area can be drawn with reasonable certainty in any direction. At least four data points should be available, in any direction, for plotting of sub surface profile.
- (iv) Geological mapping of the foundation pit should be carried out after completion of excavation.
- (v) Appropriate rectification/stabilisation measures shall be adopted if it is found necessary after excavation.

4.1 Reports on Geotechnical Investigation

The geotechnical report should contain the following details:

- (i) Geological status of the site based on available information
- (ii) Details of bore logs and trial pit logs
- (iii) Permeability test results
- (iv) Ground water observations
- (v) Results of soil and rock tests
- (vi) Chemical test results of water
- (vii) Subsurface profiles
- (viii) Electrical resistivity logging
- (ix) Petrographic study results
- (x) Evaluation of foundation design parameters