

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM FOR WASTE MANAGEMENT FACILITIES

BY

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INTRODUCTION

The U.S. Environmental Protection Agency (EPA) supports the implementation of quality assurance/quality control (QA/QC) programs for waste management facilities. This support is in the form of documents (1), (2) in training programs, (3) and in support of other programs such as National Institute for Certifying Engineering Technologists (NICET) (4). Each of these areas have their own objective and format but in total equal a program that we feel will assist in obtaining state-of-the-art technology for waste management facilities.

QA/QC procedures are widely recognized procedures that are critical to constructing the facility that that was designed. In order to ensure that the best designs and regulatory requirements are translated into waste facilities that are protective of human health and the environment these facilities must be constructed properly. It is assumed that not only the construction of the facility but also the materials used in construction will have undergone a QA/QC program.

RESPONSIBILITY AND AUTHORITY

There are many people involved with QA/QC activities for designing, permitting, constructing, and inspecting a waste management facility (see Figure 1). Some of these people are:

- Permitting Agency - It is the responsibility of this group to review the design procedures to be used in construction including the materials and inspection of the final facility.
- Owner/Operator - This organization will be the owner of the facility and will operate the site. The organization may be public or private and has the responsibility of ensuring the facility is designed and constructed in a manner that is suitable to the permitting authority.

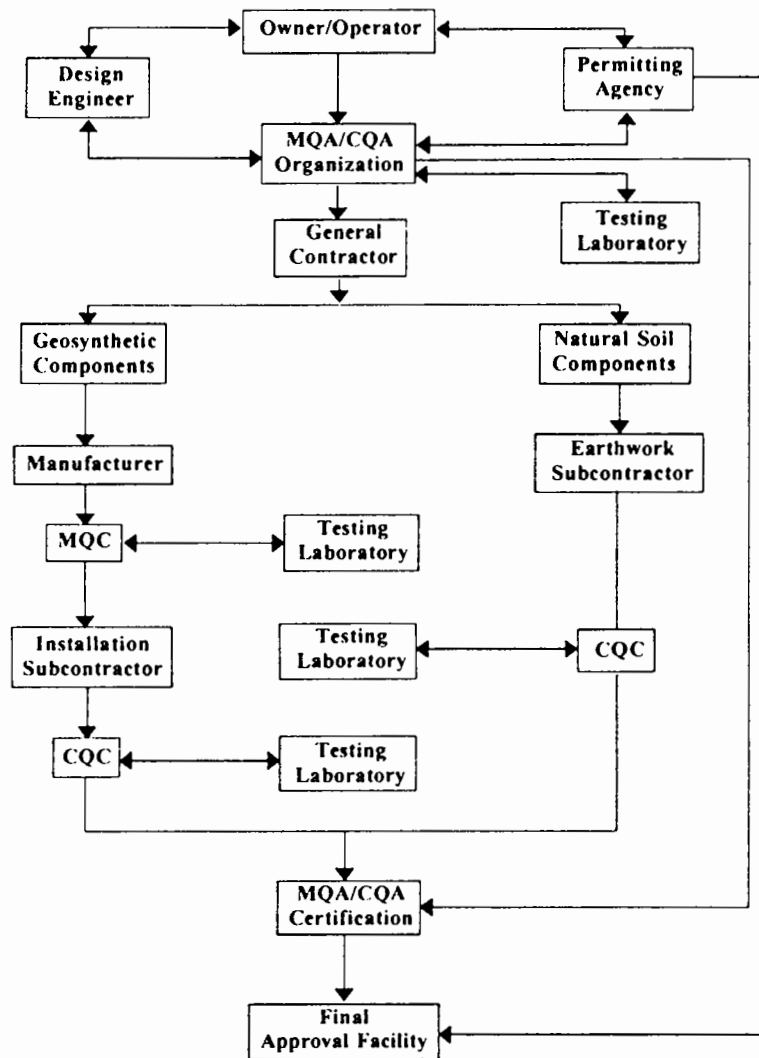


Figure 1 - Organizational Structure of QA/QC Inspection Activities

- Owner's Representative - The person in this position usually operates between the owner and the rest of the people involved in the facility. This person is responsible for scheduling, meetings, field activities and communication between all groups associated with the project.
- Design Engineer - This person is to design a facility that fulfills the operational requirements of the owner/operator, meets the regulatory requirements and complies with accepted design practices. This person is involved to ensure the design changes meet the objectives of the site for quality.
- Manufacturer - The manufacture supplies components that are manufactured. Minimum required specifications are written. The steps taken by the manufacturer are critical to overall quality management in construction of waste management facilities.
- Fabricator - Some components are assembled from manufactured materials. It is important that the end products meet or exceed the minimum specifications.
- General Contractor - He has the overall responsibility for construction of the waste management facility and for CQC during construction. He buys materials and arranges for them to be installed.
- Installation Contractor - He installs manufactured products
- Earthwork Contractor - This contractor is responsible for earthwork at the site.
- CQC Personnel - These people are responsible for ensuring that the construction is as per specifications.
- MQA/CQA Engineer - This person is responsible for overall QA/QC activities.
- MQA/CQA Personnel - These people make observations and perform field test to ensure that a facility is constructed according to specifications.
- Testing Laboratory - The laboratory is responsible for testing of samples submitted from field.
- MQA/CQA Certify Engineer - This person is responsible for certifying that the facility has been built to plans and specifications.

Construction project management is essential. It all starts with a plan. The plan is something that is not developed on a daily basis but is there from day one. It explains who should do what and when. It will tell what reports are necessary, what inspection reports are necessary, what to do when problems arise, what corrective actions should take place, who should be doing it and provides the documentation. Drawings and documents are very important. Drawings are usually prepared on a daily basis to form the as-built drawings. Final QA/QC documents, which can be voluminous, are certified and explain procedures at the site.

Meetings

Communication is a necessary part of the construction process. All parties must know, up front, who is responsible and what their authority is for corrective actions. Prebid meetings will identify problems so that owners/operators can correct them or explain to the construction personnel how things will be done. Other meetings such as pre-construction and progress meetings are equally important to identify and correct problems, identify action items, and to improve overall quality of the project.

Weather

Weather plays an important role in construction of a waste management facility. Installation of clay materials as well as geosynthetics is particularly sensitive to weather conditions. Weather may restrict the installation of certain materials at times and it is the responsibility of the contractor to make sure these weather restrictions are observed during construction.

EPA's Training Programs

The EPA is involved with not only the documentation of QA/QC activities, but also the training needed for proper performance of those activities. EPA's Center for Environmental Research Information (CERI) will stage a series of training courses during the summer of 1994. These courses will be offered in each of the EPA ten Regions and will be open to the public, at no cost.

The purpose of these training courses are to present information on a QA/QC program that addresses both natural soils and geosynthetics. The information includes a good description of principles and concepts, compacted soil liners, soil drainage systems, geosynthetic drainage systems, vertical cut-off walls, ancillary materials, appurtenances, and other details. The course will identify critical QA/QC issues for each major segment of the industry and recommend specific procedures, observations, tests, corrective actions, and recordkeeping requirements.

In addition to Agency training, several independent groups have developed course work that will train those in taking the NICET certification course.

Certification

The EPA and Geosynthetic Research Institute (GRI) have supported the development of a program for certifying inspectors for natural (soil) and geosynthetic materials used in waste management facilities. The EPA and GRI reviewed various certification programs before selecting the National Institute for Certifying Engineering Technologies (NICET). NICET was selected because they keep abreast of technology, manpower, application practices, and educational trends. NICET has an established and recognized program that evaluates the qualifications of those who voluntarily apply for certification, administer written tests, and provides a schedule for attaining different levels of achievement. The NICET program is now supported by industry, academia and government agencies. Tables 1 and 2 are the recommended implementation programs for construction quality control and construction quality assurance.

Table 1 - Recommended Implementation Program for Construction Quality Control (CQC) for Geosynthetics* (Beginning January 1, 1993)

No. of Field Crews** At Each Site	End of 18 Months (i.e., June 30, 1994)	End of 36 Months (i.e., January 1, 1996)
1-4	1 - Level II	1 - Level III***
≥ 5	1 - Level II 1 - Level I	1 - Level III*** 1 - Level I

*Certification for natural materials is under development as of this writing

**Performing a Critical Operation; Typically 4 to 6 People/Crew

***Or PE with applicable experience

Table 2 - Recommended Implementation Program for Construction Quality Assurance (CQA) for Geosynthetics* (Beginning January 1, 1993)

No. of Field Crews** At Each Site	End of 18 Months (i.e., June 30, 1994)	End of 36 Months (i.e., January 1, 1996)
1-2	1 - Level II	1 - Level III***
3-4	1 - Level II 1 - Level I	1 - Level III*** 1 - Level I
≥ 5	1 - Level II 2 - Level I	1 - Level III*** 1 - Level II 1 - Level I

*Certification for natural materials is under development as of this writing

**Performing a Critical Operation; Typically 4 to 6 People/Crew

***Or PE with applicable experience

The program has been supported by other Federal Agencies, State, consultants, and waste management firms. Testing has begun and the program is well underway.

In addition, GRI has undertaken a task to certify laboratories. The program is still in its infancy with the details of inspection of the laboratories, what will go into a certification and the fee, still need to be determined. The first round of laboratory visits is scheduled for the summer of 1994 with discussion of the results before full implementation in 1995.

SUMMARY

The USEPA is supportive of QA/QC activities for waste management facilities. The Agency is convinced that a good QA/QC program for waste facilities will improve performance of these units. Included in these programs are Agency developed manuals detailing personnel, inspection and testing requirements. Added to this activity is the training of personnel via formal courses developed by CERI and the public sector in developing courses for NICET certification. Lastly, the Agency supports the development of certifying inspectors (NICET) and the certification of laboratories testing materials going into waste management facilities.

REFERENCES

1. Environmental Protection Agency 1991. Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams EPA/530/SW-91/051, U.S. Environmental Protection Agency, Cincinnati, OH, May 1991.
2. Environmental Protection Agency 1993. Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities EPA/600/R-93/182, U.S. Environmental Protection Agency, Cincinnati, OH, September 1993.
3. Center for Environmental Research Information (CERI), Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, OH, 45268.
4. National Institute for Certification in Engineering Technologies, 1420 King Street, Alexandria, VA 22314-2715.

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