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GEOHERMAL STANDARDIZATION AND ASTM TECHNICAL COMMITTEE E44 ON SOLAR, GEOTHERMAL AND OTHER ALTERNATIVE ENERGY SOURCES

Teresa J. Cendrowska¹

¹ ASTM, Committee E44, Philadelphia, PA 19103

ABSTRACT

Standards can serve as the basis for commercial transactions and regulations. As international trade becomes more commonplace, the need for globally accepted technical standards, developed in a cooperative atmosphere, grows. The geothermal energy industry will not escape this trend. Efforts initiated by the Geothermal Resources Council (GRC) have gained momentum and have resulted in the development of new draft and approved standards for the geothermal industry. Development of these geothermal consensus documents has been managed by ASTM, specifically Committee E44 on Solar, Geothermal and Other Alternative Energy Sources and its geothermal subcommittees.

ASTM AND ITS STANDARDS PROCESS

ASTM is a non-profit organization that provides a management system for the development and publication of voluntary, consensus standards. There is great emphasis on consensus. Anyone interested in participating in the development of standards related to a particular topic or field, regardless of technical background, may participate. Of approximately 400 standards developing organizations in the United States, ASTM is the largest.

The standards development process in ASTM focuses on consensus, bringing together all who have an interest - producers, users, general interest members (including academic and government representatives) and consumers. As a result the standards developed are technically current, accurate and credible.

ASTM standards are also voluntary, both developed and used voluntarily. The only time an ASTM standard may be mandated is when called out in a contract between two parties, or when cited by a government body.

The only requirement for maintaining active membership is the return of Main Committee Letter Ballots (MCLBs). Meeting attendance is not mandated by ASTM, however, the benefits of attending subcommittee and main committee meetings include: contact with other industry professionals, open exchange of technical information, early information on new standards and revisions and a full vote on balloted documents.

STANDARDS: TYPES, DEVELOPMENT

In ASTM the term "standard" is used as an

adjective to modify the six types of standards documents: guides, test methods, specifications, practices, terminology and classifications.

Standards writing is the primary focus of each committee. Standards may be developed in as little as eight months (provisional standards with limited consensus) or may take up to 20 months to develop. The time it takes to develop a standard is dependent upon three factors: the complexity of the document, urgency of the need for the standard, the number of members dedicating their time to the work.

The cost of developing a standard includes the participants' time and travel expenses. At times participants offer their test facilities for interlaboratory tests. ASTM does not charge a project fee for its administrative support.

Today, ASTM publishes over 9,000 standards annually in 69 volumes of the Annual Book of ASTM Standards.

ASTM STRUCTURE

In ASTM there are currently 131 technical committees working to develop standards for and promote knowledge about topics as varied as geothermal energy, shipbuilding, plastics, search and rescue, environmental assessment, coal and detention and correctional facilities. (ASTM develops standards for systems and services as well as materials and products.) Each technical committee has several subcommittees; they total to over 2100 subcommittees. Units of participation exceed 90,000 which means that each member generally participates in more than one subcommittee. ASTM has over 35,000 members, of which 5,000 are international members.

While membership is open to anyone with an interest there is one membership requirement for those committees that develop commercial standards, i.e. specifications. In such committees the number of voting members classified as producers may not exceed the total number of voting members assigned user, consumer and general interest classifications. This requirement was established to prevent producers from blocking their votes together. Additionally, while an organization may send more than one participant to a meeting, only one participant from each organization is assigned an official vote on a sub- or the main committee.

The size of each committee is as varied as the topics they address, ranging from 60 to several thousand members. A typical committee, if there is such a thing, includes approximately 200 members on its roster.

ASTM's income is derived from two sources. Fifteen percent of the income is derived from the annual membership fee. This income helps defray the cost of: mailing ballots, providing each member with a free volume of his or her choice of the Annual Book of ASTM Standards, providing staff support and the monthly publication Standardization News. The balance of ASTM's income is obtained from the sale of standards and special publications.

THE BALLOTING PROCESS

Balloting is the key to the development of consensus documents. (Fig. 1) In ASTM a task group of approximately 5-7 people, not necessarily ASTM members, meet to

either develop a draft, or review and revise an existing standard. (ASTM documents are living documents, at a minimum they must be reviewed and re-approved by the sponsoring committee every five years. However, the sponsoring subcommittee may consider revisions at any time.) Once the task group feels a document is ready for review, the document is moved to the subcommittee of jurisdiction for the first level of balloting. For example, when first drafted, the Standard Practice E 1675-95 for Sampling Two-Phase Geothermal Fluid for Purposes of Chemical Analysis was submitted to Subcommittee E44.15 on Geothermal Field Development.

At the subcommittee level, 60% of the voting members on the subcommittee roster must return their ballots marked with an affirmative, negative or abstaining vote. Of the 60% returning the ballot, two-thirds of the members voting either affirmatively or negatively must cast affirmative votes to consider the ballot valid. If a document receives no negative votes it is automatically moved to the main committee level of balloting, e.g. Committee E44 on Solar Geothermal and Other Alternative Energy Sources. At this level of balloting sixty percent of the voting members must again return a ballot marked with an affirmative, negative or abstaining vote. The percentage requirement for consensus is increased to 90% at the main committee level.

While being reviewed at the main committee level the document is also placed on Society Review. Items open for Society Review are listed in the monthly publication **Standardization News**. From this listing any member of the Society may request a copy of a document for review. At the Society level of review there are no percentage requirements for returns or affirmative votes. Society Review provides

all members of ASTM the opportunity to review and provide their input to the Committee of jurisdiction.

At any level of balloting, subcommittee, main committee or Society, a reviewer may issue a negative vote. Such action prohibits the draft or revised document from moving forward until the negative has been evaluated and acted upon by the document's sponsoring subcommittee. The subcommittee may find the negative persuasive, resulting in an appropriate revision, or the negative may be ruled not persuasive or not related. In the latter two cases, rationale for the subcommittee's action and supporting votes are required.

Finally, any document receiving a negative that has been ruled not persuasive or not related, at or after the main level of balloting, will be reviewed by the Committee on Standards (COS). COS is a standing committee of the Society composed of nine members. Each year three members are selected from the Society's general membership to serve a three year term. COS members review, on a monthly basis, the handling of the not persuasive and not related negative votes. The purpose of the review is to ensure that the negative voter enjoyed due process when the subcommittee addressed his or her negative. In ASTM emphasis is placed on completely addressing the negative voter's concern.

ASTM committees not only develop standards but promote the knowledge of a given field by sponsoring symposia. On the average, ASTM sponsors 40 symposia annually. Following the symposium, the presenters' papers are peer reviewed and

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published in Special Technical Publications (STP's) or one of ASTM's journals.

COMMITTEE E45 ON GEOTHERMAL RESOURCES AND ENERGY

Committee E45 was formed in 1979 at the request of the U.S. Department of Energy (DOE) and initially included subcommittees for geothermal drilling, logging, field development, energy utilization systems, heat pump applications, emission abatement, waste disposal, materials, product recovery and chemical analysis. With the active assistance and participation of the Geothermal Resources Council the committee developed and approved seven standards by 1986. The fall of oil prices in the mid-1980's brought a decrease in funding and activity in the geothermal industry. Committee E45 activity followed the industry's cycle.¹ In 1988, ASTM merged Committee E45 with Committee E44 to create Committee E44 on Solar, Geothermal and Alternative Energy Sources. After a two year hiatus, interest in E44's geothermal subcommittees was renewed by the GRC due to certain industry trends: increased interest in marketing domestic equipment and services overseas, low pollution generation of geothermal energy, and expanded applications of geothermal energy.

Today E44 has 95 members of which approximately 35% regard geothermal energy as their primary activity. Three subcommittees exist and are designated: E44.15 on Geothermal Field Development, E44.20 on Geothermal Utilization and E44 on Geothermal Materials.

Since their reactivation the subcommittees have reviewed and re-approved the existing standards, withdrawn one existing standard from publication (Standard Practice E 1128-86 for Establish

ing Parameters for Testing Dynamic Seals for Geothermal Use), and have successfully balloted a new standard, Standard Practice E 1675 for Sampling Two-Phase Geothermal Fluid for Purposes of Chemical Analysis. (Fig.2) Another document, New Standard Practice for Geothermal Resistivity Imaging Logging, is being developed by a task group. Additionally, task groups have been established to consider standards for well logging, well testing and blow-out prevention.

SUMMARY

Standards can be effective in providing a level playing field for producers, purchasers and end-users.

In a related field, petroleum, ASTM Committee D02 on Petroleum Products and Lubricants has worked since 1904 to develop standards. With participation from producers and users and another key industry organization, namely the American Petroleum Institute (API), the committee has developed 459 standards. This committee also regularly sponsors symposia and technical and professional training courses.

ASTM Committee E44 stands ready to provide a forum for developing germane, credible and technically accurate standards. Standards provide a common language by which manufacturers, users, distributors and government bodies may communicate and establish acceptable requirements for quality, reliability and safety. Through the standards development process participants are exposed to cutting edge technologies and are able to exchange information.

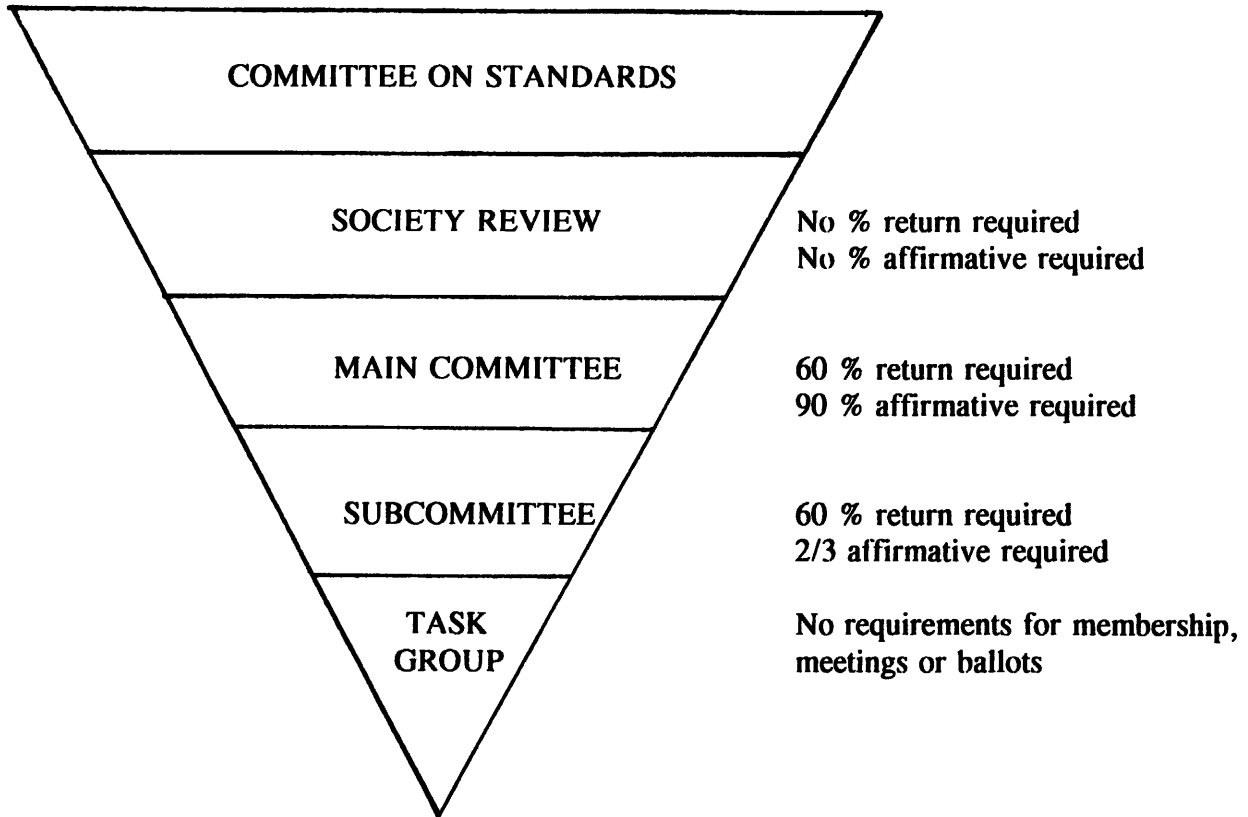
Domestic and international product acceptance is facilitated because member companies, representing their own interests, participate in the standards development process. With international participation, and international acceptance of ASTM standards, entrance into international markets is eased. Government bodies, now attentive to replacing government standards with commercial standards, find that the ASTM forum produces a standard more easily accepted by industry because industry participated in the development of the document. Additionally, government procurement is facilitated by ASTM standards because of commercial availability and through reference to the standards in government contracts.

Participation in an ASTM committee takes a number of forms: proposing areas of the industry that require standardization, developing draft documents in a task group, reviewing new or revised documents as they appear on ballot or holding a committee office. Your participation in Committee E44 is vital.

REFERENCES

ASTM rejuvenates geothermal energy activities,
Standardization News, March 1992, p
15-17.

FIG. 1 THE ASTM BALLOTING PROCESS



**FIG. 2 ASTM - COMMITTEE E44 GEOTHERMAL STANDARDS
LISTED BY SUBCOMMITTEE JURISDICTION****E44.15 on Geothermal Field Development**

- E 947-83 (1991) Specification for Sampling Single-Phase Geothermal Liquid or Steam for Purpose of Chemical Analysis
- E 1008-84 (1991) Practices for Installation, Inspection, and Maintenance of Valve Body Pressure Relief Methods for Geothermal and Other High-Temperature Liquid Applications
- E 1675-95 Practice for Sampling Two-Phase Geothermal Fluid for Purposes of Chemical Analysis
- z5084z Draft Practice for Geothermal Resistivity Imaging Logging

E44.20 on Geothermal Utilization

- E 974-83 (1991) Guide for Specifying Thermal Performance of Geothermal Power Systems

E44.40 on Geothermal Materials

- E 1068-85 (1992) Test Method for Testing Nonmetallic Seal Materials by Immersion in a Simulated Geothermal Test Fluid
- E 1069-85 (1992) Test Method for Testing Polymeric Seal Materials for Geothermal and/or High Temperature Service Under Sealing Stress
- E 1128-86 Practice for Establishing Parameters for Testing Dynamic Seals for Geothermal Use (Withdrawn by subcommittee.)