Proceedings World Geothermal Congress 2005
Antalya, Turkey, 24-29 April 2005

Geothermal Safety and Health Rules and Regulations in the Philippines

Alejandro F. Oanes, Josefino C. Adajar and Ariel D. Fronda

Geothermal and Coal Resource Development Division, Department of Energy, Taguig, Philippines

alexoanes@yahoo.com, bobskyadajar@yahoo.com, adfronda@yahoo.com

Keywords: Safety, rules and regulations, geothermal operations

ABSTRACT

The Philippine Department of Energy is mandated to ensure adequate safety and protection against hazards to health, life as well as pollution of air, land and water from geothermal operations.

The Geothermal Safety and Health Rules and Regulations (GSHRR) was formulated. It incorporates the modern safety management systems that enforce measures on risk assessment, identify the significant hazards and set the framework that will enable geothermal industries to set their own safety management control. Likewise, it contains the DOE's new administrative requirements on occupational safety and health provisions and updated standards for an effective safety management of geothermal operations in the country.

1. INTRODUCTION

The geothermal activities in the Philippines were initiated by the Commission on Volcanology, a research agency of the Philippine Government in 1962. Five years later, on April 12, 1967, for the first time in the country, an electric bulb was lighted by geothermal energy at Cale, a remote barrio in the Municipality of Tiwi, Albay. By 1970, the Philippine Government, recognizing the benefits that can be obtained from geothermal energy and realizing that the exploration work at Tiwi had reached the stage for commercial development, gave the National Power Corporation the task to develop and exploit the field. Since then, geothermal exploration and drilling activities have been on in full swing in the Tiwi area and in other equally potential fields in the country.

As of May 2004, there are six geothermal fields in the country with installed generating capacity of 1930.89 MWe. (Figure 1). The total manpower from the field developers (PNOC & PGI) including sub-contractors is 3119 personnel while the Power Plant operators have total manpower of 1739 employees. (Table 1)

To ensure adequate safety and protection against hazards to health, life as well as pollution of air, land and water from geothermal operations, the DOE formerly OEA (Office of Energy affairs) in cooperation with the field developers spearheaded the formulation of the first Philippine Geothermal Safety and Health Rules and Regulations (GSHRR) in 1990. It was signed into a law by then OEA Executive Directors on November 8, 1991 under OEA Circular No. 91-11-06.

The law authorizes the OEA to conduct safety inspection to all geothermal field but limited only to the field operations. It was fully implemented until the approval of the Revised version of the GSHRR or RGSHRR in February 11, 2000.

Table 1. Number of employees in each field including sub-contractors and power plant operators.

FIELD	*PNOC*	*PGI*	*P.P.*
MAKBAN	0	33	758
TIWI	0	43	224
BACMAN	500	0	132
TONGONAN	1264	0	408
PALINPINON	443	0	153
Mt. APO	466	0	64
NNGP	370	0	0
T O T A L	3043	76	1739

2. FORMULATION OF RGSHRR

In 1996, the DOE formed a Technical Working Group (TWG) to revise the original GSHRR in line with the Modern Safety and Health Management or Loss Control Management. The members of the TWG were mostly safety practitioners from the concerned government agencies and geothermal field contractors

The TWG conducted several meetings and deliberations until it came out with the final draft in late 1999 and submitted to the Secretary of DOE for approval. The RGSHRR was promulgated under Department Circular No. 2000-02-001 on 11 February 2000.

The RGSHRR incorporates the Modern Safety and Health Management system that enforce measures on risk assessment, identify the significant hazards and set the framework that will enable geothermal industries to set their own safety management control.

Following are the salient features of the RGSHRR.

1. It contains the DOE's new administrative requirements on occupational safety and health provisions and updated standards for an effective safety management of geothermal operations in the country.

2. It expands the authority of the DOE to supervise not only the operations of the geothermal contractors but also to the sub-contractors and power plants operators as well.

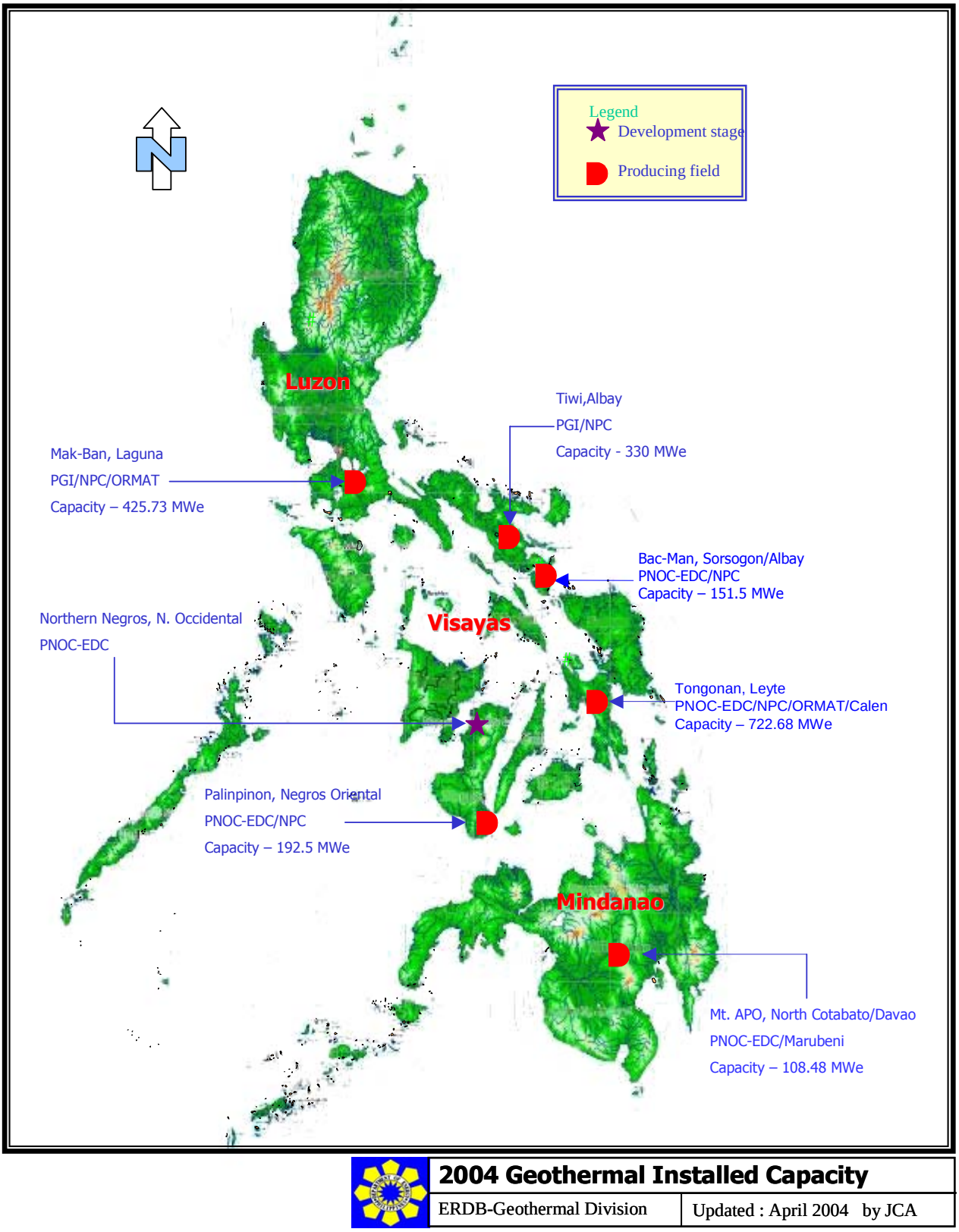


Figure 1. Geothermal Installed Generating Capacity as of May 2004

3. It standardizes the accident report writing and monthly accident statistics submitted to DOE by using the form included in the appendix of the RGSHRR.

4. It provides the DOE's tool to compare the safety performance of each company by using the different forms required in the RGSHRR.

5. It can monitor the use/disposition, purchase and current inventory of explosives through the use of the appendix D form which is the Explosives Monthly Transaction Report.

2. TABLE OF CONTENTS

C4. Analysis of Personal Accident by Occupation Report Form

C5. Analysis of Personal Accident by Part of the Body Report Form

C6. Analysis of Personal Accident by Workplace Report Form

C7. Analysis of Personal Accident by Immediate Causes Report Form

D. Monthly Explosives Transaction Report Form

3. FORMULATION OF CODE OF PRACTICE

Under Section 8, Rule 2 of the RGSHRR, The Bureau of Energy Resource Development of the Department of Energy is mandated to make technical guidelines and/or code of practice for safety and health management systems for any geothermal operations, processes or methods that are deemed necessary to ensure appropriate and effective implementation of safety and health measures that the employers is requires to observe under the Rules.

To ensure that the code of practice will be enforceable to the Geothermal Service Contractors, the DOE activated the TWG, which formulated the RGSHRR and expanded the group to include sub-contractors and power plant operators. Several meetings and deliberations were conducted among the TWG. The final Code of Practice was signed into law on October 6, 2003 under Department Circular Number DC 2003-10-009. The Code of Practice was fully implemented 15 days after publication in a newspaper of general circulation.

3.1 Code of Practice Table of Contents

3. SAFETY PERFORMANCE

The safety performance of the geothermal industry had greatly improved during the implementation of the RGSHRR due to strict monitoring by the DOE safety inspectors and close coordination with the safety officers of all geothermal contractors. Table 2 is the Safety Performance of the Geothermal Field Operators

In 1996, a total of forty-one (41) lost time accident were recorded resulting in 12,608 days lost. The year was marred by an increase of recorded number of LTA and Days Lost. The increase in LTA was due to the two (2) fatal accidents during the year in Tongonan (LGPF). One was classified, as occupational accident while the other was a vehicular accident. During the same year, there were also reports of vehicular accidents at the geothermal fields involving non-geothermal workers.

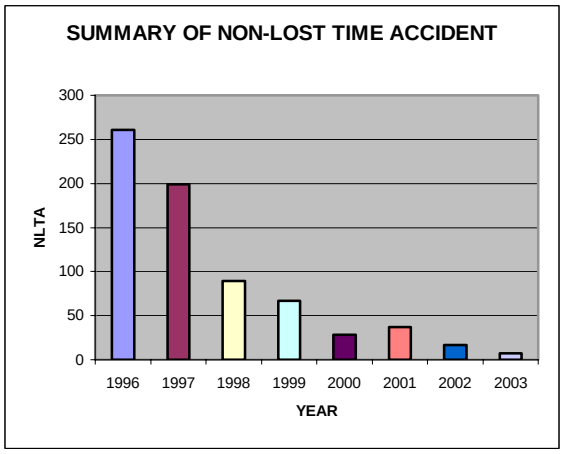
These series of accidents had alarmed the DOE as a result, the review of the existing Geothermal Safety Rules and Regulation was instigated to conform to the Modern Safety Management or Loss Control Management while the safety inspection by the DOE was done on a quarterly basis. Findings during the inspections and subsequent recommendations were submitted to the highest officials of the company to make sure that the concerned supervisors and/or managers will implement all the corrective measures.

The following year (1997), the recorded LTA was only nineteen (19) with 576 Days Lost, which are equivalent to a decrease of 53.66% and 95.54%, LTA and Days Lost respectively, as compared with last year. The exceptionally impressive performance was attributed to the effective implementation of Loss Control Management, adherence to International Safety Rating System (ISRS) standards and close monitoring by the DOE safety inspectors. The reported accidents for the year were commonly caused by S*truck By/Against* occurring frequently at *Shops* and *Rig Area.*

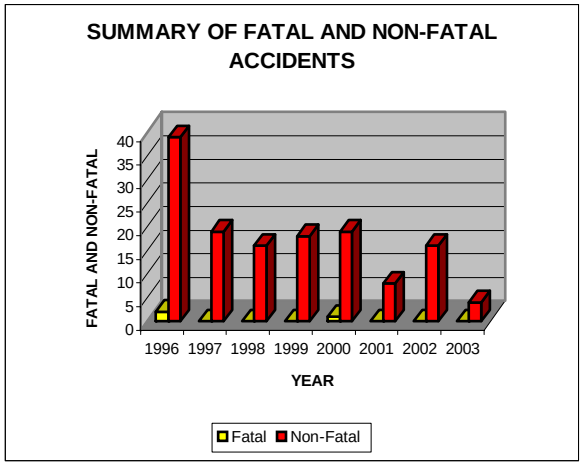
From that impressive performance up to the present the Geothermal Industry had continuously reduced the occurrence of NLTA and Days lost. Graphs 1 and 2 are the summary of non-lost time accident and fatal and non-fatal accidents.

Table 2: Safety Performance of Geothermal Field Operators

	NLTA	NF	F	DAYS LOST
1996	261	39	2	12608
1997	199	19	0	576
1998	89	16	0	303
1999	67	18	0	354
2000	28	19	1	6202
2001	37	8	0	43
2002	17	16	0	167
2003	7	4	0	25



Graph 1: Summary of Non-Lost Time Accidents



Graph 2: Summary of Fatal and Non-Fatal Accidents

REFERENCES

Alcaraz A., Cardozo M. Datuin R. Filart a. Romagoli P and Tolentino B: Energy for Development "The survival of Humankind: The Philippine Experience"(1976)

Adajar J, Ruiz E, Mendoza R: Geothermal Safety and Health Rules and Regulation (1990)

Adajar J., Oanes A, Fronda A, et.al. : Revised Geothermal Safety and Health Rules and Regulations and Code of Practice. (2000)

Det Norske Veritas Industry Pte. LTD.: Loss Control Management:

Det Norske Veritas Industry Pte. LTD. : Accredited Safety Auditing

Department of Energy: 1996 – 2003 year-end reports

Philippine Department of Labor and Employment: Occupational Safety and Health Standards

Philippine National Oil Co.: Monthly Statistical Report

Philippine Geothermal Inc.: Monthly Statistical Report