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Proposed Guide
for
MAINTENANCE OF TRANSFORMER ASKAREL

(Published for trial use)



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CONTENTS

	PAGE
I Introduction	5
II Economic Factors	5
III Classification of Used Askarel	5
IV ASTM Askarel Tests and Their Significance	6
V Other Criteria Which May Be Helpful in Evaluating the Quality of Askarel in Service	7
VI Sampling	7
VII Testing Procedures	7
A. Field Screening	
B. Laboratory Screening	
VIII Methods of Reconditioning and Reclaiming Used Askarel	8
A. General	
B. Treatment After Exposure to High Temperature or an Electric Arc	
C. Reconditioning of Askarel	
D. Reclaiming of Askarel	
IX Addition of Scavengers	9
X Special Considerations	10
A. Askarel Used Under Light Arcing Conditions	
B. Hazards	
C. Personnel	
D. Storage and Handling of Askarel	

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PROPOSED GUIDE

for

MAINTENANCE OF TRANSFORMER ASKAREL

I INTRODUCTION

The term askarel generally describes a widely-used, broad class of non-flammable synthetic halogenated hydrocarbon insulating liquid. As treated in this Guide it applies solely to askarel used in transformers, reactors, and accessory equipment operated at power frequencies. Certain essential properties must be retained if askarel is to perform reliably its dual role of electrical insulation and heat-transfer agent.

It must have adequate dielectric strength to withstand the electric stresses imposed in service. It must retain a sufficiently low viscosity so that its ability to circulate and transfer heat is not impaired. The dielectric losses should not become excessive. It should not be allowed to become so deteriorated or contaminated that it adversely affects other materials in the apparatus.

This guide attempts to assist the power equipment operator in his efforts to maintain askarel in serviceable condition. It recommends standardized tests and evaluation procedures. Methods are outlined for reconditioning and reclaiming askarel whenever necessary.

II ECONOMIC FACTORS

In Section III of this Guide askarel is classified on the basis of significant characteristics. Many of the undesirable characteristics of used askarel can be corrected by reconditioning or reclaiming, if economic considerations justify it. The alternate choice is to replace with new askarel.

A review of the experiences of many users of electric equipment reveals a wide variation in the actual cost data involved in the reconditioning or reclaiming of askarel. This variation can be attributed to the amount and condition of askarel involved, laboratory and shop facilities, whether the work is performed at one central or several distant locations and the availability of qualified personnel.

Askarel that contains water and insoluble contaminants can be reconditioned by mechanical means using a conventional filter press. If soluble and/or colloidal contaminants are present in the askarel, reclaiming can be done with a special filter press that uses minerals such as activated clay, activated alumina or aluminum hydroxide. These processes can be operated at a cost of from 2 to 10 cents per gallon for reconditioning and at a higher range of costs for reclaiming, depending on the quantity involved and the facilities available.

To determine if reconditioning or reclaiming of askarel, where possible, is economically justifiable, a number of factors must be considered. Some of these factors are as follows:

1. Value of askarel being considered for processing
2. Cost of processing materials
3. Total cost of process *vs* quality of end-product
4. Equipment maintenance and amortization
5. Cost of collection and storage
6. Labor and transportation costs
7. Laboratory cost
8. Loss of askarel during reprocessing
9. Cost of scavengers and make-up chemicals if addition is necessary and desirable
10. Cost of disposing of processing material and scrap askarel.

III CLASSIFICATION OF USED ASKAREL

It is extremely difficult, if not impossible, to indicate the value of specific tests and recommended test limits for all possible existing applications of askarel. It should also be recognized that with the present state of knowledge no one test can be used as the sole criterion of condition of askarel. It is possible, however, to summarize the value and importance of current tests and to suggest methods of treatment for the askarel being examined, such methods being based on current industry experience. Askarel may be placed in the following classifications based upon composite evaluation of significant characteristics and on field and laboratory screening tests. (Refer to Section VII—*Testing Procedures*)

GROUP I

This group contains askarel which is in satisfactory condition for continued use.

GROUP II

This group contains askarel which requires only minor reconditioning for further service. (Reconditioning is the removal of moisture and insoluble contaminants. The usual method employed is dry paper filtration.) (Refer to Section VIII—*Methods of Reconditioning and Reclaiming Used Askarel*)

GROUP III

This group contains askarel in poor condition. It should be reclaimed or discarded depending upon economic considerations. (Reclamation involves the use of methods and processes which result in a beneficial chemical change in the askarel. Possible means employed are treatments