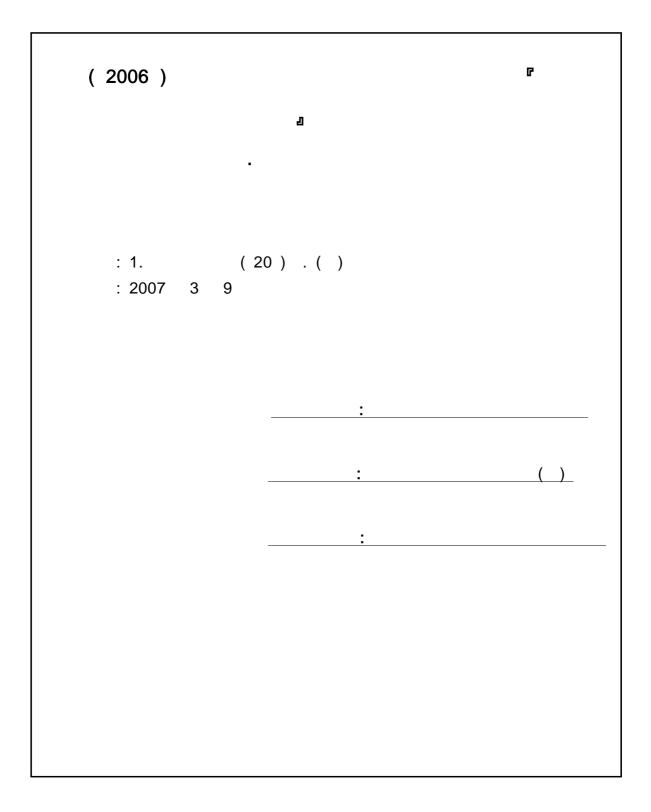
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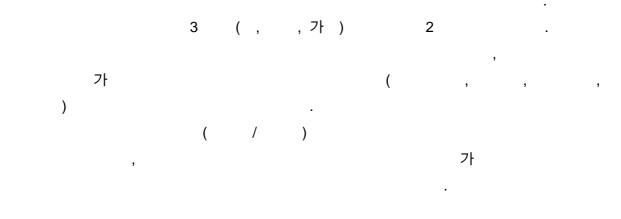
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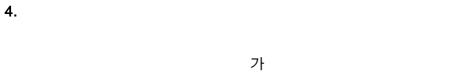
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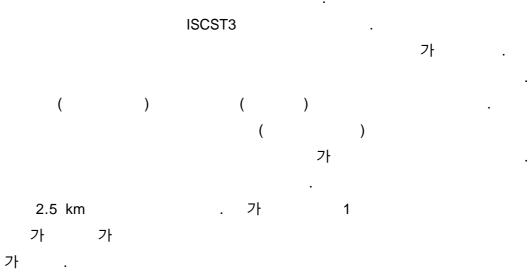






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SUMMARY

I. Title

" A study for odor management plans near the Jeongja-Dong area in Suwon city "

II. Objectives and necessities

The Jeongja housing development complex located in the northern Suwon city consists of around 30,000 households in a large scale apartment complex including 18,000 households near the Chechen Area. Since the apartment complex had been constructed near the existing chemistry and the medical and drug manufacturing factories, many public nuisances/grievances caused by malodorous smell were appealed by residents. For example, a total of 26 public nuisances against malodorous problems was recorded only in the year of 2005.

The problem seems to be caused by local socio-geological conditions where the residential area was developed near the existing odor emitting facilities and also by insufficient control and management programs to fight offensive odor emitting from manufacturing equipments.

Thus, the objective of the study is to intensively identify the odor causing chemical species and sources to deal with public nuisances, to prepare substantial management plans, and finally to attain pleasant air environment inside the study area.

III. Contents and scopes

The study focuses on identifying and assessing odor causing chemical species (including regulated odor species designated by government) in order to prepare substantial malodorous counter-measures by performing qualitative and quantitative analyses in the area of the Jeongja-Dong, Suwon city.

The scope of the study includes investigation of characteristics of major odor causing species and assessment of impact areas in the area. Further the study carries out the evaluation of odor causing factors for each source in the target factories and finally can recommend best practices to reduce odor problems and suggest maximum achievable control techniques for the odor emitting facilities.

IV. Results

1. Survey results

The odor species at each sampling site have been collected twice for each season (spring, summer and fall) at the following sites; near boundary areas between residential area and factory, public nuisance areas, and a comparison area. Further source sampling near the odor emitting facilities was performed at 5 sites in the SKC and SK Chemical factories, respectively. The 23 specified odor species as well as related 34 VOC species were intensively analyzed.

According to the results at the SKC and SK Chemical factories, the levels of most odor species were below the emission standard, but some species exceeded the standard. Especially, the level of acetic aldehyde exceeded the emission standard at all sites in the SKC. Odor complex, ammonia, hydrosulfide, and aldehydes exceeded the emission standard at the RTO in the SKC.

Odor concentrations measured at the public nuisance areas were compared with those of a comparison area; the odor complex was 3 times higher than average concentration measured at the Daewol and Shinmyoung apartment. The dilution multiple factor was level of 3 on an average at the comparison site (Pajang elementary school). In the spring, nuisance sites located on the downwind area were strongly affected by wind. The elevated ammonia concentration was observed at the Sinmyoung apartment near the factory boundary, where the apartment is located on the downwind direction from the factory. On the other hand, average ammonia concentration at the Daewol apartment loacted on the upwind direction was 62.4 ppb, which was lower than that of comparison site. However, in the case of hydrosulfide, the average concentration at the Daewol and the Sinmyoung apartment was 2.1 ppb and 4.4 ppb, respectively, which were lower than that at the Pajang elementary school (5.4 ppb) located on the upwind direction.

2. Modeling results

The assessment of impact areas by odor facilities was effectively carried out by using the ISCS3 (Industrial Source Complex Short Term 3) model. The ISCST3 dispersion model is one of the US EPA's regulatory models. The model is able to consider the wind change according to the height and to assess the average

concentration from one hour to one year. After calculating emission rates from all the odor inventories of both factories, ISCST3 was extensively applied to assess impacting areas. According to results, estimated maximum odor concentrations for all species do not exceed the odor standard. For example, the maximum acetic aldehyde concentration was estimated by 2.75 ppb, that is far below the emission standard of 50 ppb. However, the level exceeds the threshold odor concentration of 1.5 ppb. The acetic aldehyde is believed to be controlled in order to deal with public grievances on malodorous problems.

3. Odor reduction schemes

In order to the solving of odor problems at the industrial process and sources included wastewater treatment, it make choice of the most economic and efficiency odor control technology for each process and facilities.

This study was assessment of impact areas by the odor causing factors for each source in the factories and evaluation of special property and raw material for each process. Finally, the study investigated the maximum achievable control techniques for the facilities and suggested the odor reduction plans for each source in the factories by the systematic process.

V. Future plans to utilize this study results

identifying major odor sources and assessing their impacts providing fundamental data bases for odor related research on the odor emitting

sources

increasing the control efficiency for major malodorous species emitting from the similar facilities

providing reduction plans from each odor source

dealing with strong regulation to be proposed by government near future and dealing actively with odor relating public nuisances

establishing systematic investigation method to solve malodorous problems

CONTENTS

| Summary (Korean) |
|---|
| Summary (English) |
| Contentsx |
| |
| Chapter 1. Introduction1 |
| 1. Background and objectives1 |
| 2. Contents and scope2 |
| 2.1 Study contents2 |
| 2.2 Study scope2 |
| 3. Study approach |
| Chapter 2. Related environmental conditions7 |
| 1. Regional background7 |
| 2. Meteorological conditions9 |
| 3. Public nuisances |
| Chapter 3. Odor property and regulation13 |
| 1. Odor property 13 |
| 1.1 General property 13 |
| 1.2 Chemical property of odor species |
| 1.3 Odor units |
| 2. Odor regulation in Korea and foreign countries |
| 2.1 Regulation status in Korea 24 |
| 2.2 Regulation status in foreign countries |
| Chapter 4. Survey results |
| 1. Study period and sampling sites |
| 1.1 Study period |
| 1.2 Sampling sites |
| 2. Field measurement |
| 2.1 Odor species |
| 2.2 Sampling and analytical methods41 |
| 2.3 Remarks of field sampling |

| 3.1 Survey results in the factories 53 3.2 Results at the public grievance areas and factory boundary areas 71 3.3 Major odor causing chemical species 89 Chapter 5. Impact assessment by odor dispersion modeling 91 1. Selecting odor dispersion model 91 1.1 Odor dispersion model 91 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2.3 Recommended odor reduction plans for the SKC 131 2.1 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 2. Recommended odor reduction plans for the SK Chemical 142 <tr< th=""><th>3. Results</th></tr<> | 3. Results |
|---|---|
| 3.3 Major odor causing chemical species 89 Chapter 5. Impact assessment by odor dispersion modeling 91 1. Selecting odor dispersion model 91 1.1 Odor dispersion modeling 91 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 2. Future research plans and feasibility study 156 References 1 | 3.1 Survey results in the factories53 |
| Chapter 5. Impact assessment by odor dispersion model 91 1. Selecting odor dispersion model 91 1.1 Odor dispersion modeling 91 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 | 3.2 Results at the public grievance areas and factory boundary areas71 |
| Chapter 5. Impact assessment by odor dispersion model 91 1. Selecting odor dispersion model 91 1.1 Odor dispersion modeling 91 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 | 3.3 Major odor causing chemical species |
| 1. Selecting odor dispersion model 91 1.1 Odor dispersion modeling 91 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1.1 General method for control techniques 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 | |
| 1.1 Odor dispersion modeling 91 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 | Chapter 5. Impact assessment by odor dispersion modeling |
| 1.2 ISCST3 model 92 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks and feasibility study 156 References 1 | 1. Selecting odor dispersion model |
| 2. Input data for modeling 94 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. General method for control techniques 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 | 1.1 Odor dispersion modeling91 |
| 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks and feasibility study 156 References 1 | 1.2 ISCST3 model |
| 2.1 Calculation of emission rates 95 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks and feasibility study 156 References 1 | 2. Input data for modeling |
| 2.2 Boundary area limits 99 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks and feasibility study 156 References 1 | |
| 2.3 Meteorology data applied 99 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SKC 131 2.3 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 | |
| 3. Modeling results 102 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks and feasibility study 156 References 1 | |
| 3.1 Results of impact assessment 102 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks and feasibility study 156 References 1 | |
| 3.2 Assessing RTO 105 Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 | 3. Modeling results102 |
| Chapter 6. Odor reduction plans 109 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 | 3.1 Results of impact assessment102 |
| 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 1.55 1. Concluding remarks and feasibility study 155 2. Future research plans and feasibility study 156 | 3.2 Assessing RTO105 |
| 1. Reviewing applicable odor control techniques 109 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 1.55 1. Concluding remarks and feasibility study 155 2. Future research plans and feasibility study 156 | |
| 1.1 General method for controling odor sources 109 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References | Chapter 6. Odor reduction plans |
| 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References | 1. Reviewing applicable odor control techniques109 |
| 1.2 Innovative odor control technology 113 2. Best practices to reduce odor 131 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References | 1.1 General method for controling odor sources |
| 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References | |
| 2.1 Recommended odor reduction plans for the SKC 131 2.2 Recommended odor reduction plans for the SK Chemical 142 Chapter 7. Concluding remarks and future study plans to utilize final results 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References | |
| 2.2 Recommended odor reduction plans for the SK Chemical | - |
| Chapter 7. Concluding remarks and future study plans to utilize final results 155 1. Concluding remarks | 2.1 Recommended odor reduction plans for the SKC |
| 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 1 | 2.2 Recommended odor reduction plans for the SK Chemical |
| 1. Concluding remarks 155 2. Future research plans and feasibility study 156 References 1 1 | Chapter 7. Concluding remarks and future study plans to utilize final results 155 |
| 2. Future research plans and feasibility study | |
| | |
| | |
| Appendix | References ······1 |
| | Appendix1 |

| 1 | | 1 |
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| 1. | | 1 |
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| 2. | | |
| | 2.1 | 41 |
| | 2.2 | 41 |
| | 2.3 | |

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|----|-----|--------|-----|---|---|------|------|-----|
| | 3.1 | | | | | | | |
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| | 3.3 | | | | | | | |
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| | 1.1 | | | | | | | |
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| 2. | | | | | | | | |
| | 2.1 | SKC() | | | | | | 131 |
| | 2.2 | SK | () | 1 | | | | |
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