# Appendix 4.D Existing Generation Units

The following appendices comprise Appendix 4.D:

**Appendix 4.D.1:** Combustion By-Product Restrictions

**Appendix 4.D.2.** Water-Related Restrictions (Cooling Towers and Fish Impingement Control)

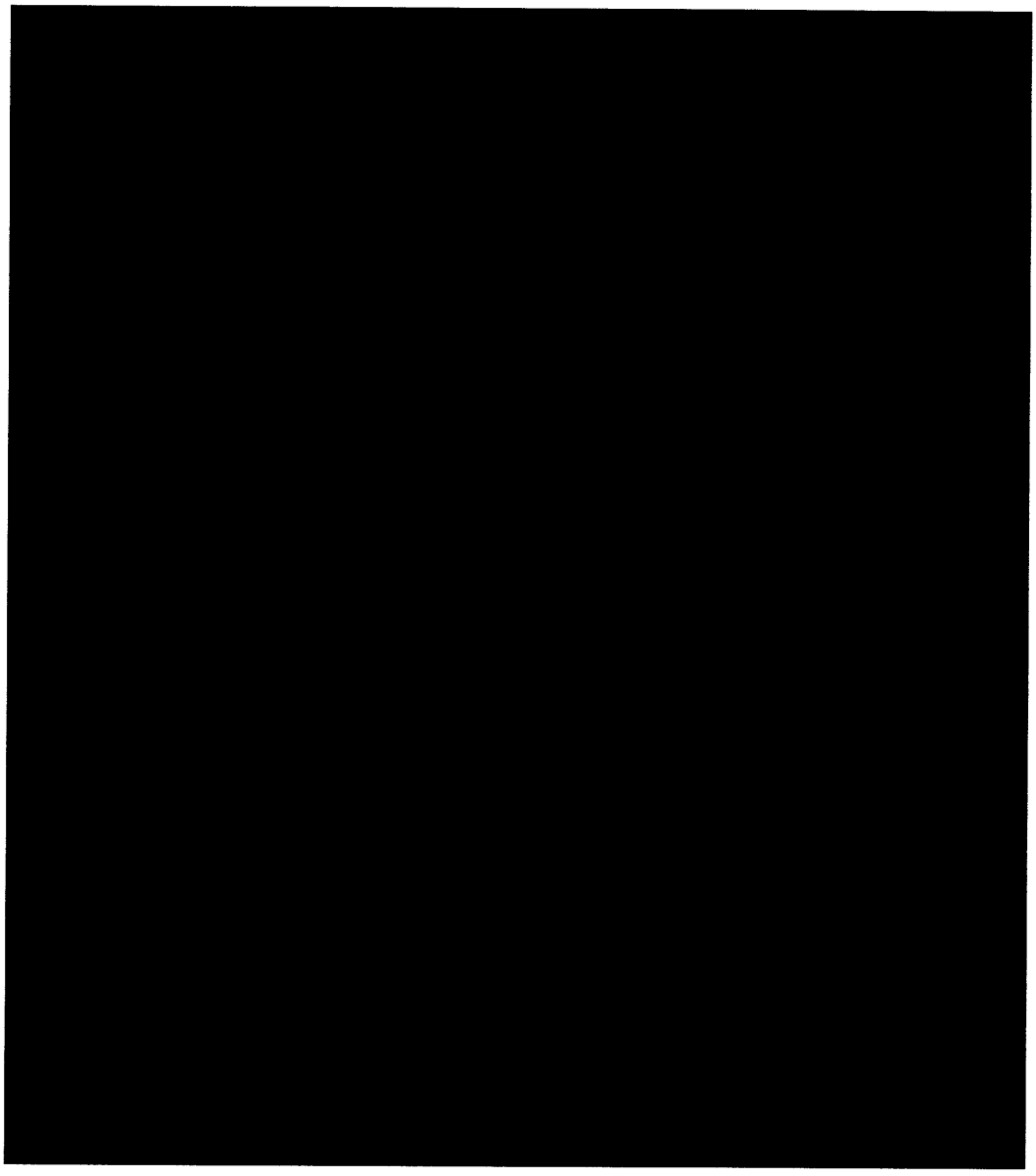
**Appendix 4.D.3.** Other Air Pollutants

**Appendix 4.D.4.** Zebra Mussels

**Appendix 4.D.5:** Probable Environmental Costs (Existing Units)

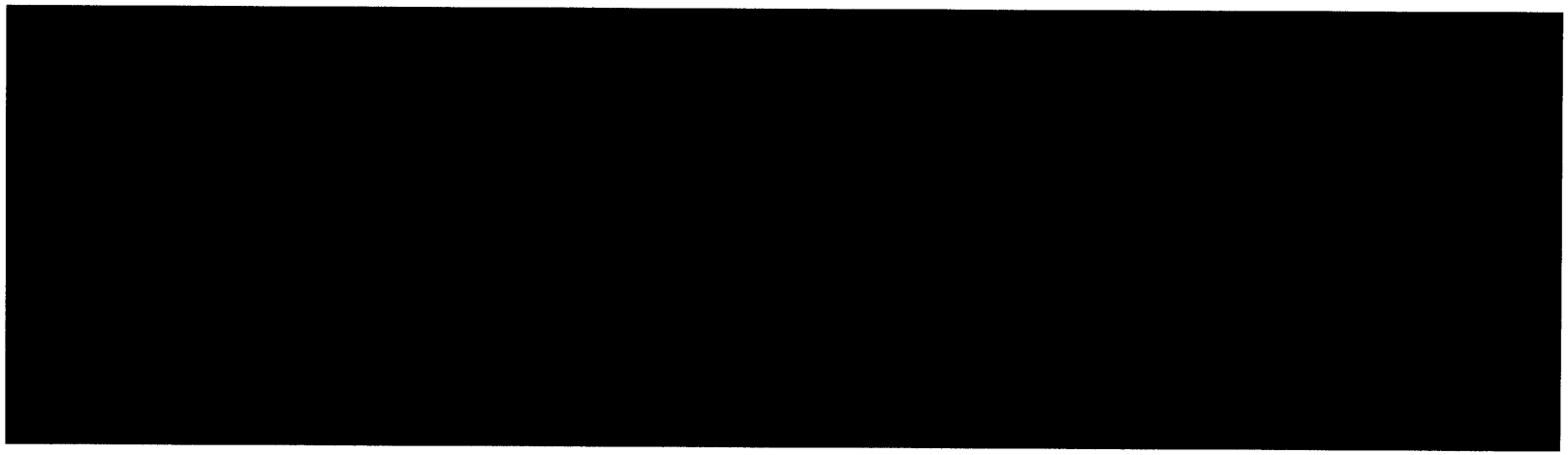
**Appendix 4.D.6:** Plant Efficiency Study

## Appendix 4.D.1: Combustion By-Product Restrictions
## **<u>Highly Confidential</u>**



HC

## Appendix 4.D.2. Water-Related Restrictions (Cooling Towers and Fish Impingement Control)**Highly Confidential**



HC

## Appendix 4.D.3. Other Air Pollutants**Highly Confidential**

[redacted]

HC

# Appendix 4.D.4. Zebra Mussels

**KCP&L IRP ZEBRA MUSSEL PLAN**

There are two commonly used options available for zebra mussel control. They are chemical treatment with chlorine (or a commercially available molluscicide) and mechanical scraping of the mussels to remove them from the effected system. The former option is used both for preventative treatment and removal while the latter option is a removal option solely. Therefore, the chemical option will be the recommended course of action.

While chemical treatment should not be the foremost solution for zebra mussel control, it is probably the most common method used. Presently, chlorine is the chemical of choice for controlling zebra mussels in industrial and municipal water facilities. Chlorine can be used as either gaseous chlorine or in liquid form as sodium hypochlorite (bleach). The liquid form is generally considered the safer method to feed chlorine.

KCP&L's environmental discharge permits (NPDES) contain a provision for using chlorine in the circulating water systems. This provision limits the federate to be no more than** [redacted] ** a day per unit and for our discharge to be below** [redacted] ** ppm. It should be noted that new permits are expected to have the limit dropped to ** [redacted] ** ppm. This is a problem in that the levels of chlorine needed to be effective are approximately ** [redacted] ** ppm and for that level to be fed either continuously for anywhere from ** [redacted] ** (there is an optional method which is reported to be successful at times but it is an alternating 20 minutes off and on process for this same period of time.

Consequently, it would be necessary to "de-chlorinate" the circulating water system to meet environmental regulations. Therefore, the estimate given below are broken down into capital costs for both the chlorination and de-chlorination feed equipment and monitoring equipment and the annual O&M costs for the chemicals.

HAWTHORN STATION (Units #5 & #9)

Capital costs: ** [redacted] **

O&M costs: ** [redacted] **

IATAN STATION (Units #1 & #2)

Capital costs: ** [redacted] **

O&M costs: ** [redacted] **

LA CYGNE STATION (Units #1 & #2)

Capital costs: ** [redacted] **

O&M costs: ** [redacted] **

MONTROSE STATION (Units #1, #2 & #3)

Capital costs: ** [redacted] **

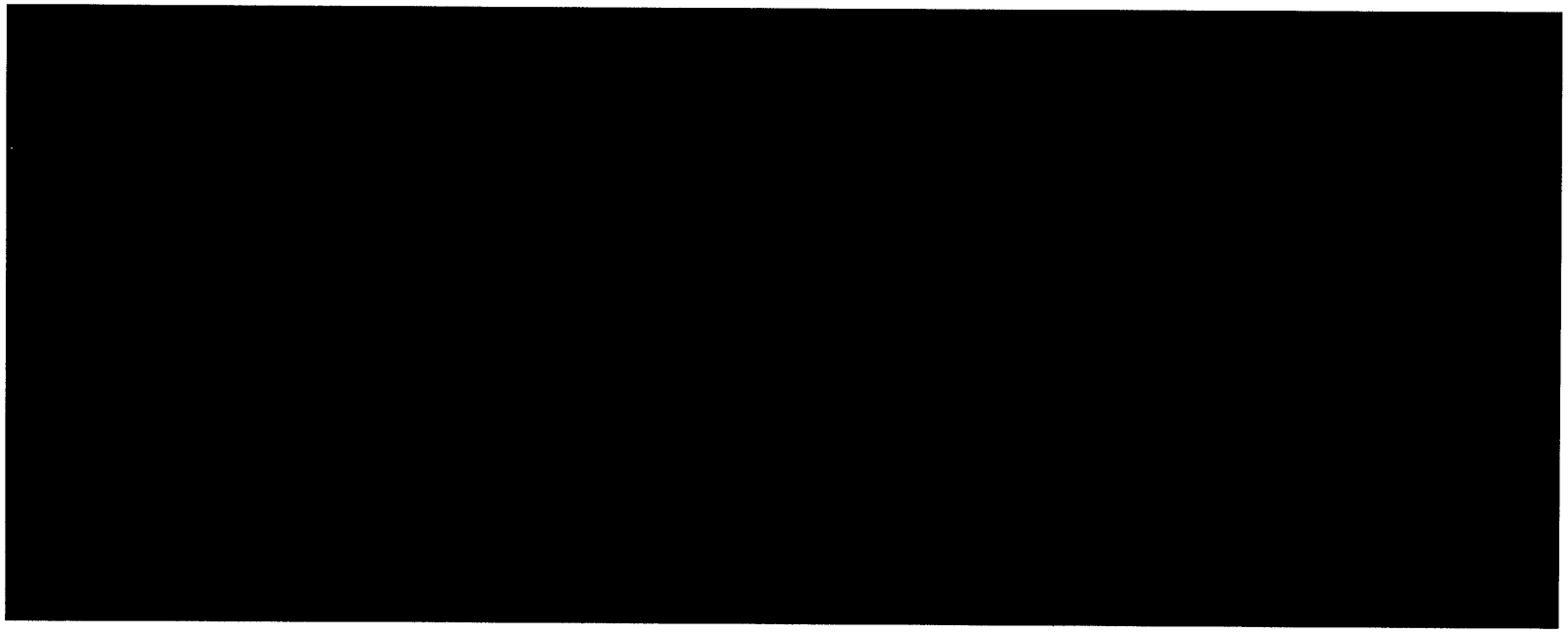
O&M costs: ** [redacted] **

**Highly Confidential**

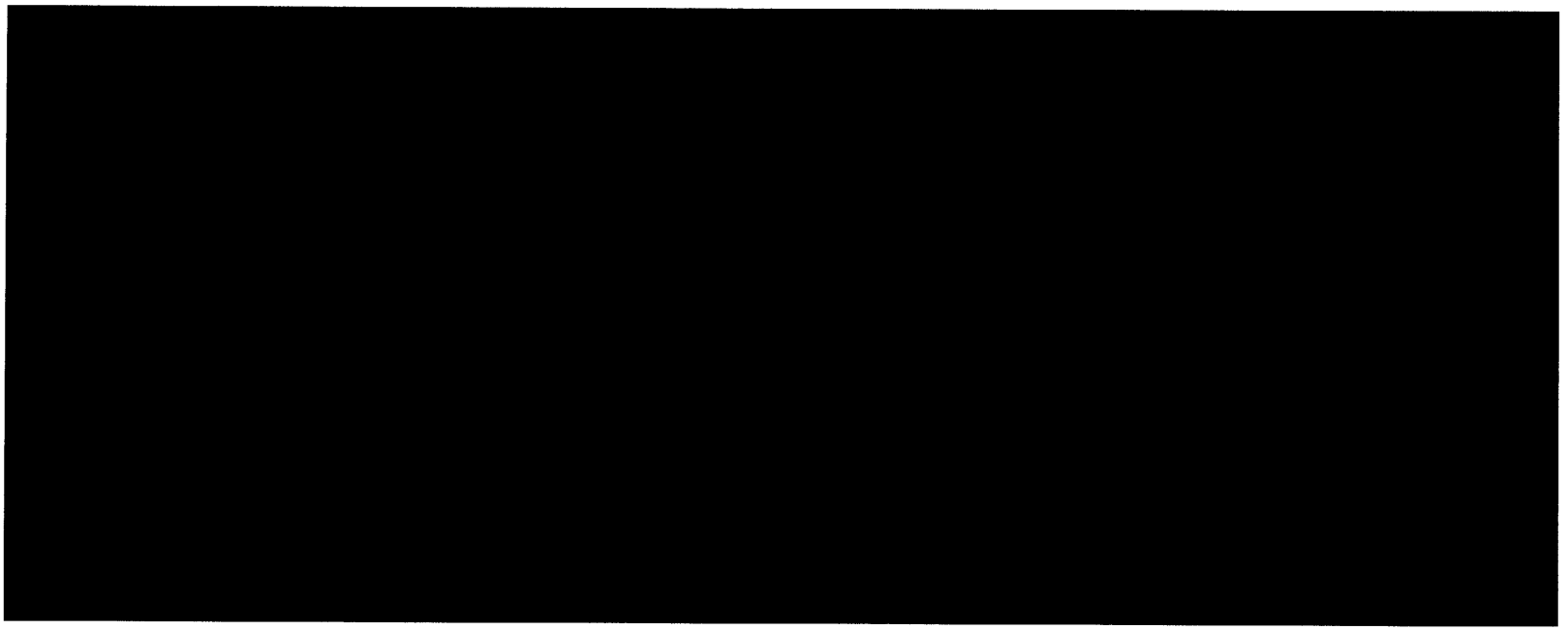
[redacted]

HC

## Appendix 4.D.5: Probable Environmental Costs (Existing Units)**Highly Confidential**



HC



BLACK & VEATCH
Building a world of difference.

# Appendix 4.D.6: Plant Efficiency Study**Highly Confidential**

Kansas City Power & Light
$CO_2$ – Plant Efficiency Improvement Assessment

B&V Project 147591
B&V File No. 10.0000
April 28, 2008

Attn: Mr. Lance Gockel
Kansas City Power & Light
PO Box 418679
1201 Walnut
Kansas City, MO 64141-9679

Subject: Project Report Submittal

Dear Mr. Gockel:

Black & Veatch is pleased to submit our project report for the CO2 – Plant Efficiency Improvement Assessment. We appreciate the opportunity to be of service to Kansas City Power & Light and in particular this specific and strategic project. The attached report outlines our findings and suggested strategy to evaluate and compare economic opportunities for efficiency gains in plant operations.

We trust that this report submittal meets your expectations and needs. Should you have any comments, please feel free to contact me at (913) 458-7597.

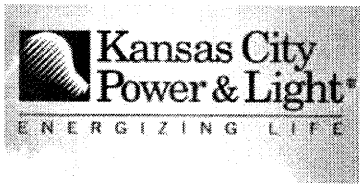
Very truly yours,

BLACK & VEATCH

Phillip Webster
Project Manager

dd
Enclosure[s]

cc: Mike Irwin (KCPL)
Randy Hughes (KCPL)
Dave Brill (B&V)
Matt Wood (B&V)




## Kansas City Power & Light

# CO2 – Plant Efficiency Improvement Assessment

(I) PROJECT REPORT

B&V Project Number 147591
B&V File Number 10.0000

**July 2008**

Black & Veatch Corporation
11401 Lamar
Overland Park, Kansas 66211
Tel: (913) 458-2000 www.bv.com

BLACK & VEATCH
Building a world of difference.

**Principal Investigators:**

Phil Webster, Project Manager
Matt Wood, Project Technical Lead
Kelly Whittenberg, Project Engineer
Curtis Robinson, Project Engineer
Matt Oakes, Project Engineer



BLACK & VEATCH

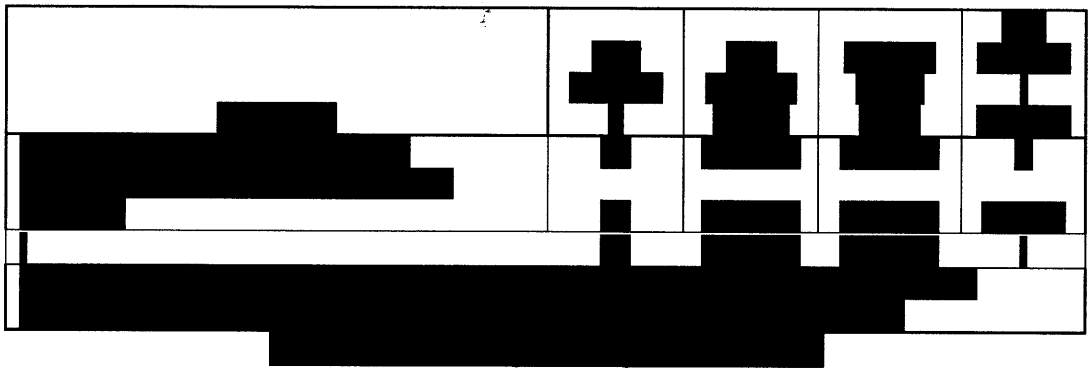
## Table of Contents



## LIST OF TABLES

## Appendices

[redacted]



[redacted]

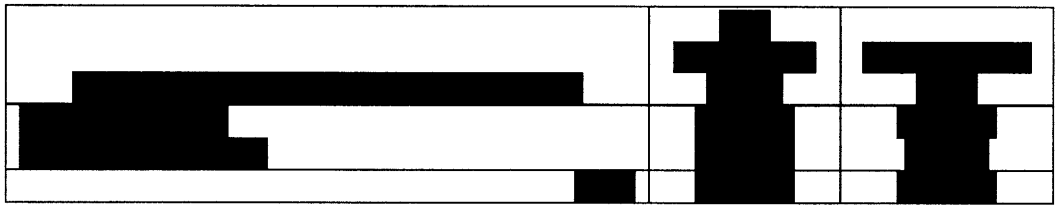
[redacted]

[redacted]

[redacted]

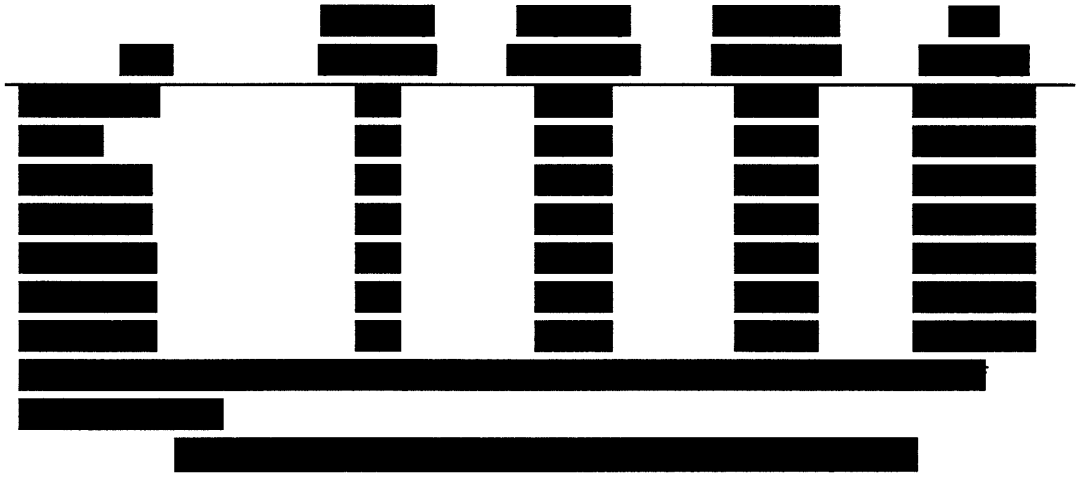
[redacted]

[redacted]



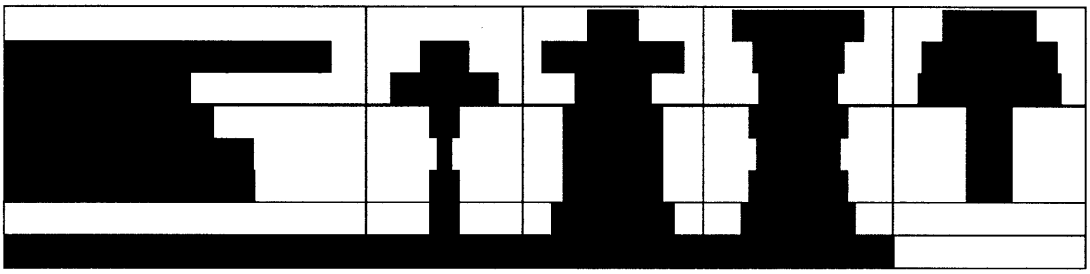
[redacted]

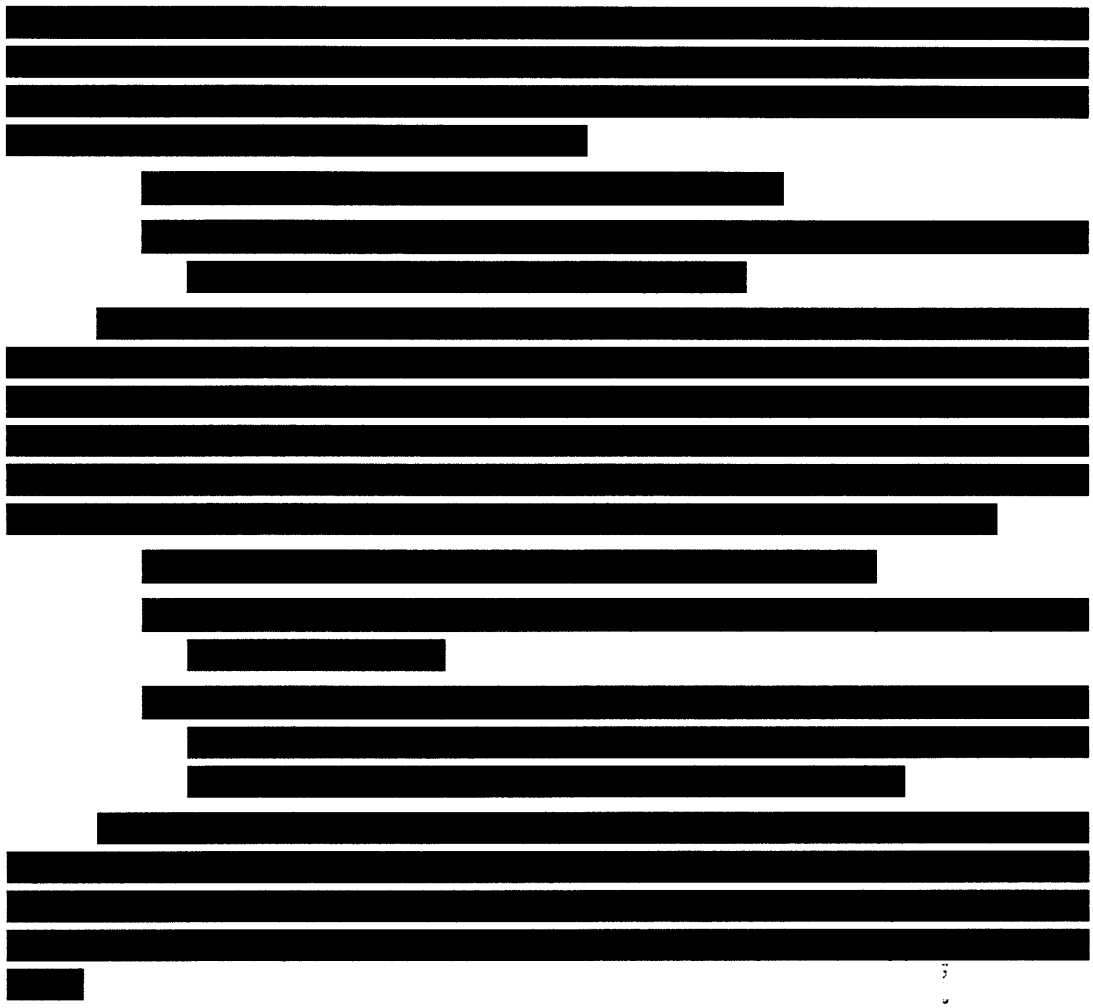
[redacted]

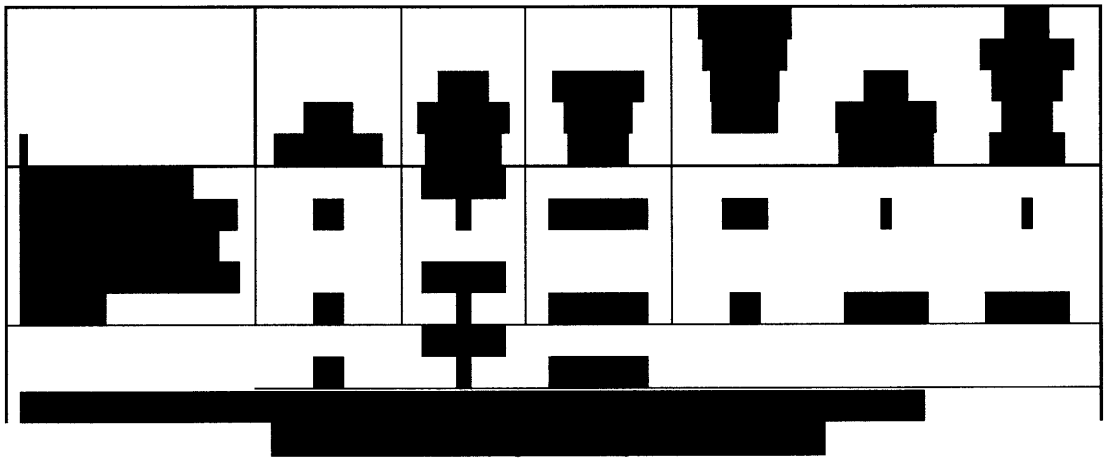


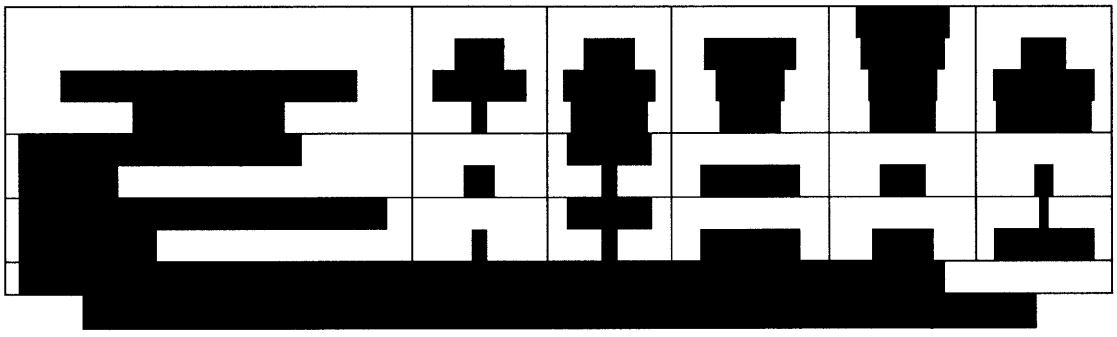
[redacted]

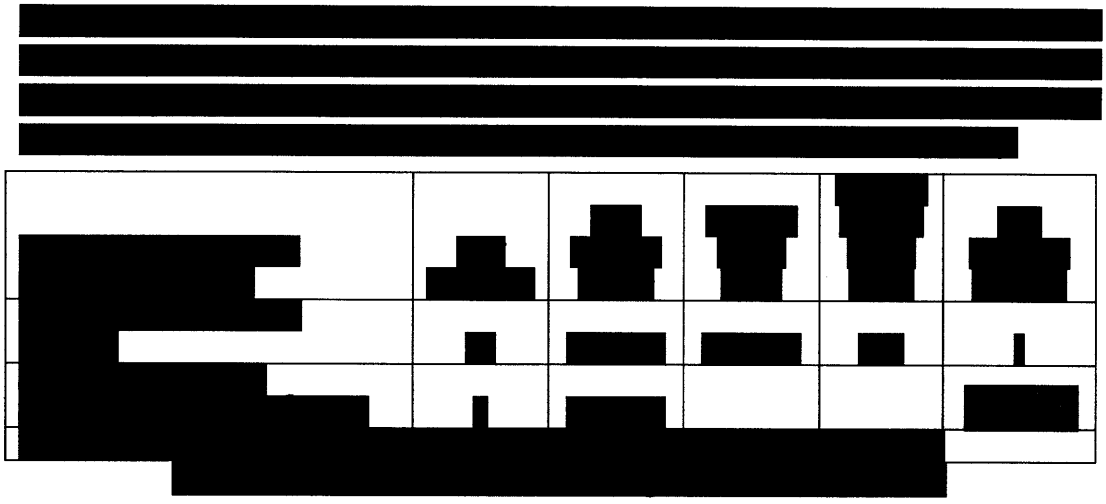
[redacted]



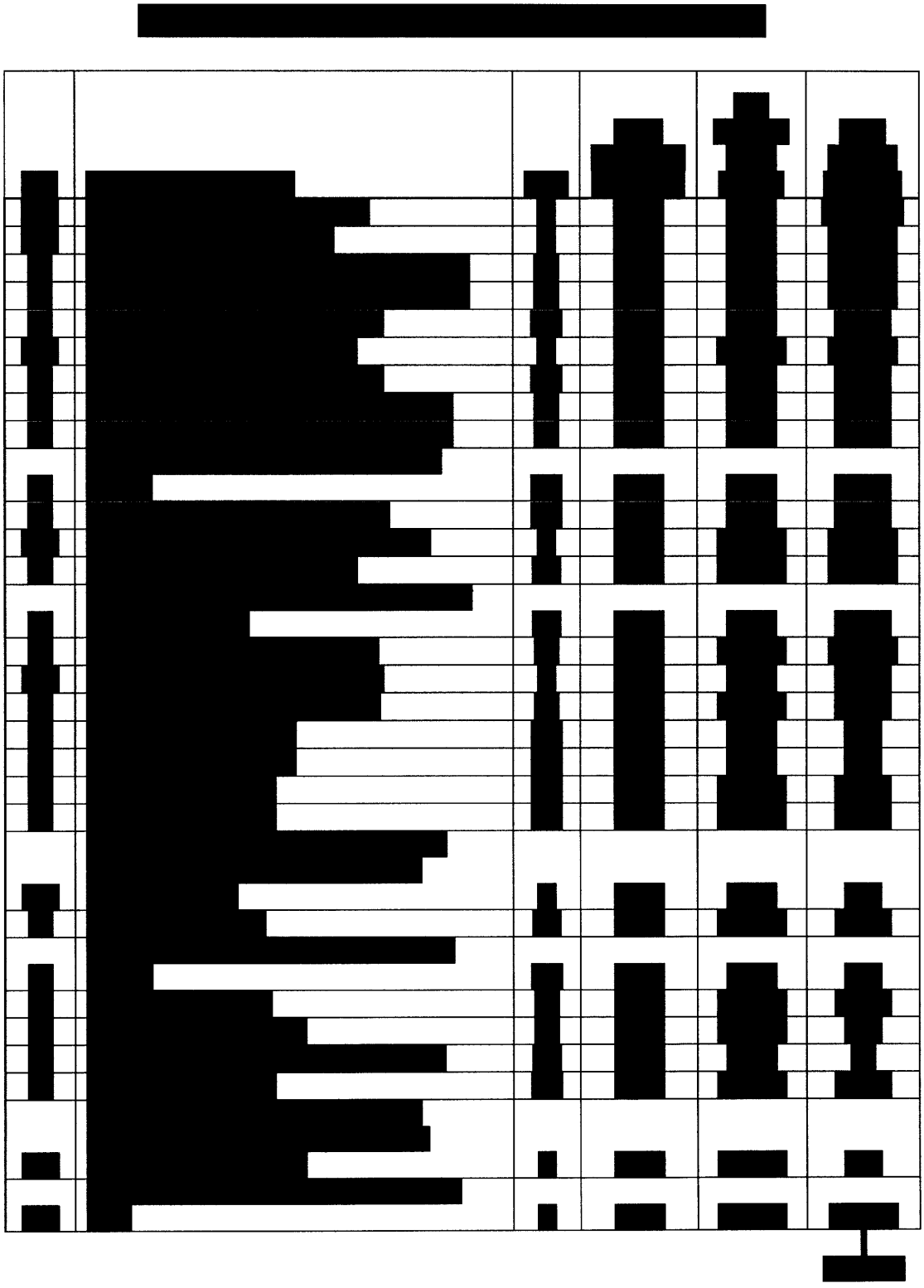


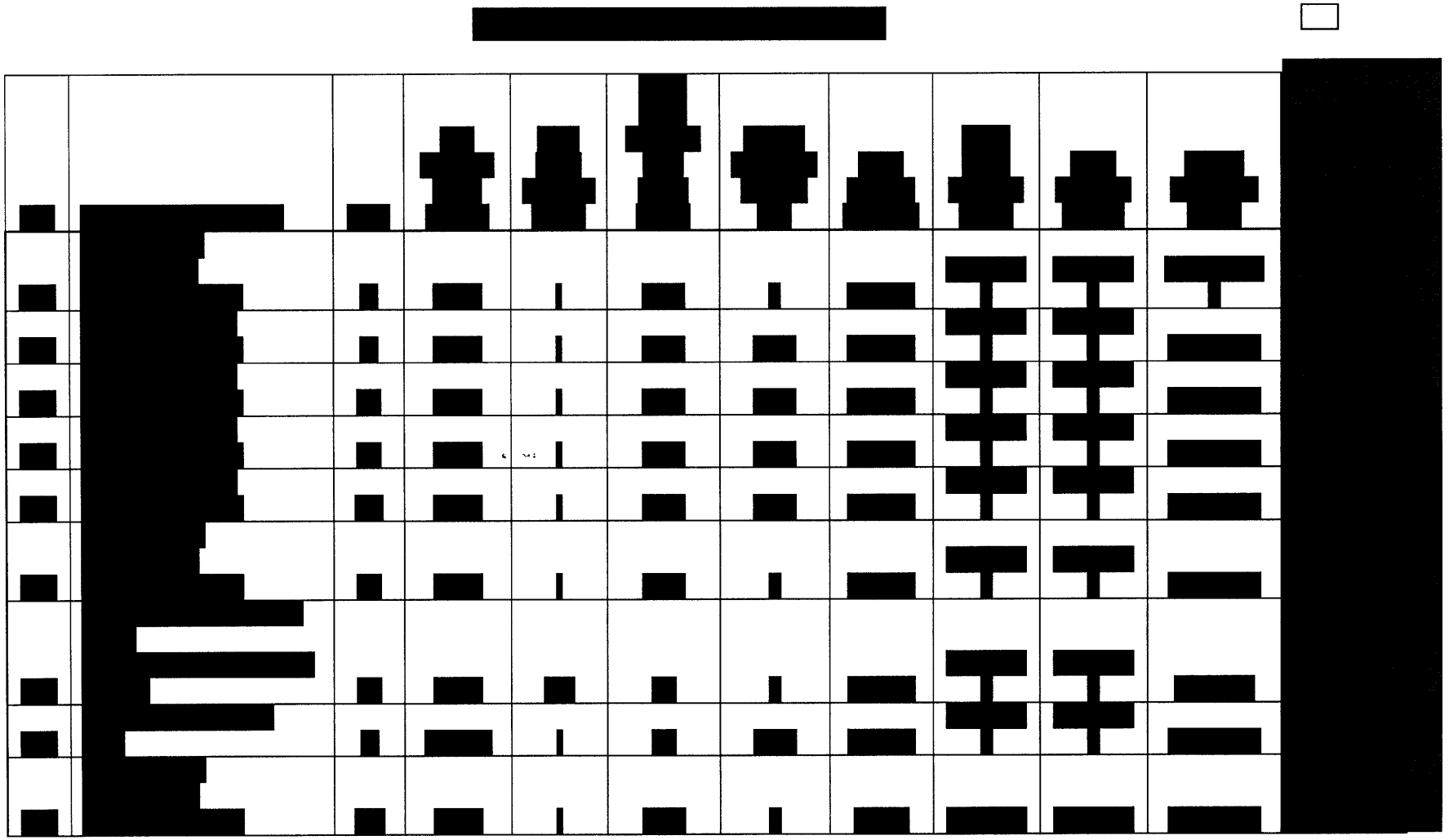


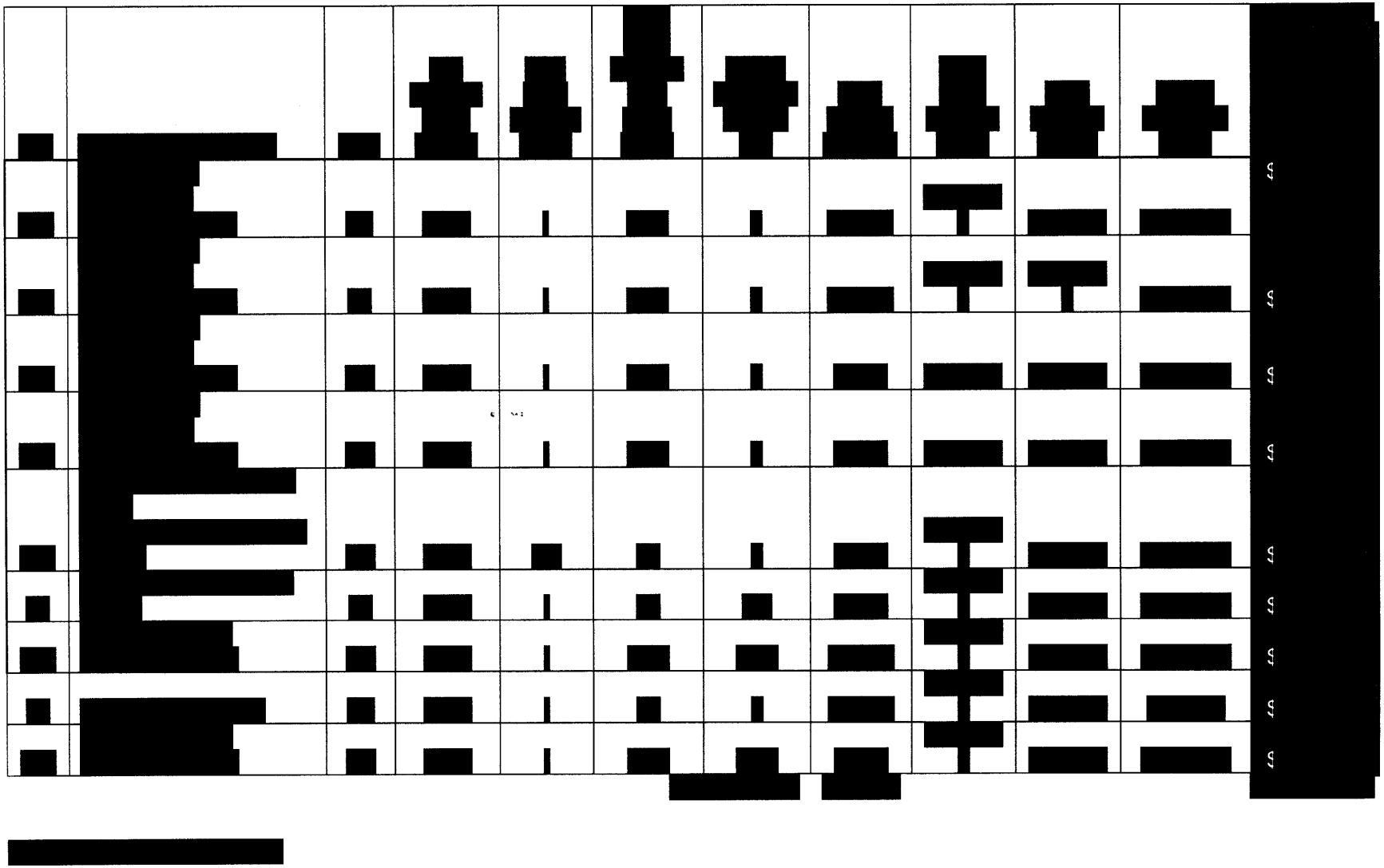




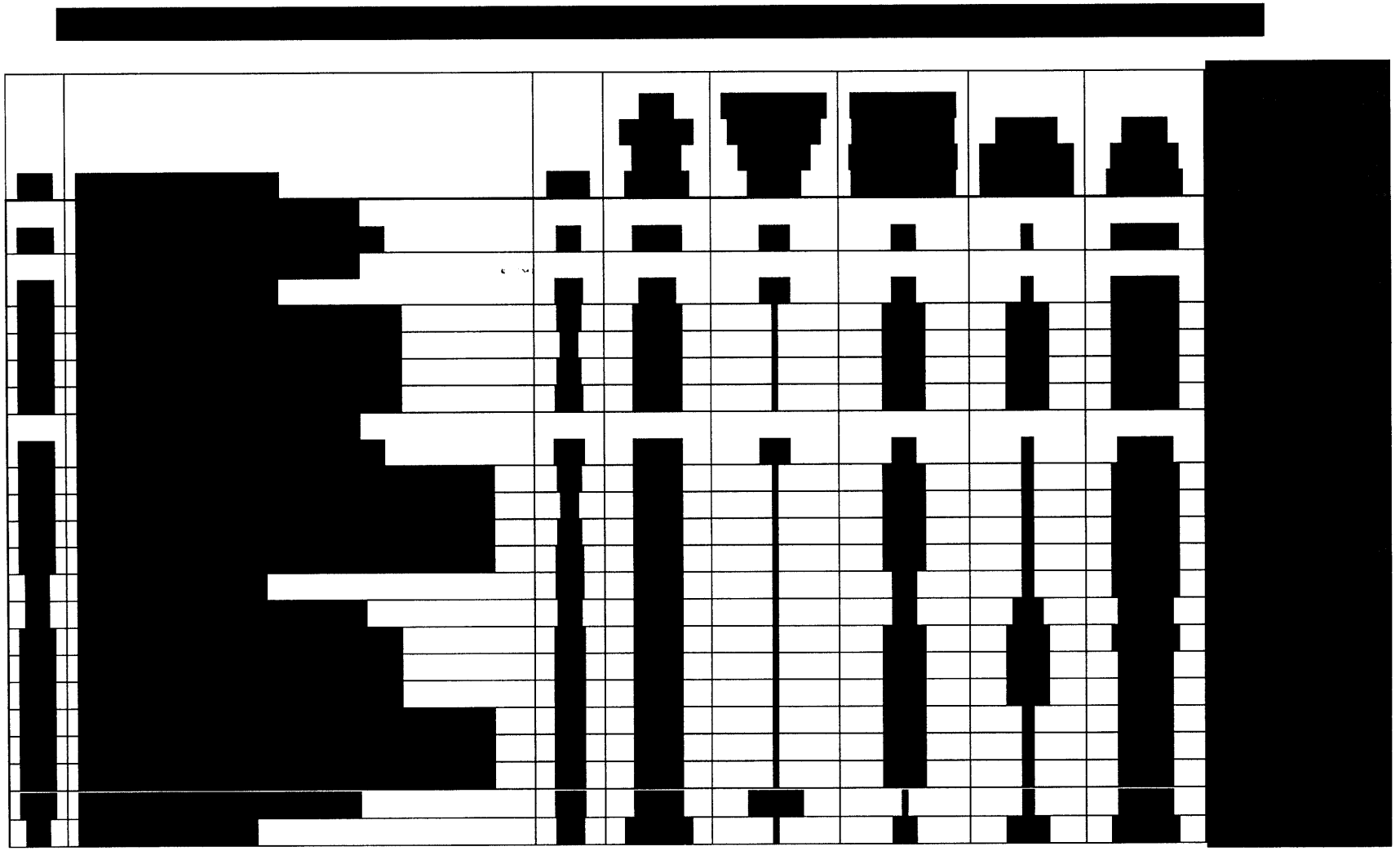
[redacted]

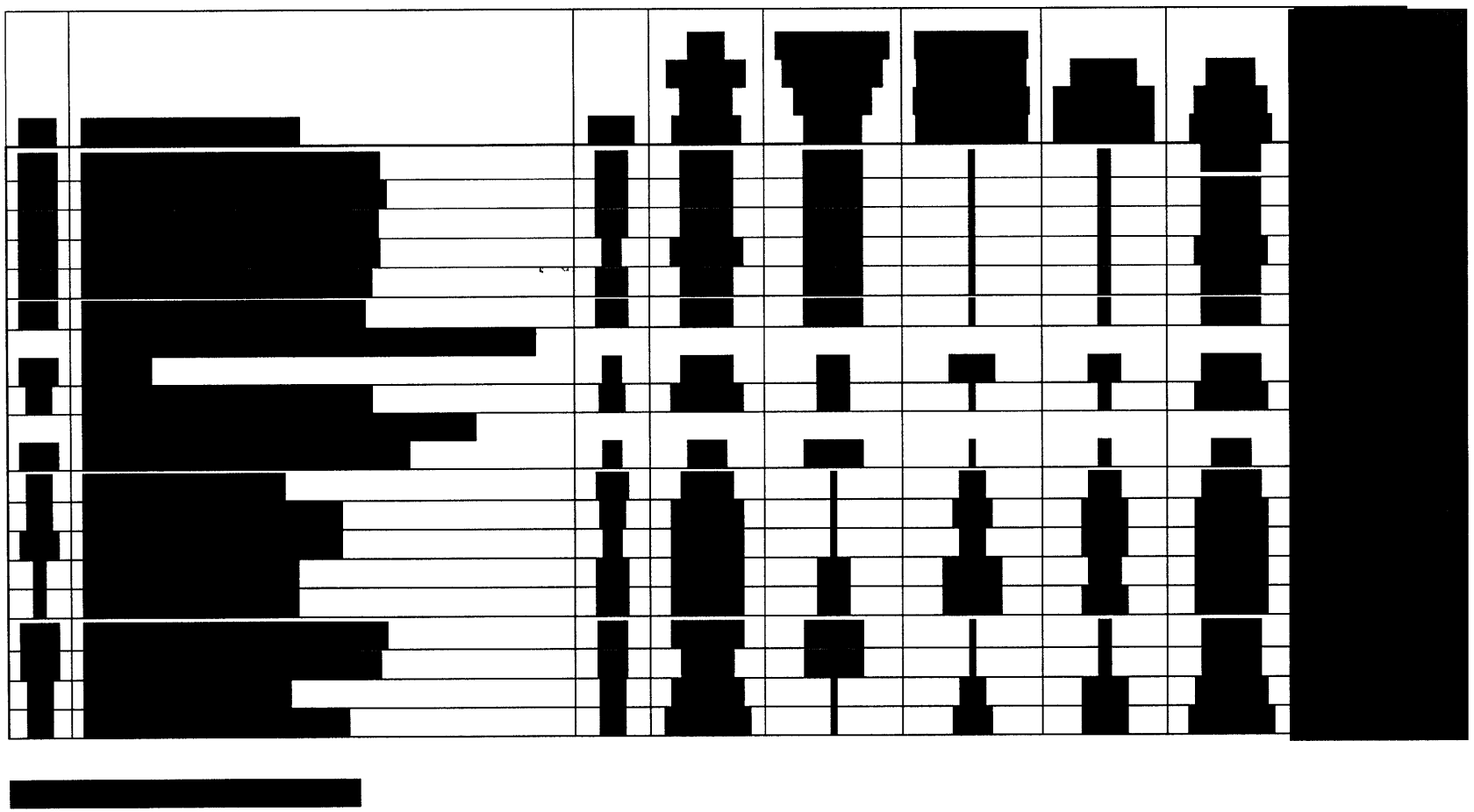


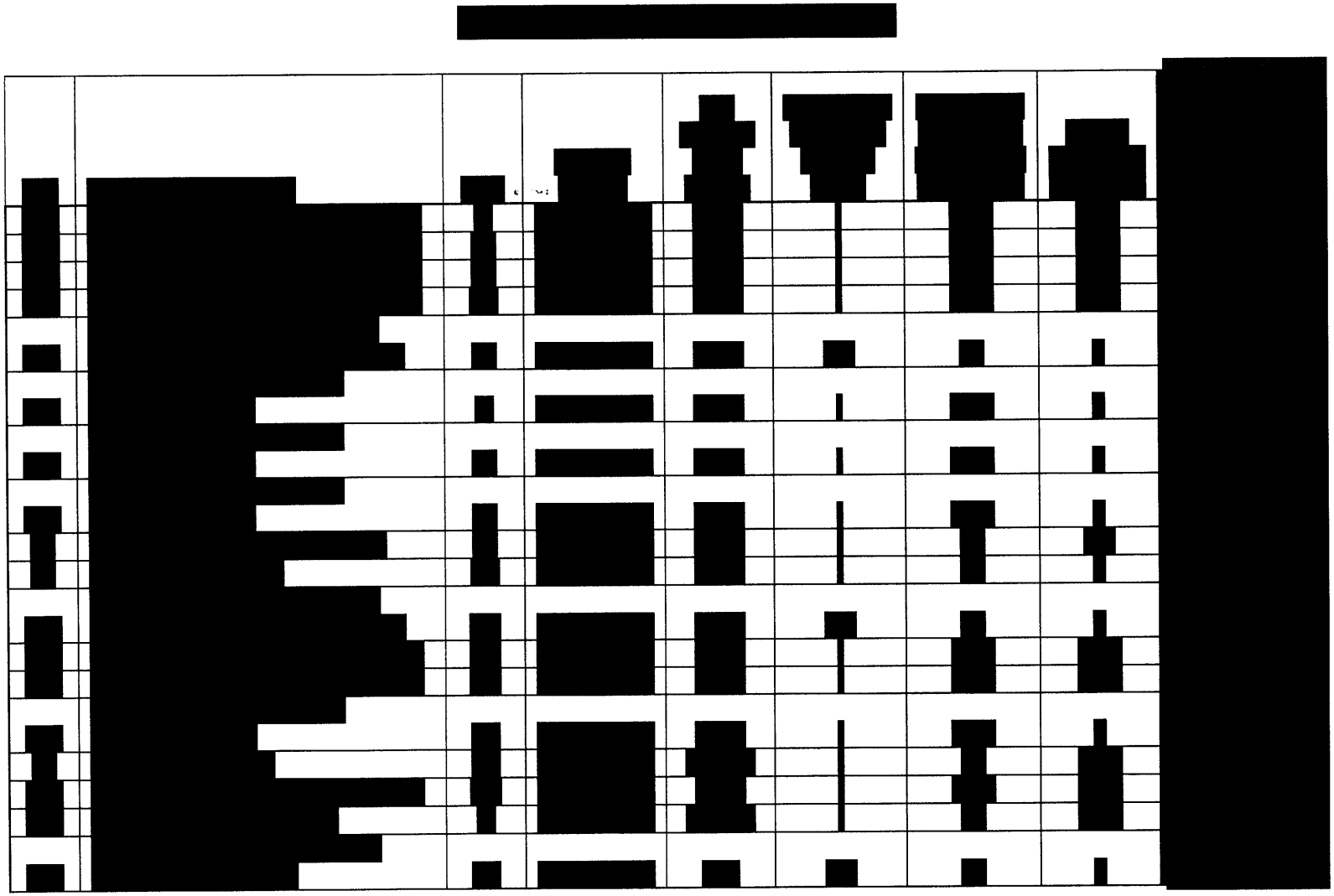


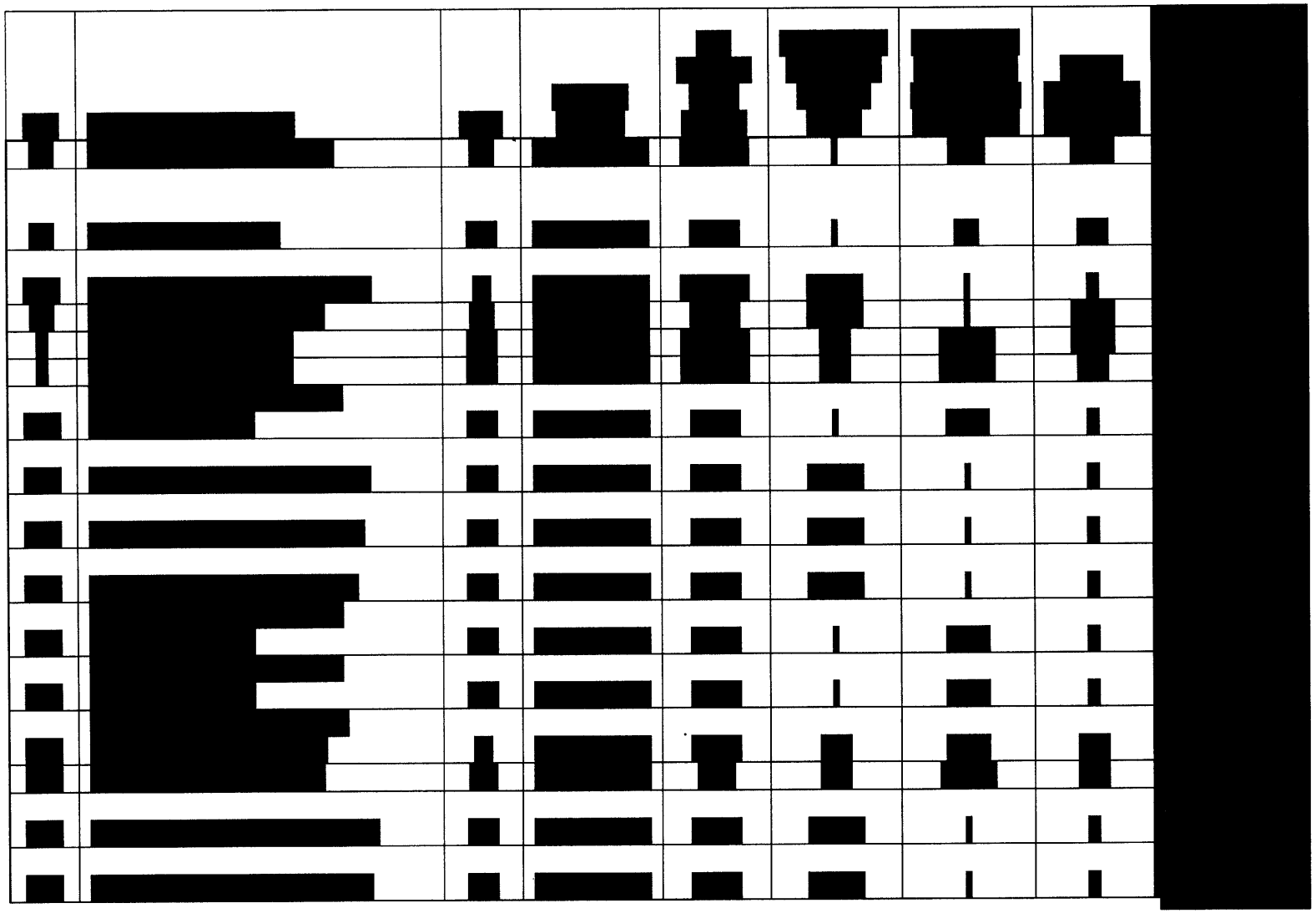


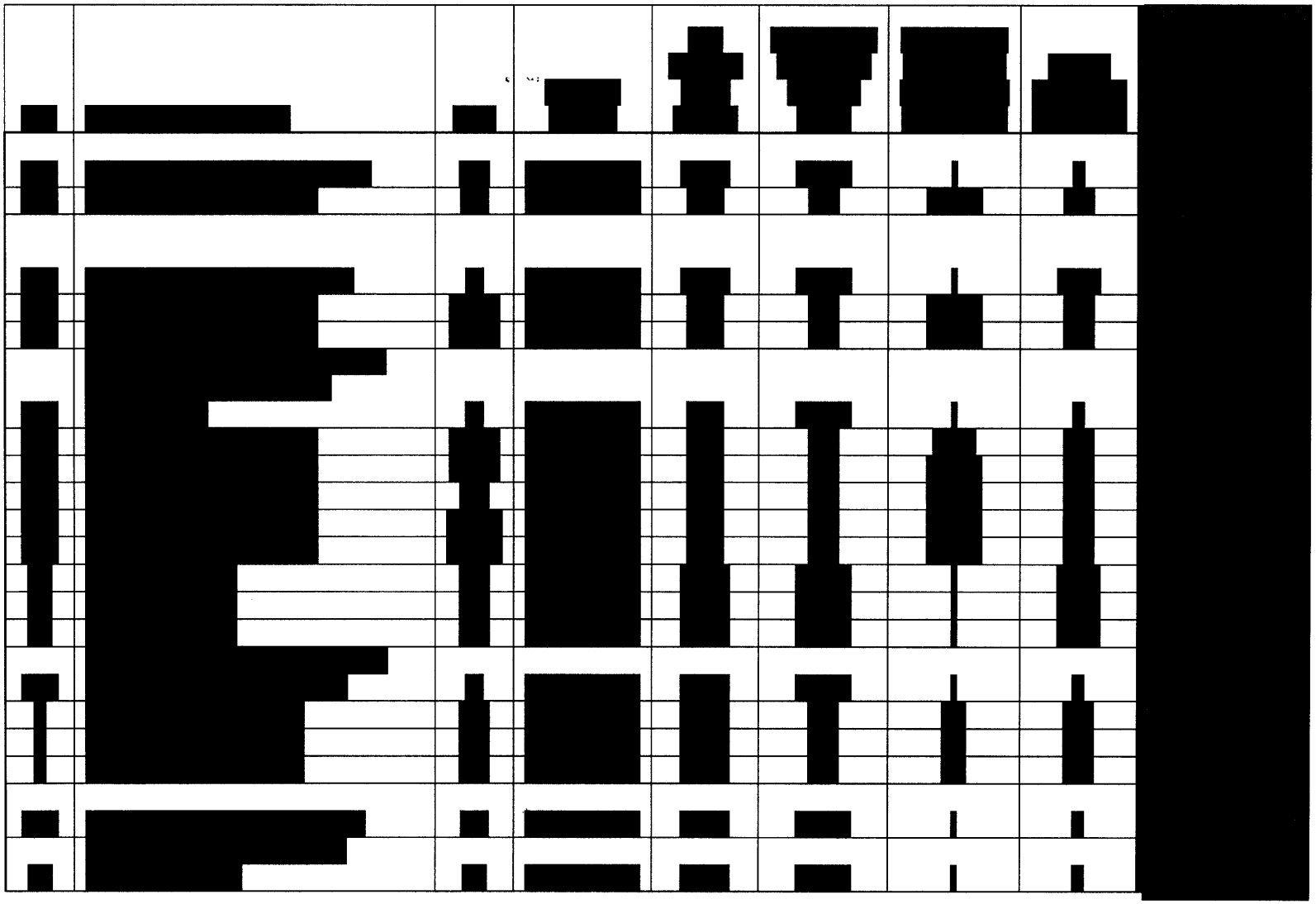
[redacted]

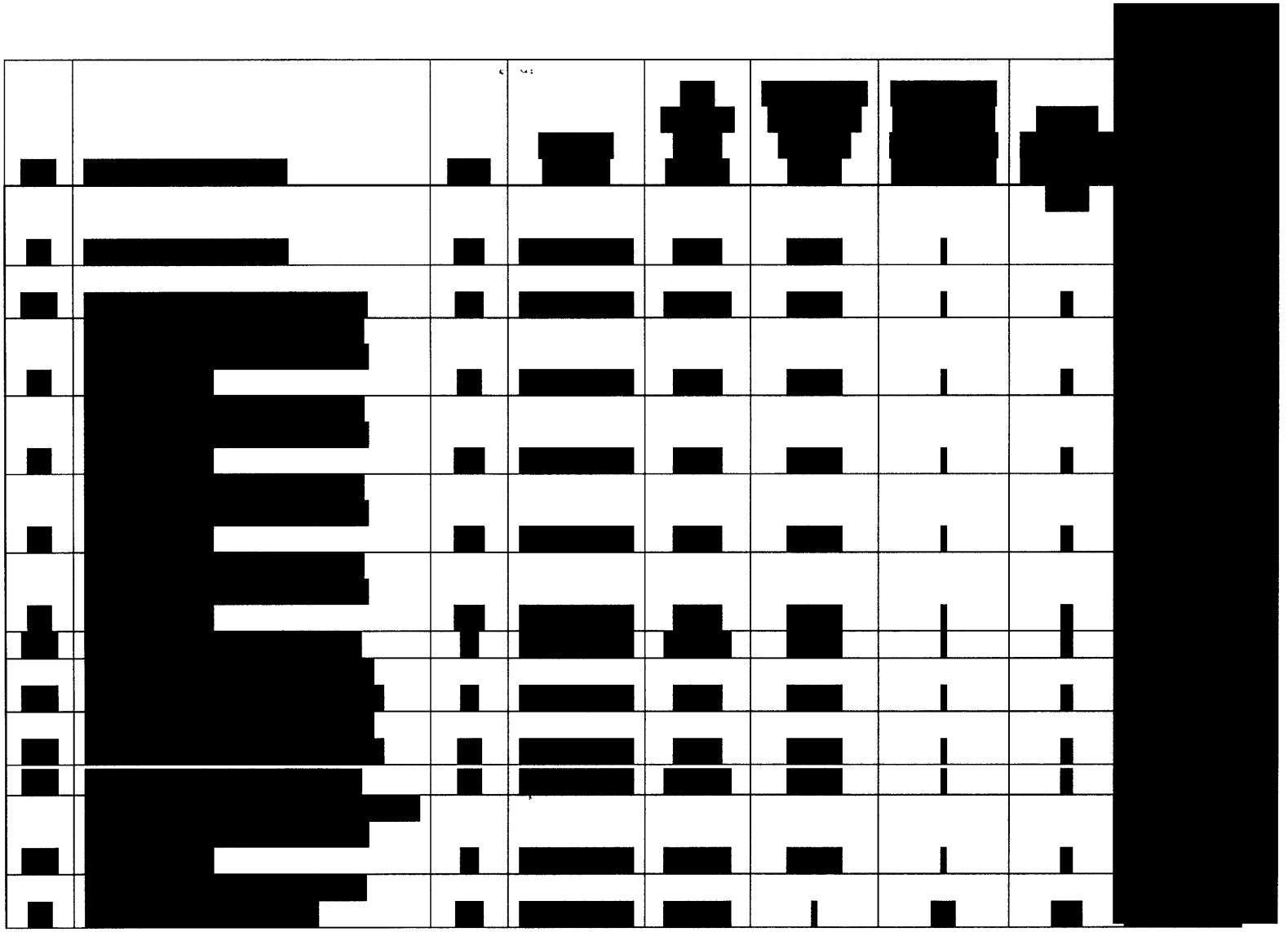


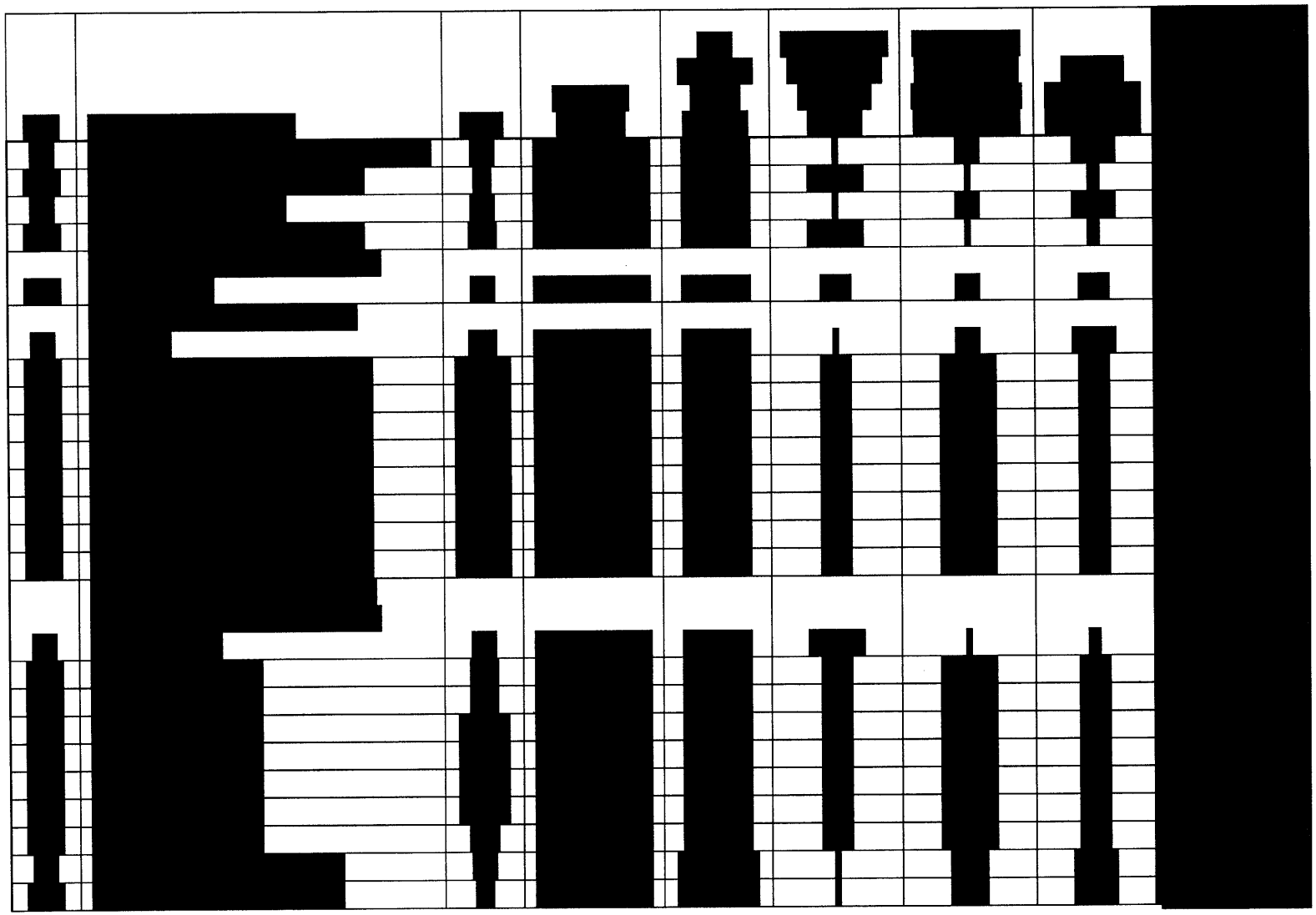


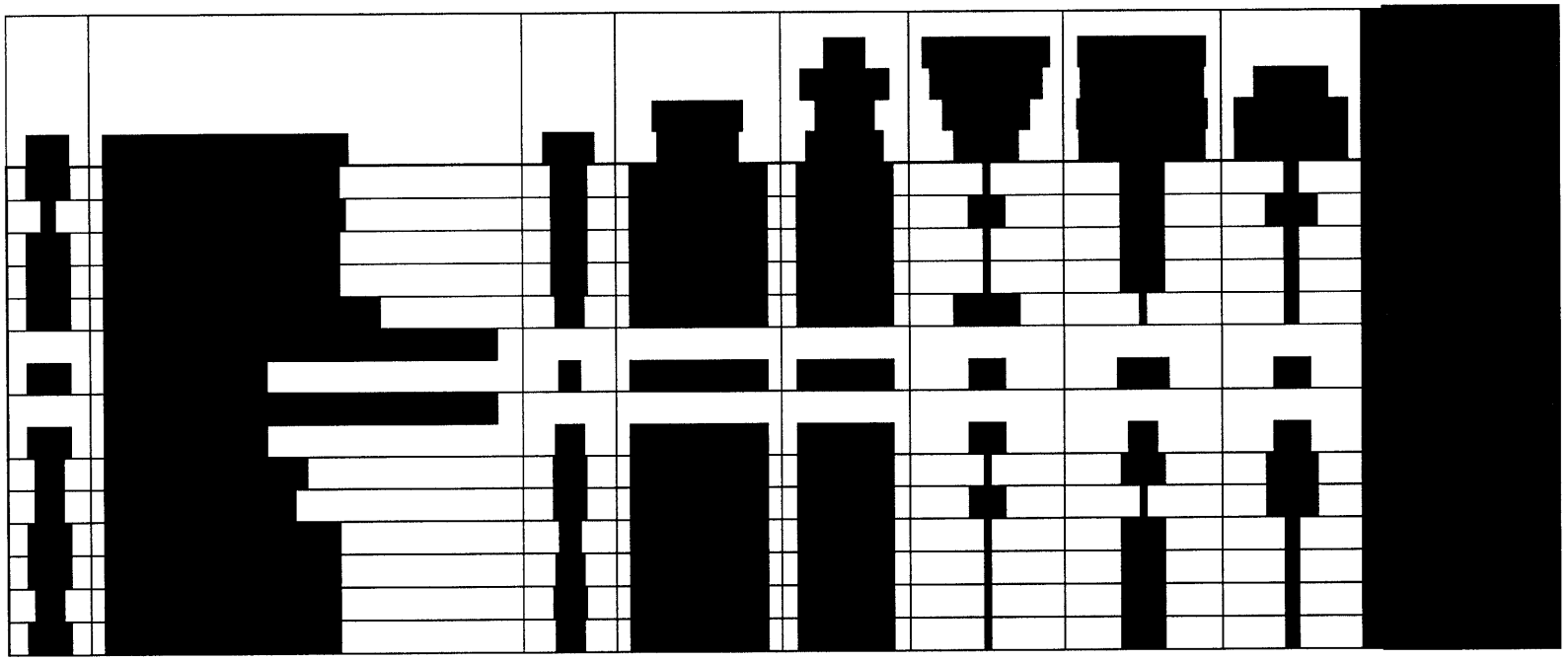


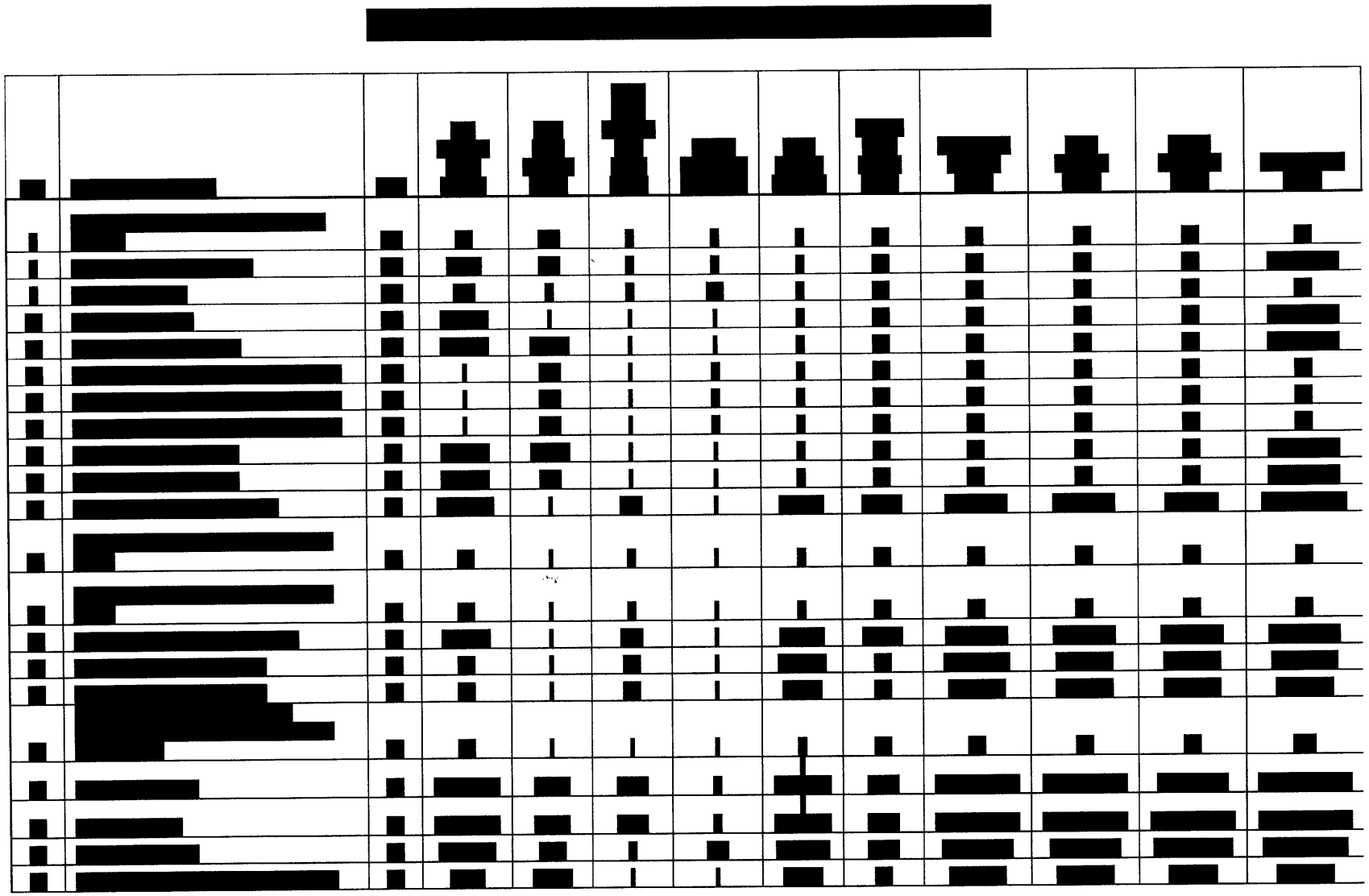


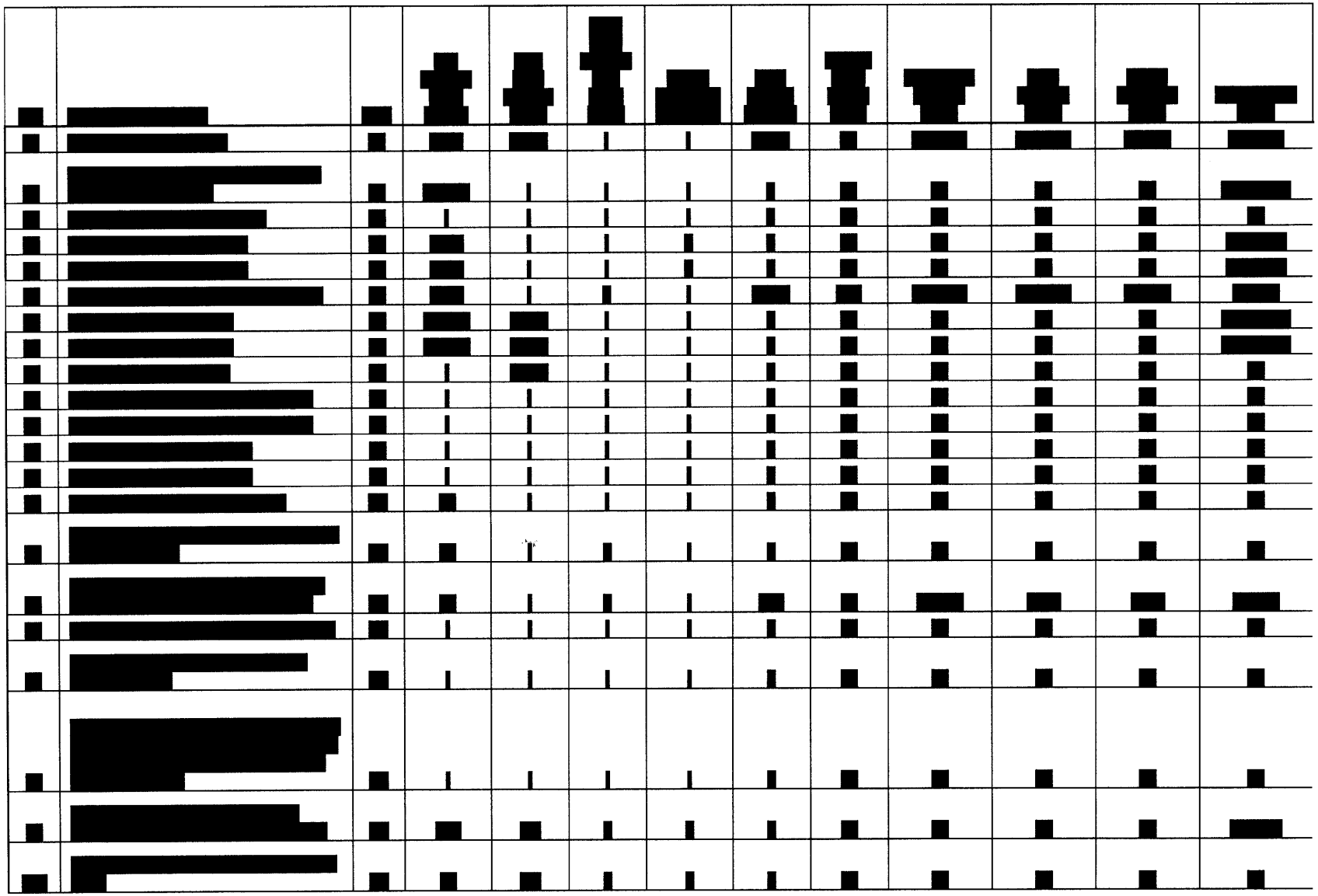


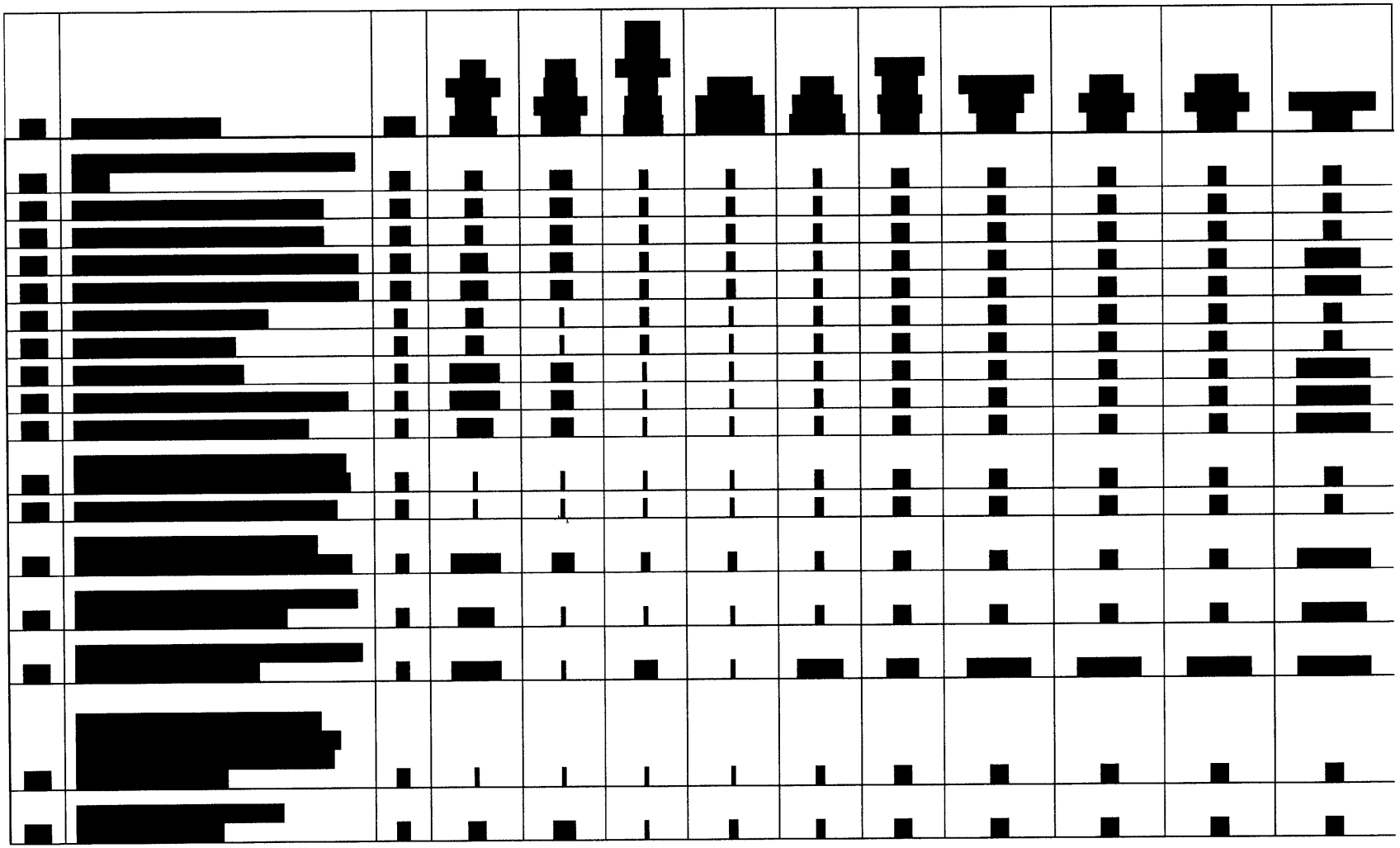












| | |
|---|---|
| | [redacted] |
| Plant: | Ka |
| B&V Project Number | |
| Project Title: | |
| Names | |
| **Project Description** | |
| General Description of Project | |
| Concerns | |
| Capital Cost | |
| Other (describe) | |
| **Potential Impact** | |
| Heat Rate Impact | |
| Reliability | |
| Operating Costs | |
| Maintenance Costs | |
| Aux Power | |