

# Long-Term Work Hour Controls

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August 19, 2004  
Ramada Inn, Rockville MD

# Long-Term Work Hour Controls

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## Overview

- Background
- Objective
- Methods
- Concerns
- Context

# Long-Term Work Hour Controls

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- GL 82-12 established an objective of a 40-hour work week
- Daily - weekly work hour limits of GL 82-12 were not intended for routine use
- Experience has shown the daily-weekly limits are inadequate as long-term controls

# Long-Term Work Hour Controls

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- Staff previously proposed two methods for long-term work hour control
  - Group work hour averaging
  - Individual quarterly and annual limits
- Staff has received significant stakeholder comment on proposed methods

# Long-Term Work Hour Controls

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- Objective -  
Reasonable assurance personnel performing risk significant functions are not impaired by cumulative fatigue.
- Cumulative Fatigue -  
The increase in fatigue over consecutive sleep-wake periods resulting from inadequate rest (draft proposed rule)

# Cumulative Fatigue

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- Sleep restriction can result in a “sleep debt” until adequate recovery sleep is obtained
- Consecutive periods of partial sleep restriction can cause increased sleepiness, somatic complaints, mood disturbance, and degraded vigilance
- Accommodation may occur at depressed levels of alertness, but may be transient

# Work, Daily Living, & Sleep

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8-Hour Shifts



12-Hour Shifts

Daily Living Obligations - eating, commuting, bathing, laundry, spouse, children, education, extended family, community, house, yard, car/truck, bills, etc.

# Work, Daily Living, & Sleep (Debt)

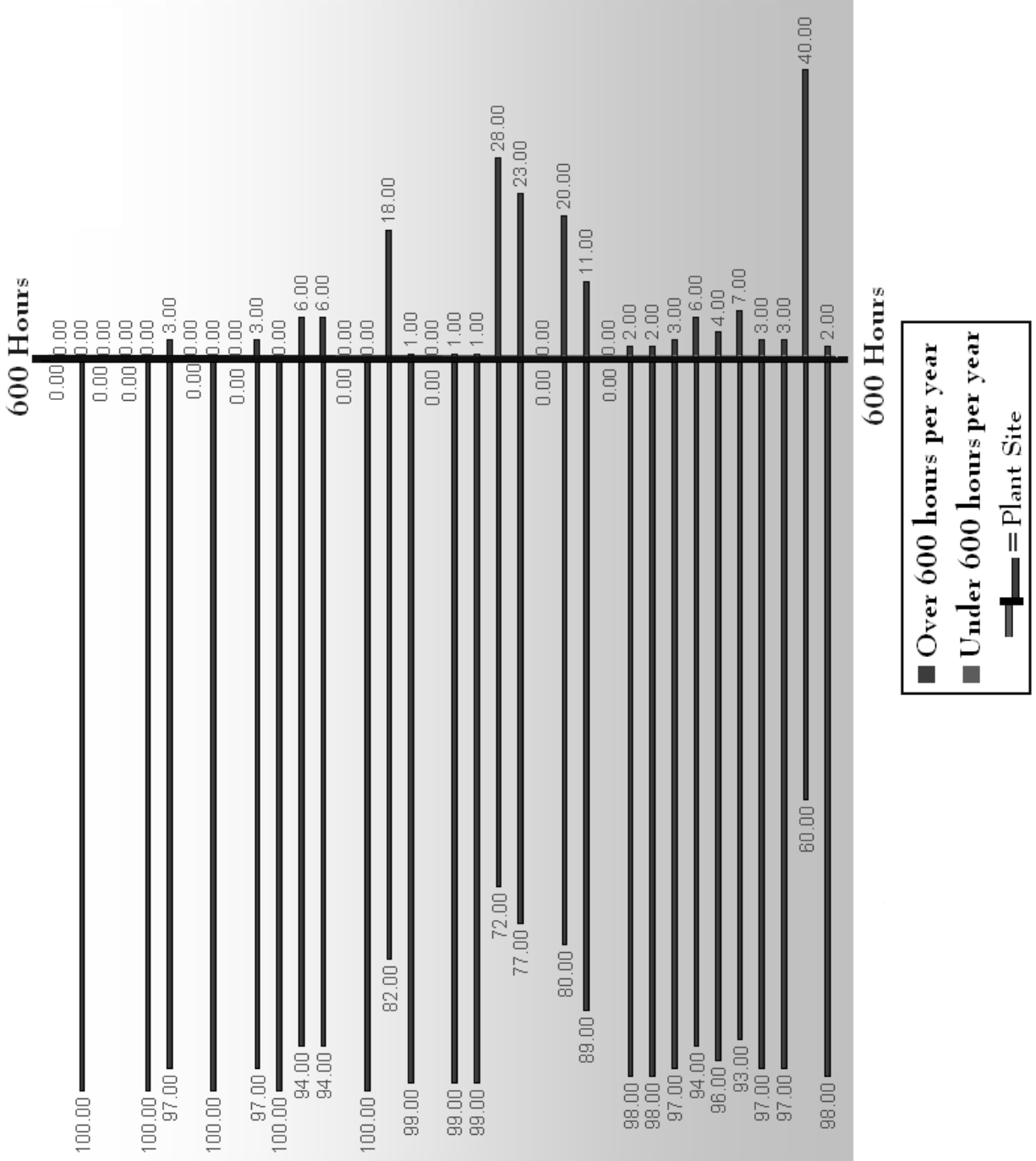
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Ability to defer daily living obligations without adverse effects is limited

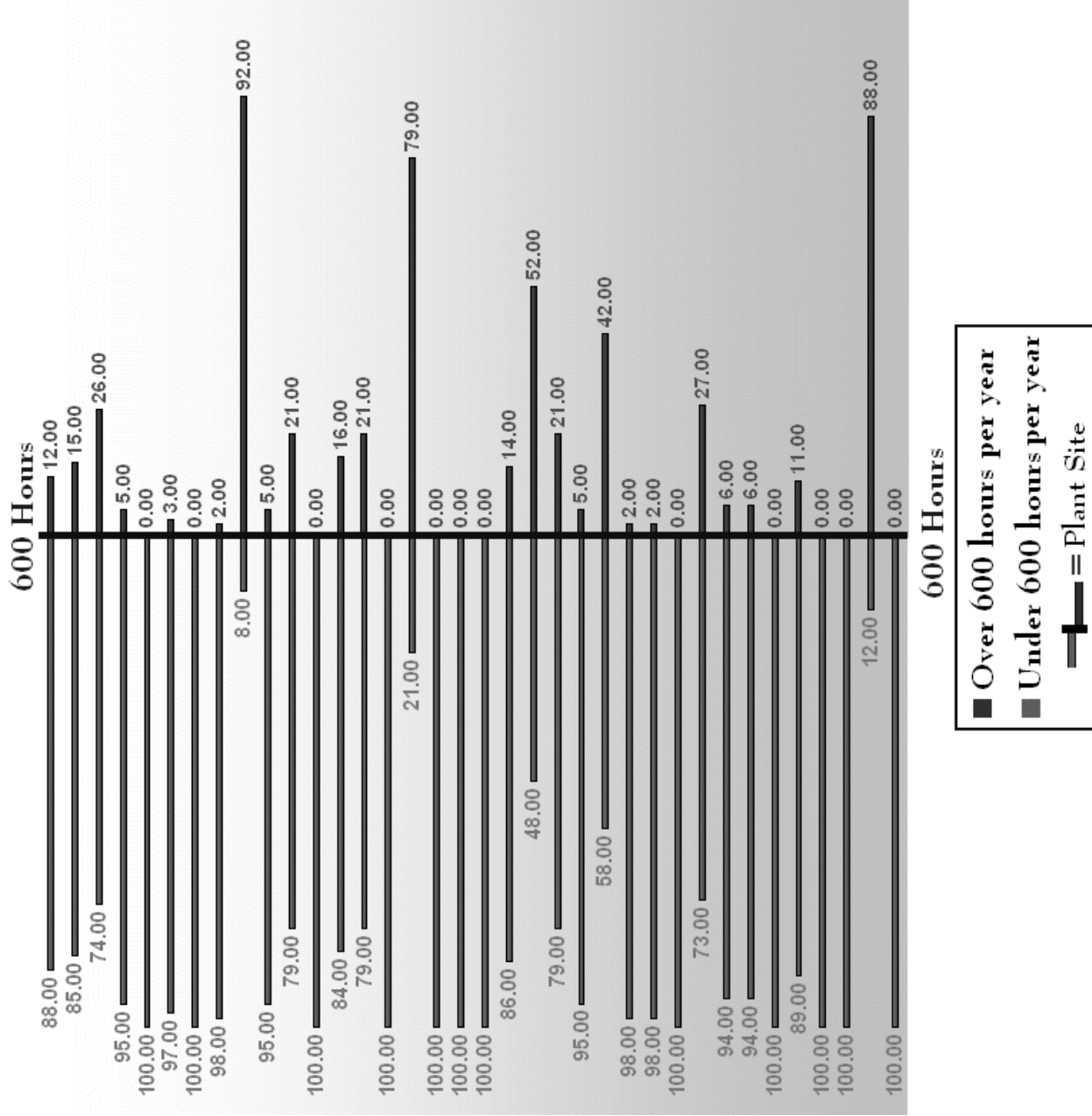


# Percentage of Other Covered Personnel Under and Over 600 Hours Annual Overtime (by site - 1999)



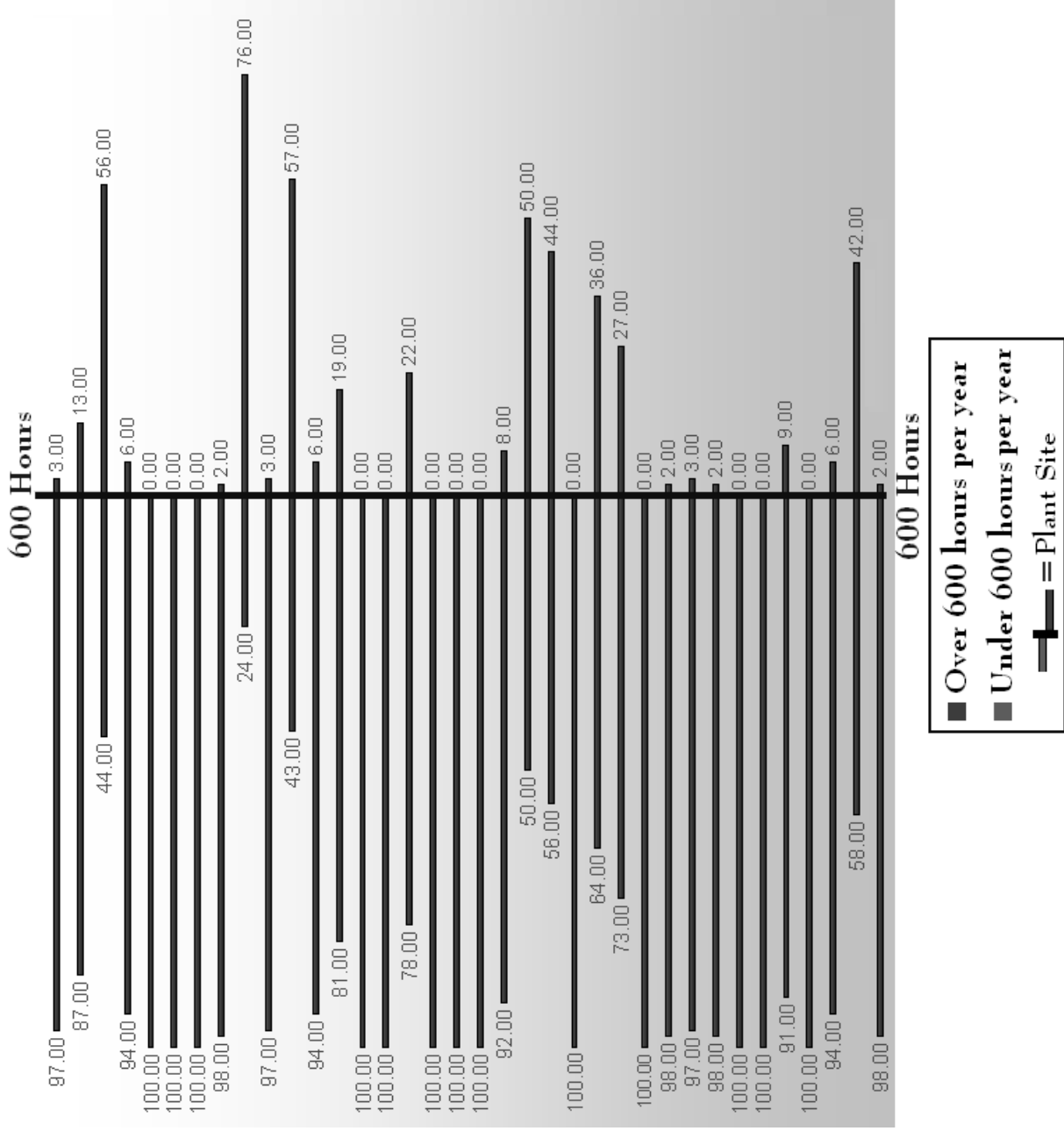
Based on NEI data provided by letter dated August 29, 2000 (NL003746495)

# Percentage of Licensed Operators Under and Over 600 Hours Annual Overtime (by site-1999)



Based on NEI data provided by letter dated August 29, 2000 (ML003746495)

# Percentage of Non-Licensed Operators Under and Over 600 Hours Annual Overtime (by site - 1999)



Based on NEI data provided by letter dated August 29, 2000 (ML003746495)

# Group Work Hour Controls

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(June 25, 2004 Draft Requirements)

- Applicable to selected functions within 5 groups
  - Operations, Maintenance, Health Physics/Chemistry, and Fire Brigade
- Averages based only on individuals working at least 75% of scheduled hours
- Group average limited to 48 hours/week while plant is operating

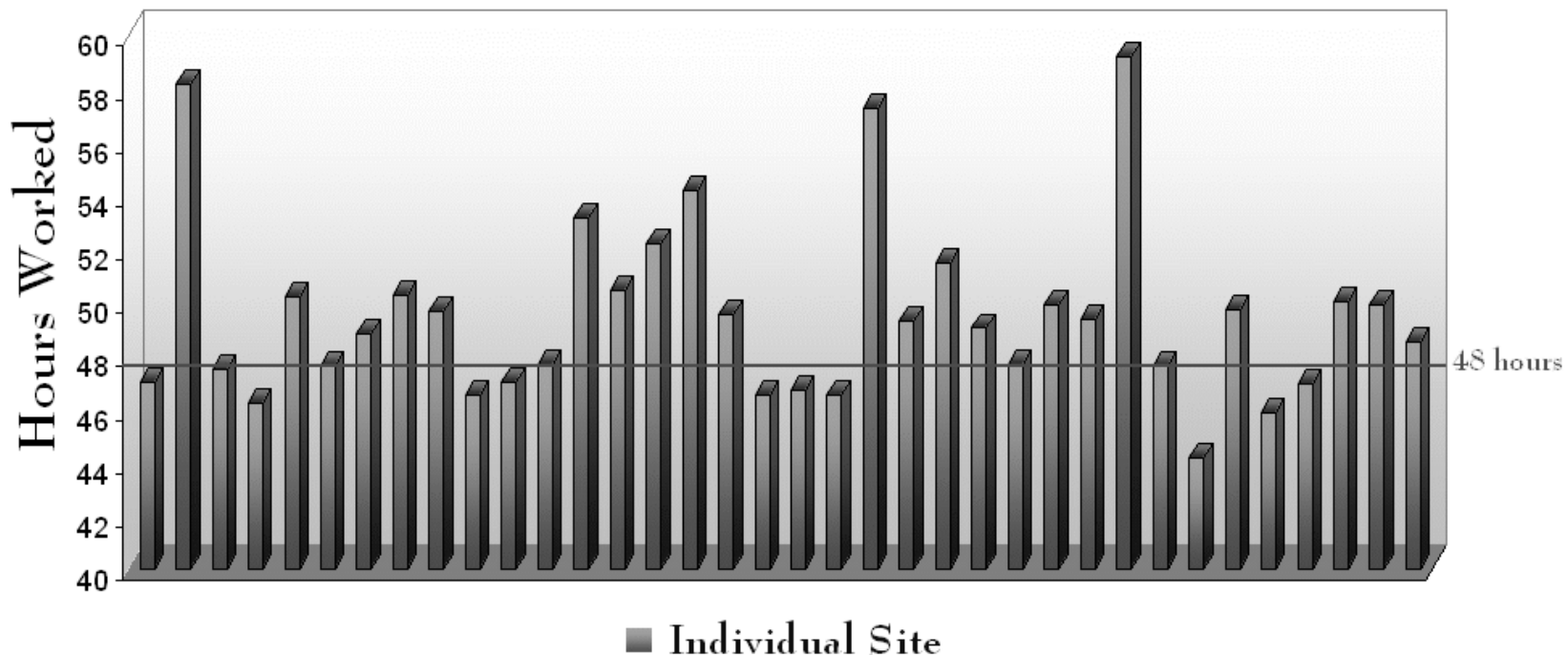
# Group Work Hour Controls

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(June 25, 2004 Draft Requirements)

- Outages
  - ▶ Non-security personnel subject to individual limits only for first 120 days of an outage
  - ▶ Security personnel limited to 60 hours/week average for first 120 days of a planned outage
  - ▶ Security personnel subject to individual limits only first 120 days of an unplanned outage
- Increased Threat Conditions
  - ▶ Security personnel subject to individual limits only for first 120 days

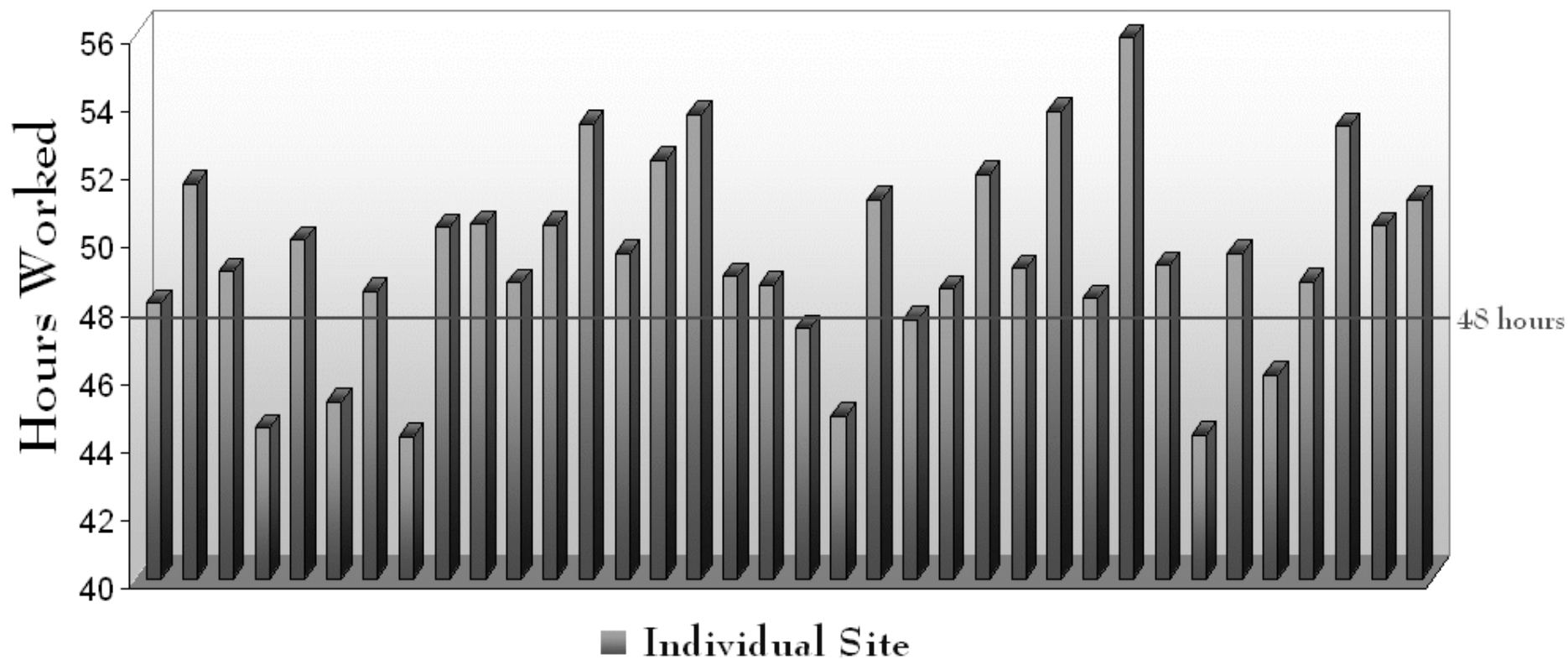
Average Hours Worked  
by Licensed Operators  
Per Week Per Person (Estimated)  
(1999)



Per week averages estimated from annual overtime values in NEI data provided by letter dated August 29, 2000 (ML003746495)  
Calculations Based on assumption of 42 hr base week, 3 weeks sick , annual and holiday leave

Note: Estimated weekly averages include all overtime (outage and non-outage).

## Average Hours Worked by Non-Licensed Operators Per Week Per Person (Estimated)



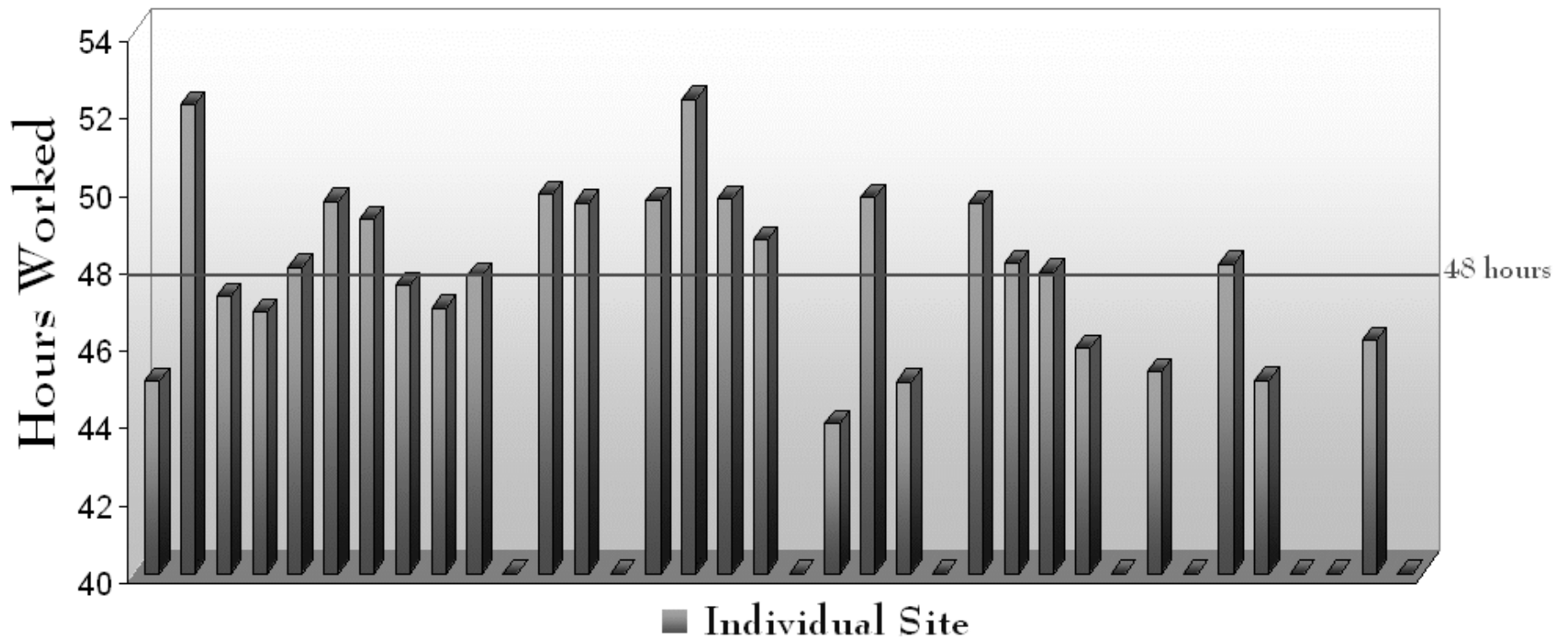
Per week averages estimated from annual overtime values in NEI data provided by letter dated August 29, 2000

(ML003746495)

Calculations Based on assumption of 42 hr base week, 3 weeks sick , annual and holiday leave

Note: Estimated weekly averages include all overtime (outage and non-outage).

Average Hours Worked  
by Other Covered Personnel  
Per Week Per Person (Estimated)  
(1999)



Per week averages estimated from annual overtime values in NEI data provided by letter dated August 29, 2000 (ML003746495)  
Calculations Based on assumption of 42 hr base week, 3 weeks sick, annual and holiday leave

Note: Estimated weekly averages include all overtime (outage and non-outage).



# Group Work Hour Controls

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## Comments and Concerns

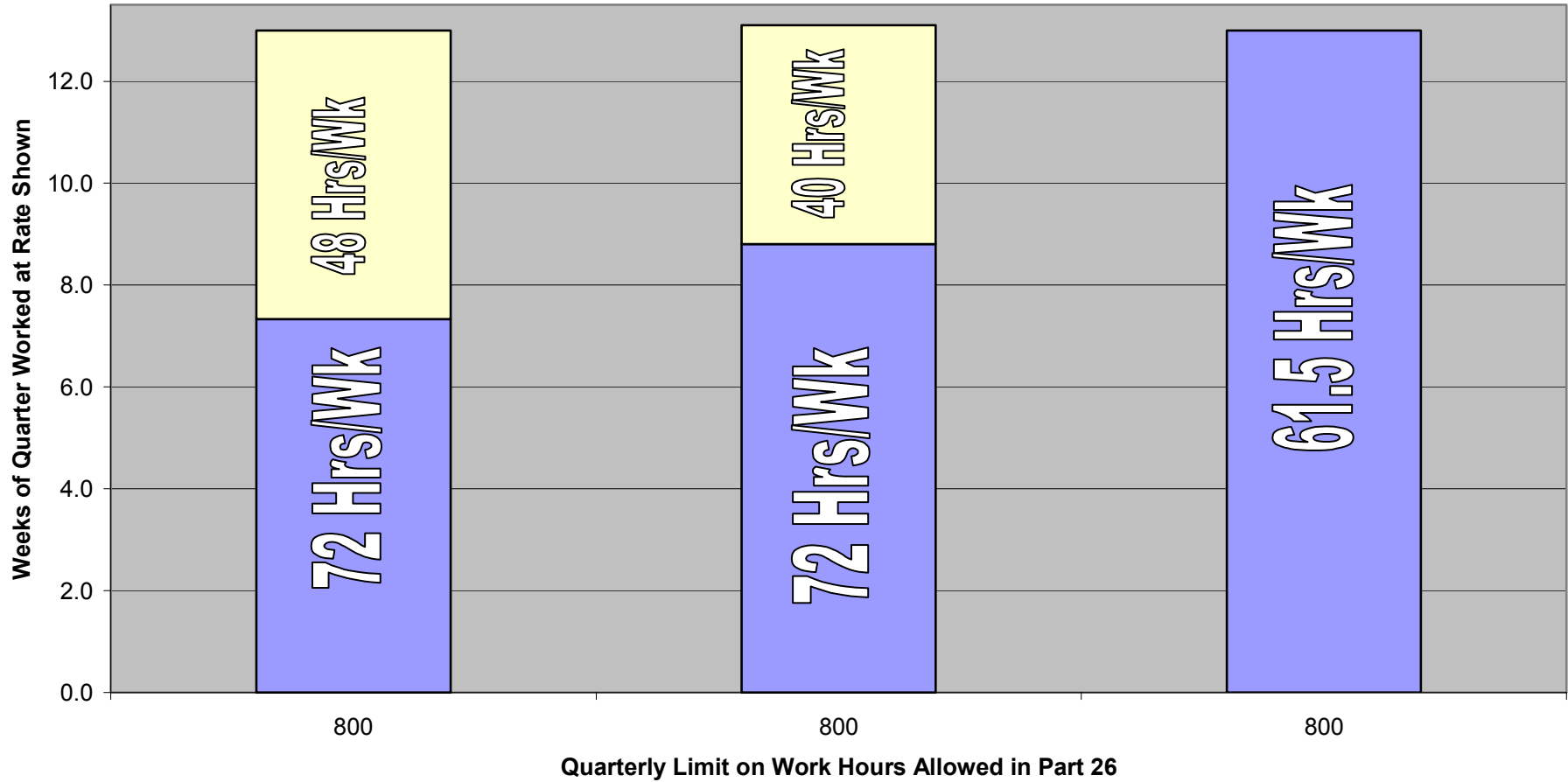
- Complexity
- Record keeping burden
- Potential for individual work schedule disruptions
- Potential for “outage exclusion” to allow excessive hours
  - Multiple outages
  - Transient workers
  - Extended Outages

# Individual Long-Term Limits

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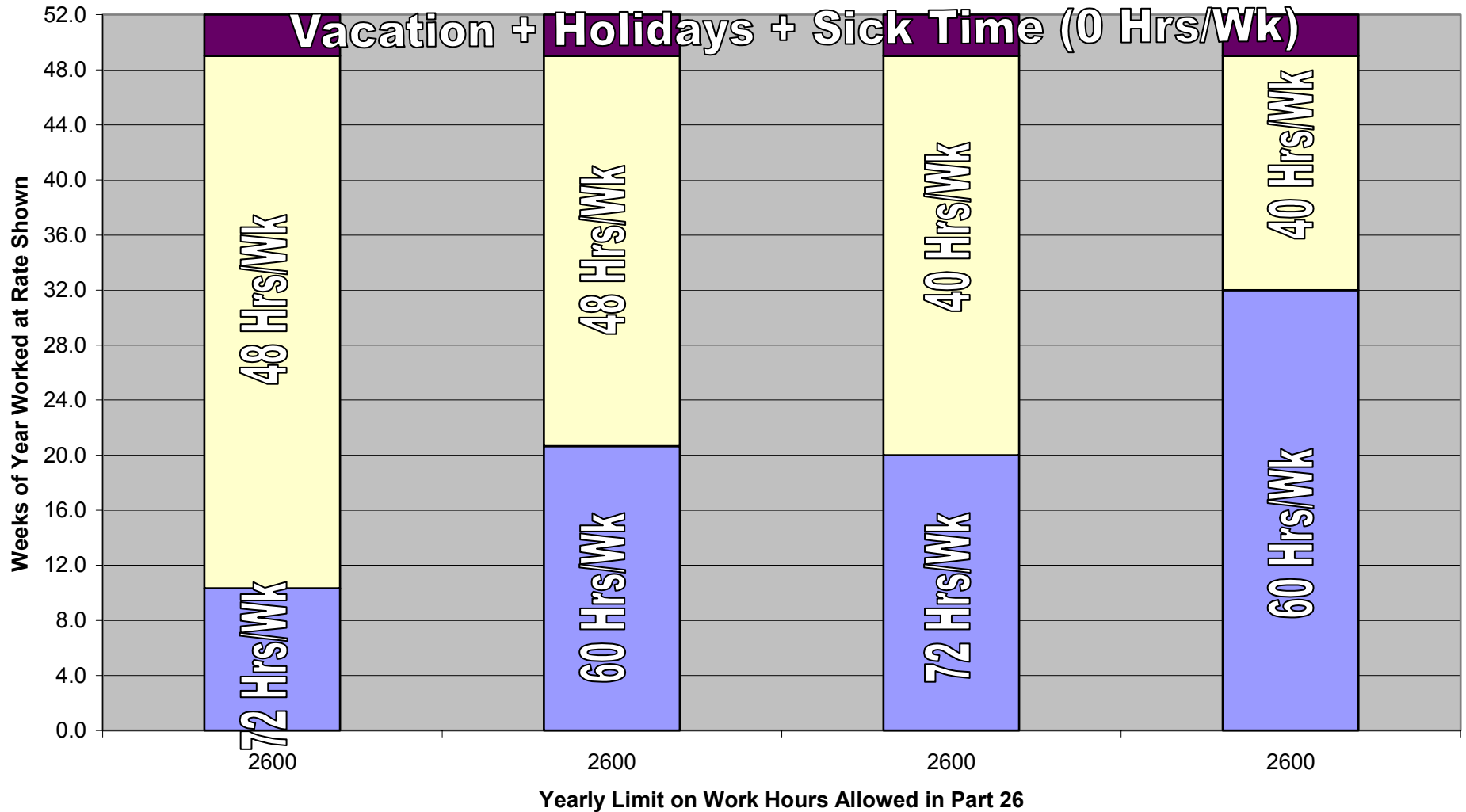
- 800 work hours in consecutive periods not to exceed 13 weeks
- 2600 work hours in any annual period, as defined by the licensee

**Portion of Quarter Worked at Various Rates for a 800 Hour Quarterly Limit**  
**- Assumes outage scheduling - no time taken during quarter for vacation, holiday and sick time -**



■ Number of Weeks (High Work Periods) ■ Number of Weeks (Low Work Periods) ■ Number of Weeks (Vacations + Holidays + Sick)

**Portion of of Yearly Work at Various Rates for a 2600 Hour Yearly Limit**  
 - Assumes 3 weeks per year of vacation, holiday and sick time -

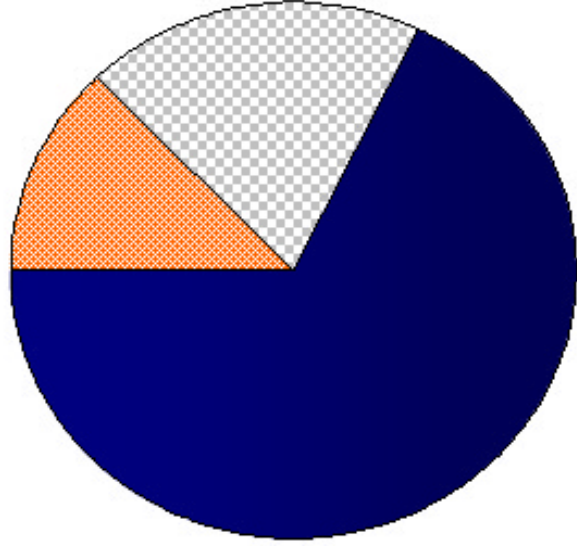


■ Number of Weeks (High Work Periods) ■ Number of Weeks (Low Work Periods) ■ Number of Weeks (Vacations + Holidays + Sick)

# Site Outage Duration In Days

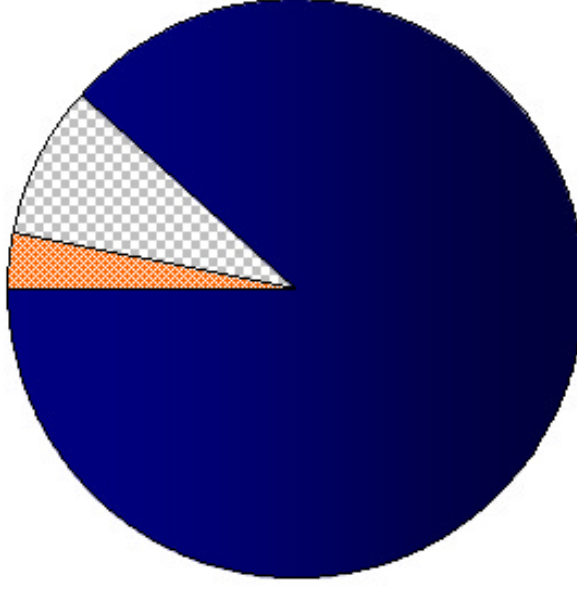
## PWR's

6 Sites, 19%  
4 Sites, 13%



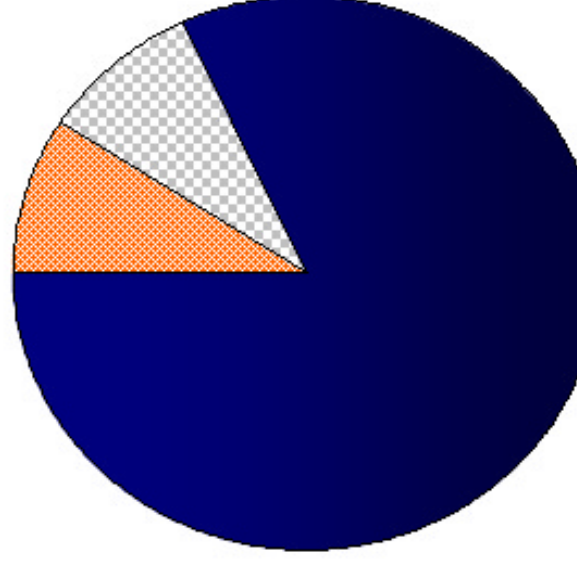
21 Sites, 68%  
**2000**

3 Sites, 9%  
1 Site, 3%



30 Sites, 88%  
**2001**

3 Sites, 9%  
3 Sites, 9%

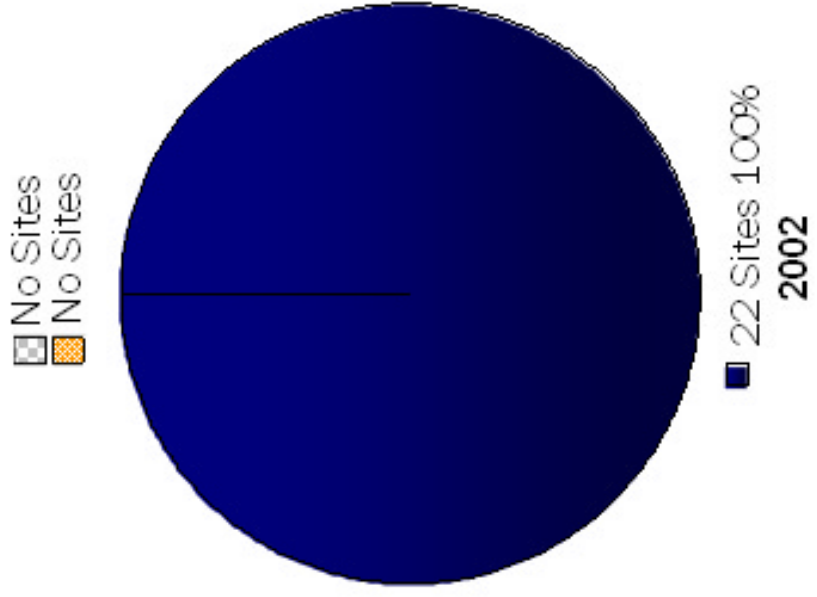
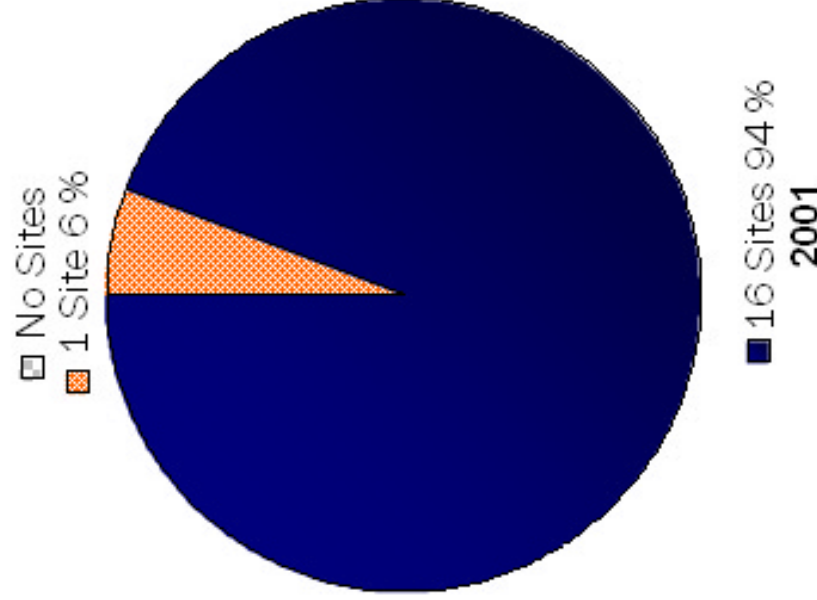
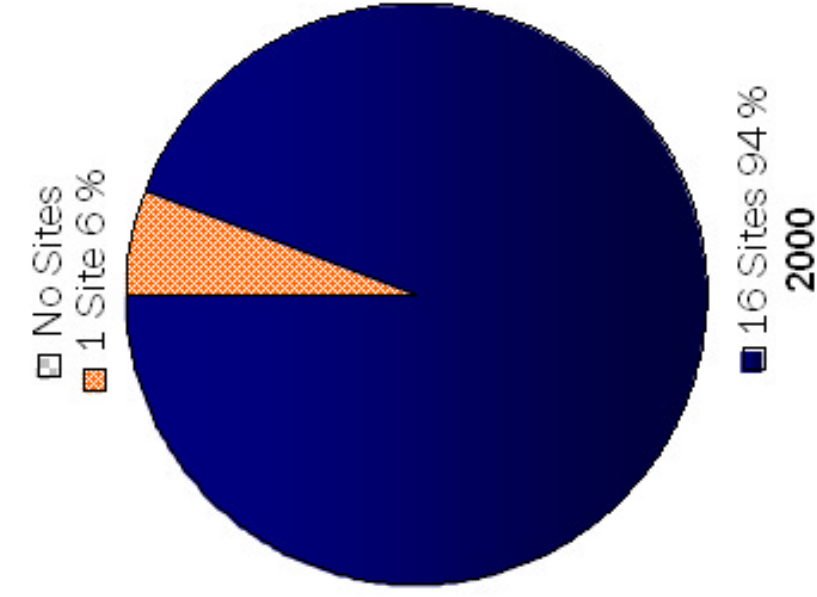


27 Sites, 82%  
**2002**

Outages Greater Than 70 Days Due To Multiple Units  
Outages Greater Than 70 Days from Single units  
Outages Less Than 70 Days

# Site Outage Duration In Days

## BWR's



■ Outages Greater Than 70 Days Due To Multiple Units  
■ Outages Greater Than 70 Days from Single units  
■ Outages Less Than 70 Days

# Long-Term Work Hour Controls

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NRC staff is interested in hearing stakeholder -

- Comments
- Concerns
- Recommendations