



## Taylor Energy Center

### Health Impact Assessment--Phase 1 of 3 Summer 2006

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## **Introduction to Phase One**

Healthy Development, Inc. (HDI) was hired by the Taylor County Development Authority (TCDA) to conduct a health impact assessment (HIA) of the pending Taylor Energy Center (TEC), an 800 megawatt coal fired electric plant slated to be built over the next four years in rural Taylor County, Florida.

Taylor officials anticipate elevating the county's economic, health and social conditions by bringing TEC jobs to the area that come with a full benefits package for employees. Conversely, many community members fear health impacts of the plant's harmful emissions to the area's air and water. This study is intended to inform the community as to the expected risks and benefits of the plant's operation. It is also important to note that this study functions under the premise that the coal plant will be built as planned - as does the Taylor County Development Authority.

Phase one of the study (there are three phases) addresses the areas outlined below and describes the specific scope of the full study.

Phase One contract requirements:

1. Qualitative Data Collection:
  - a. Expert, stakeholder, and key informant perspectives
  - b. Community concerns identified through a blend of methods including press clips, public testimony, etc. - evaluated using issue specific scientific literature review
2. Collection of existing population data: sources: Health Departments and other government statistics such as US Census of population, housing and the economy, etc.

### *Limits to This Study*

Although the scope of this study is more fully described below, it is important to lay out what this study will and will not address. The breadth of issues surrounding the health of Taylor County in context to the Taylor Energy Center is immense. Issues of transportation, housing, air and water quality, lifestyle, other industrial operations, economic factors, access to health services, social cohesion and capital, racial disparities, education, social equity and justice and more will be impacted by the development of the plant. All are valid areas of study.

Despite those issues' relationship to the TEC project, it is only feasible to study those of most concern and interest to the community, and those that have available data with which to analyze the health impacts to the population.

Federal and state regulations dictate reporting of criteria pollutants that effect human health. If the emissions are not regulated, such as carbon dioxide, and/or no data are available, population-based analysis is not feasible. See Table 1 below for a description of the data requirements for population health analysis.

## Scope

The scope was determined by stakeholder concerns and available data. As such, this HIA will **investigate** many aspects of the impact of the TEC on the health of Taylor County. However, **quantitative analysis** will only be undertaken for the investigation of the impact on life expectancy (mortality) from the TEC's reported criteria pollutants and the impact of income on employee's life expectancy.

Life expectancy is the outcome measurement for several reasons. First, comparisons can be made between the impact of emissions and employment. Second, using available data is economical and faster than using hospital discharge data. Hospital discharge data is not population-based and would require substantial time and data manipulation to investigate the impact of emissions on hospitalization rates<sup>1</sup>. Finally, life expectancy is a indicator of illness (morbidity); shorter life span implies earlier sickness and lower quality of life. The impact on illness and quality of life will be investigated and will accompany the life expectancy analysis.

The study will investigate or analyze the health impacts of the TEC in the following areas:

1. Human health aspects of emissions by:
  - a. analyzing the impact of criteria pollutants on life expectancy
  - b. investigate the impact of criteria pollutants on illness
  - c. investigating carbon dioxide
  - d. investigating measurable surface and groundwater impacts<sup>2</sup>
  - e. compare death rates of Taylor County with Madison, Dixie, Hamilton, Hendry, Washington and Suwannee Counties
2. Human health aspects of the economic impact by:
  - a. analyzing economic issues related to employment and its relationship to death rates and life expectancy
    - i. race

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<sup>1</sup> Some HIAs use hospital discharge data to look at specific illnesses (morbidity). This HIA uses only available data in a population-based format. Hospital discharge data is available for each discharge and is not population-based. For example, if a person was admitted to the hospital for asthma three times within a year, there would be three discharge records for one person. In order to analyze these data, Healthy Development would need to disaggregate the data so that one person is identified for the three discharges. The contract for this HIA is for the use available population-based data only and will not look at illnesses represented in hospital discharges.

<sup>2</sup> Mercury is not a criteria pollutant and TEC plant emissions estimates for mercury are currently not available for analysis.

- ii. income
  - iii. health insurance
  - iv. In short, the study will predict impacts on life expectancy of TEC employees according to various employment levels and scenarios.
- b. exploring economic multiplier effects
  - c. exploring the issues of job training
3. Smoking Attributable Mortality Rate analysis

Finally, the study will give recommendations as to what steps should be taken to enhance the expected positive benefits of the plant's operation and minimize the negative impacts in a wide range of areas.

*Criteria for Analysis*

The table below defines what is required for quantitative analysis for issues related to the TEC for HIA.

Table 1: Criteria for forecasting population health impacts:

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<ol style="list-style-type: none"> <li>1. A statistically significant level of the risk has been identified in scientific peer reviewed journal article or other source</li> <li>2. The risk is applicable to a general population identifiable from a source such as Vital Statistics records or US Census data.</li> <li>3. The risk level can be applied mathematically to the population. For example, it is a percentage, risk or odds ratio or is a multivariate equation where all the components of the equation are known or can be credibly estimated.</li> </ol>
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**Health Impact Assessment Explained**

HIA's are performed for all manner of development scenarios: energy, housing and town development, water resource and supply, parks and recreation and transportation. They are prospective and used to assess impact to specific populations using relevant data.

Health Impact Assessment (HIA) – Components and Applications

- HIAs define both positive and negative health impacts within specific populations and allow for design or policy change recommendations to optimize health
- HIAs often analyze social and economic impacts of projects on effected populations
- HIAs bring public health issues to the attention of decision makers, potentially improving project design and implementation
- HIAs contain specific protocol and an ethic based on improving the social determinants of health

HIA methods:

- collect qualitative data from stakeholders and experts with surveys and focus groups for the purpose of HIA scoping
- use a variety of sources of data including reported governmental data for the purpose of analysis
- collect health risk information from peer-reviewed journal articles and other sources
- employ a mixture of epidemiological and demographic statistical techniques
- project statistics onto maps using Geographic Information Systems (GIS).

## **A Social Model of Health and Well-being**

HIA is based on a holistic, social model of health which recognizes that the well-being of individuals and communities is determined by a wide range of economic, social and environmental influences as well as by heredity and health care. As such, Healthy Development subscribes to the World Health Organization's definition of health which is:

Health is a state of complete physical, mental and social well-being and not merely the absence of disease<sup>3</sup>.

This definition is much broader than (but encompasses) the traditional medical model which defines health as freedom from disease which can be diagnosed clinically and is concerned primarily with treating symptoms rather than their underlying causes.

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<sup>3</sup> <http://www.who.int/about/definition/en/>

## **Health Impact Assessment of the Taylor Energy Center**

HDI conducted a rapid health impact assessment (HIA) for the Jefferson and Madison County Health Departments in September, 2005. This rapid assessment focused on the health impacts of particulate matter and mercury emissions from the Taylor Energy Center. This TCDA HIA is a more in depth study on health, social and economic impacts on Taylor County citizens. Taylor County officials will have the potential to enhance the positive impacts and minimize the negative impacts of the project with the foresight that the HIA analysis brings.

The operational phase of the energy plant has raised concerns about air and water pollution on one hand and, on the other, the increase in health and well-being brought by the positive economic impacts on county residents' health. This HIA will focus on (1) environmental health, (2) the economic impacts from added jobs and the population newly covered by health care insurance and (3) the social determinants of health.

### **Scoping and Stakeholder Perspectives**

Fundamental to an HIA is gathering stakeholder and community member input about their concerns and desires for a proposed project, program or policy. The scope of an HIA is determined in part by community and stakeholder input. In Taylor County, many community stakeholders representing a variety of perspectives and constituencies were interviewed or surveyed regarding Taylor County in general, and the Taylor Energy Center specifically. Names were supplied by the TCDA. Those selected were not required to participate and their input is confidential. In addition, press clippings and other coverage of public meetings were used to collect the concerns and perspectives of the community regarding the plant's construction.

Two themes emerged from many of the stakeholders: (1) pollution and (2) economic development. Other often cited concerns were racial tensions and disparity and lack of political empowerment (this study uses the term social capital). Examples of lack of social capital cited by community members include the absence of a public vote on the coal plant and/or their assertion that little or no information was available to the public about TEC's impacts.

The length and breadth of the comments by opponents was greater than other stakeholders from a variety of constituencies. Some community members in opposition to the plant that were not identified as stakeholders independently contacted HDI to provide input. Summary of stakeholder perspectives:

### *Concerns*

- Overall poor health of county residents
- County's high level of smoking rates
- Racial Disparities, Racism
- Remaining fear from bombing range experience
- Poverty and lack of economic development
- General illness
- Respiratory illnesses
- Cancer
- Odor
- More pollution at night
- Haze over Perry
- Health impacts of TEC are unknown
- Fetal health
- Cancer
- Global Warming
- Water needed by TEC to operate will come at no cost to TEC
- Impact to tax roll of TEC acreage
- Negative effects of combined emissions from Buckeye and TEC

### *Desires*

- Nature coast identity is strong
- Retirees will be attracted to Taylor County
- Health insurance from TEC will elevate health status of the entire community over time
- Land development of the coast will improve Taylor County overall
- Economic development opportunities are increased
- Maintain small town charm
- Clean, non-polluting industry and business growth for the county
- No TEC in Taylor County

### **Demographic Characteristics of Taylor County and the City of Perry**

This section highlights demographic characteristics of the city, county and state. The health impact assessment will calculate impacts using basic demographic characteristics collected from the US Census and from Florida Department of Health vital statistics data.

Demographic characteristics of both the City of Perry and Taylor County are shown in Table 2. Most of the county's black residents (76%) live within the city limits. Gender and education rates are similar between the city and county. Chart 1 shows that 80 percent of state residents compared to 70 percent of Taylor County residents had a high school diploma or equivalent at age 25 and

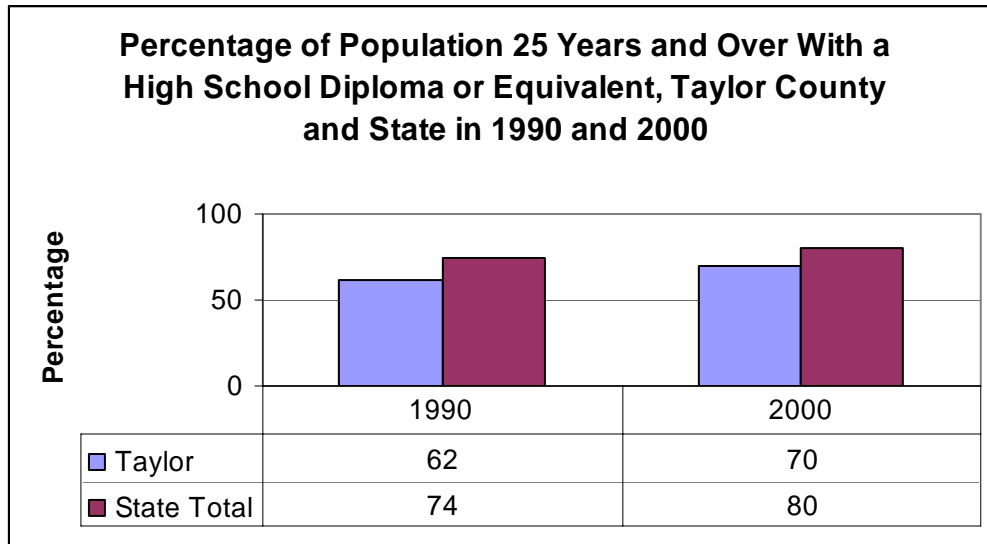
older. Achievement of a high school diploma has improved over time for both the state and county. Chart 2 shows that the average state household earned approximately 30 percent more income than Taylor County households. Chart 3 shows median household income statistics by white and black race for Taylor County residents compared to the state<sup>4</sup>.

Table 2: Selected Demographic Characteristics of the City of Perry and Taylor County.

	City of Perry		Taylor County	
	Number	Percent	Number	Percent
White	3,835	56%	14,988	78%
Black	2,819	41%	3,666	19%
Other	193	3%	602	3%
Male	3,201	47%	9,833	51%
Female	3,646	53%	9,423	49%
High School Diploma, Equivalent or Less	3126	71%	9155	71%
More than High School	1304	29%	3759	29%

Source: US Census, 2000 Race and Gender from the summary file 1 and education from summary file 3 sample.

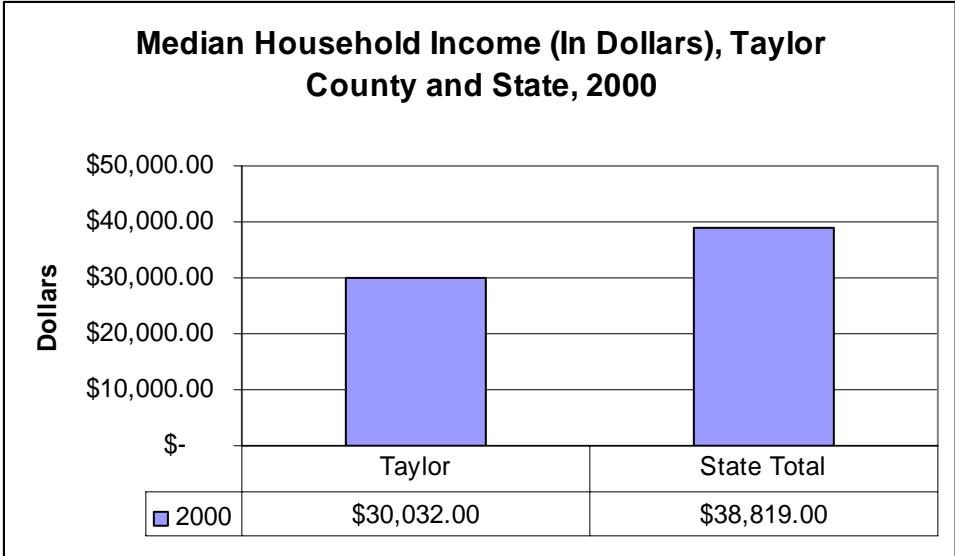
Chart 1.



Source: Florida Charts--<http://www.floridacharts.com/charts/CensusData.aspx>

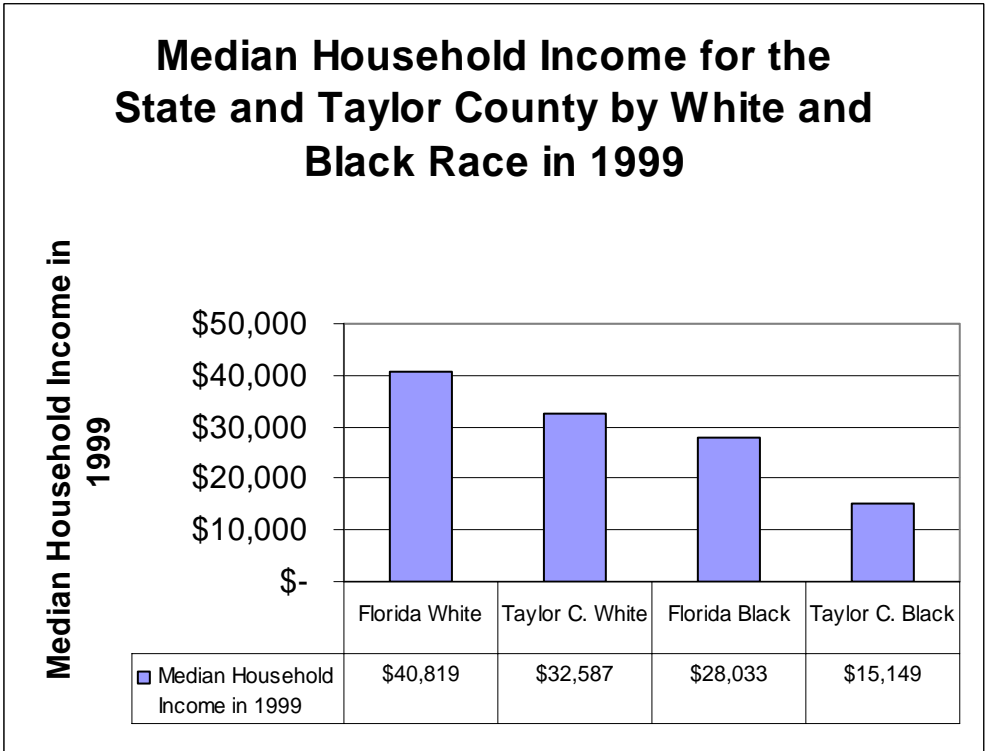
Chart 2:

<sup>4</sup> Most race statistics in this report reference white and African-American (black for brevity). Hispanic ethnicity still comprises a small proportion of the population and their estimates unstable.



Source: Florida Charts--<http://www.floridacharts.com/charts/CensusData.aspx>

Chart 3:

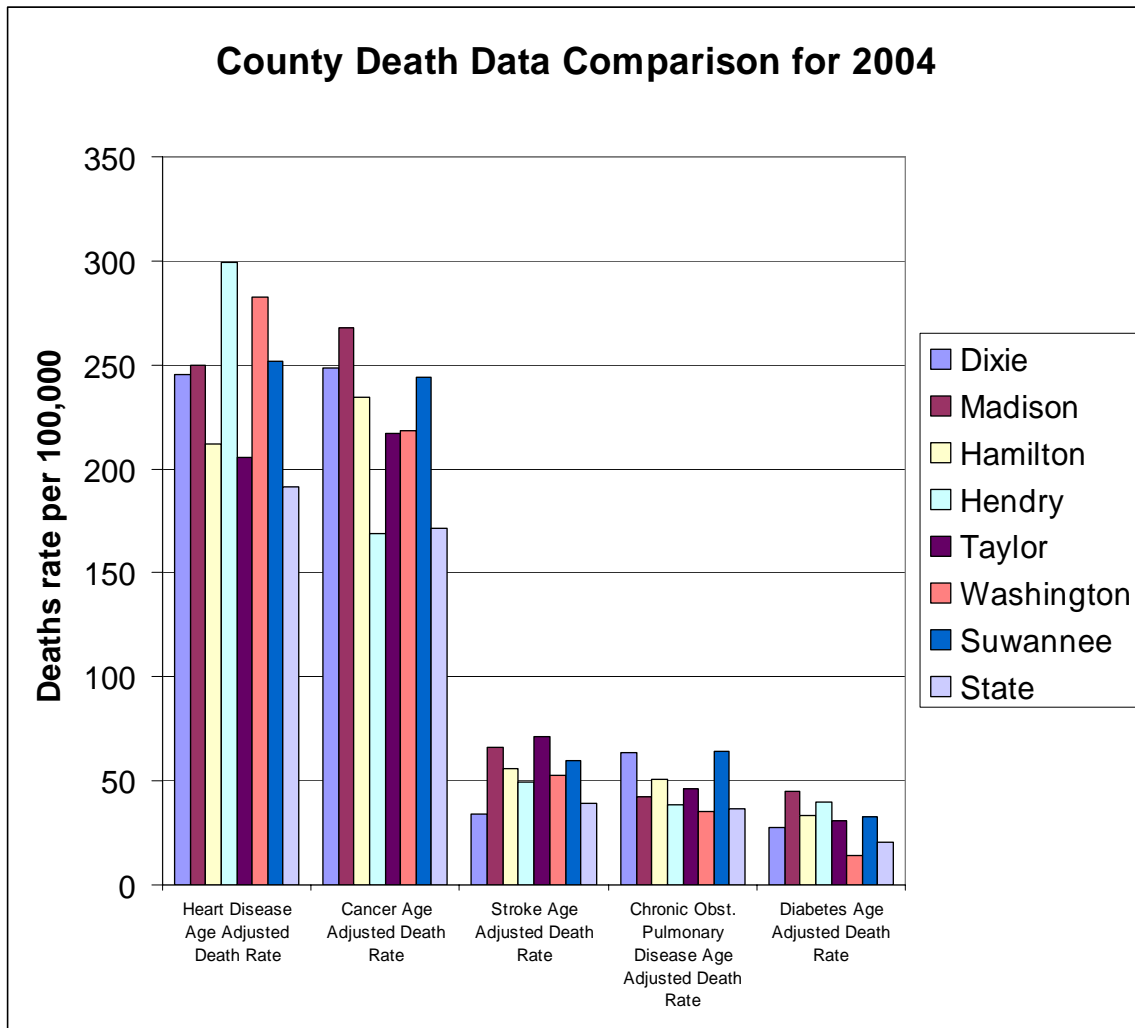


Source: US Census 2000

## Baseline Health Status of Taylor County Residents

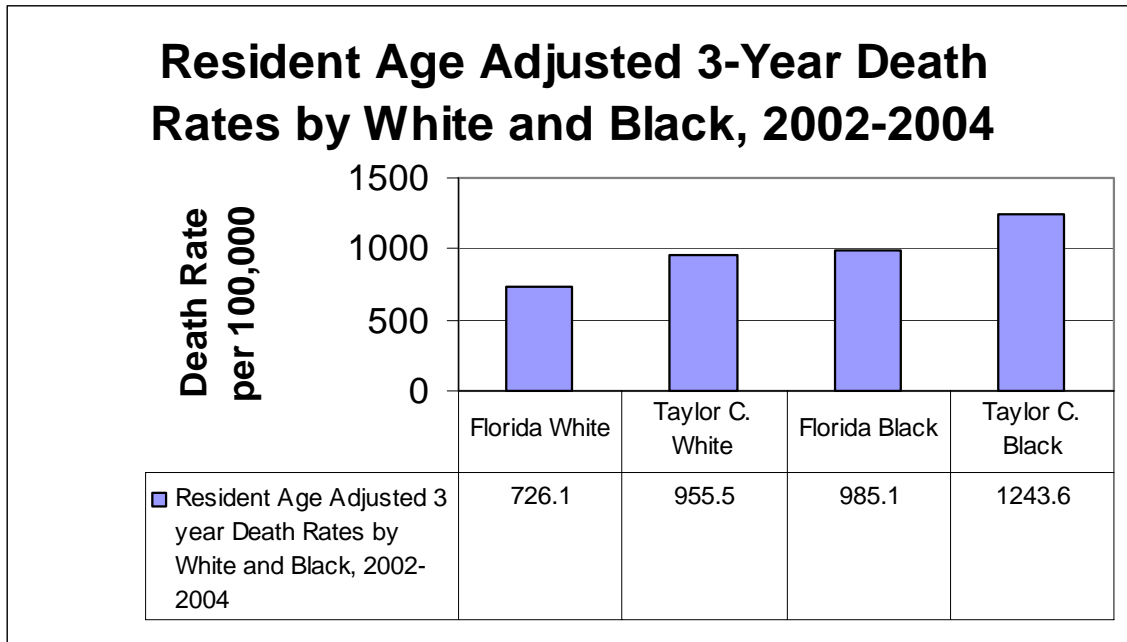
The current (baseline) health conditions of Taylor County residents will also be used for quantitative analysis as a part of the Health Impact Assessment. Chart 4 shows that the age-adjusted death rates for Taylor County residents are higher than the state average for the top five causes of death. Taylor County residents have higher average death rates for heart disease, cancer, stroke, chronic lower respiratory disease (CLRD), and diabetes than the state average. Other counties are included in Chart 4 for comparison. Chart 5 shows state and Taylor County three year age adjusted death by black and white. Table 3 shows selected lifestyle and behavioral issues for the county. Compared to the state, residents are more likely to be obese and to smoke. Residents are less likely to exercise than the rest of the state.

Chart 4:



Source: County Death Data Comparison, 2004, Florida Charts  
<http://www.floridacharts.com/charts/SpecReport.aspx?RepID=372>

Chart 5:



Source: Florida Charts, Taylor County Health Profile

Table 3: Behavioral Risk Factors, 2002

	Taylor County	State
Adults who currently smoke	31%	22%
With no regular vigorous physical activity	81%	76%
Who engage in no leisure-time physical activity	37%	26%
Who are overweight (BMI >25)	35%	35%
Who are obese (BMI >=30)	30%	22%

Source: Florida Charts--Taylor County Chronic Disease Profile, Behavioral Risk Factors (BRFSS) Data 2002.  
<http://www.floridacharts.com/charts/SpecReport.aspx?RepID=377>

Table 4 shows estimates of health insurance coverage for residents. These are estimates since the data were reported at different time periods and percentages could only be approximated. Medicaid and Medicare cover about 37 percent of residents; whereas, 28 percent of the county's residents are uninsured. Blue Cross and Blue Shield of Florida covers about 31 percent of the population. With

this information, it can be roughly estimated that about 5 percent of the rest of the population may be covered by some other sort of private health insurance. For more information on baseline health status of Taylor residents, see appendices one and two.

Table 4: Health insurance coverage estimates for Taylor County

	Number	Approximate percentage
Blue Cross Blue Shield of Florida (April 2006)+	5950	31%
Other private health care insurance*	?	~5%
Medicaid (Jan. 2006)**	3,796	20%
Medicare (2003)***	3,227	17%
Uninsured (2002)****	5,392	28%
Total Population (US Census 2000)	19,256	100%

+ Personal communication with Blue Cross Blue Shield of Florida

\* Estimated

\*\* Agency for Health Care Administration...

\*\*\* US Department of Health and Human Resources, Centers for Medicaid and Medicare Services, [www.cms.hhs.gov/MedicareEnrpts/](http://www.cms.hhs.gov/MedicareEnrpts/)

\*\*\*\* Prevalence of Major Behavioral Risk Factors in Taylor County A Report from the 2002 County Behavior Risk Factor Surveillance System (BRFSS) Survey Bureau of Epidemiology Florida Department of Health

## Air Quality

Ambient (on-the-ground, where it is breathed) air quality in Taylor County is currently not monitored<sup>5</sup>. Air quality estimates for Taylor County are created from Leon County monitors combined with meteorological data. In the 1980s, particulates and sulfur dioxide were measured at below state and federal standard limits. Criteria pollutants from stack emissions in the county are annually reported and monitored.

From discussions with the Department of Environmental Protection (DEP), it was represented that several steps are required to install an air quality monitoring system in the county that would be managed by DEP. The monitor would need open land in an appropriate area without trees or buildings in addition to a power source. The cost is estimated at \$70,000; however the Florida Legislature would have to provide the money in order for DEP to operate the monitoring system.

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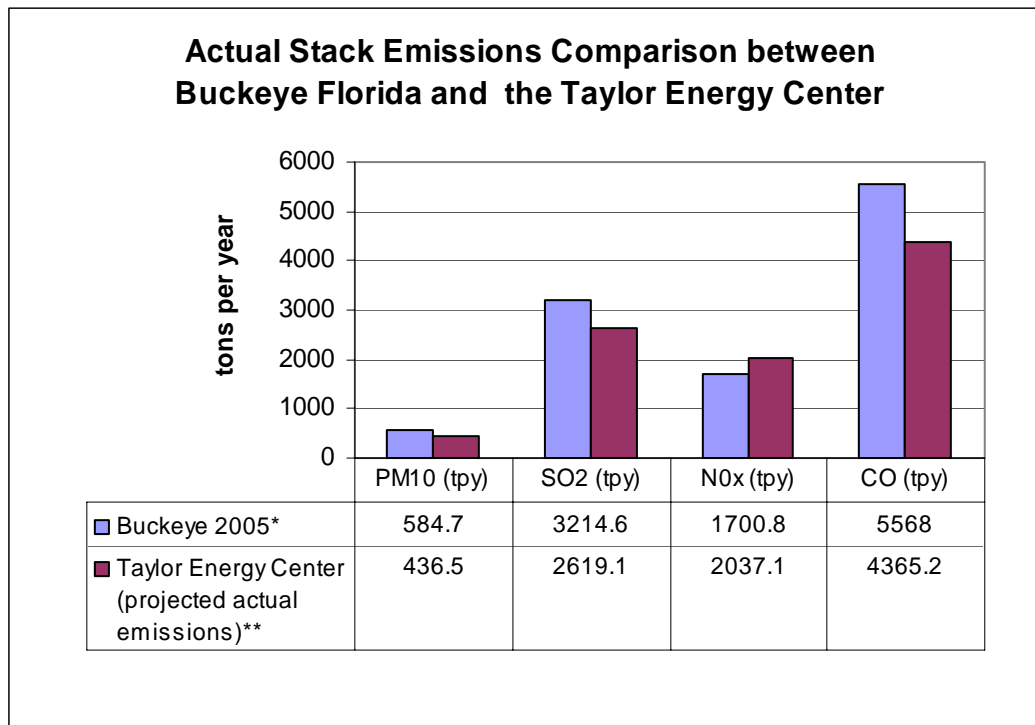
Personal communication with the Florida Department of Health, Division of Air Resource Management

Theoretically, the monitor could be accessible at all times over the internet and could link to an alert system in case of poor air quality.

Some stakeholders were concerned about the emissions from Buckeye Florida and the TEC. Both Buckeye and TEC are required to and will report pollutants that are associated with human health impacts called criteria pollutants. The pollutants reported from both industries include particulate matter (PM<sub>10</sub>)<sup>6</sup>, sulfur dioxide (SO<sub>2</sub>)<sup>7</sup>, nitrogen oxides (NO<sub>x</sub>)<sup>8</sup>, and carbon monoxide (CO)<sup>9</sup>.

The stack height of TEC will be 700 feet. The TEC stack height is designed to be high enough to prevent downwash of the emissions plume. According to TEC, this stack height, which conforms to Good Engineering Practices, will enhance the dispersion of emissions resulting in lower ground-level concentrations of inhale-able (ambient) pollutants<sup>10</sup>. Chart 6 shows the stack emissions of criteria pollutants from Buckeye Florida for 2005 compared to the anticipated permitted emissions from TEC.

Chart 6:



\* Source: Florida Department of Environmental Protection Electronic Annual Operating Report, Emissions by Report Facility 2005.

\*\* Based on anticipated permitted emissions and assumed capacity factor of 90 percent (Sources: Environmental Consulting & Technology 2006 and Taylor Energy Center, 2006).

<sup>6</sup> See Particulate Matter: Health and Welfare at [www.epa.gov/air/particlepollution/health.html](http://www.epa.gov/air/particlepollution/health.html)

<sup>7</sup> See Health and Environmental Impacts of SO<sub>2</sub> at [www.epa.gov/oar/urbanair/so2/hlth1.html](http://www.epa.gov/oar/urbanair/so2/hlth1.html)

<sup>8</sup> See Health and Environmental Impacts of NO<sub>x</sub> at [www.epa.gov/oar/urbanair/nox/hlth.html](http://www.epa.gov/oar/urbanair/nox/hlth.html)

<sup>9</sup> See Health and Environmental Impacts of CO at [www.epa.gov/air/urbanair/co/hlth1.html](http://www.epa.gov/air/urbanair/co/hlth1.html)

<sup>10</sup> FDEP rule for GEP is Rule 62-210.550 Stack Height Policy, Florida Administrative Code

The Health Impact Assessment will use TEC ambient emissions estimates to calculate the impacts on health from the coal plant. Those estimates will be used in population health analysis where possible (see Table 1).

The Florida Department of Environmental Protection (DEP) recently received approval from the Environmental Regulation Commission to implement more stringent air emission standards. The new standards will help the state meet the requirements of the U.S. Environmental Protection Agency's (EPA) Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR)<sup>11</sup>.

As part of CAIR, Florida's power plants will be required to reduce emissions of nitrogen oxides and sulfur dioxide, which contribute to the formation of fine particles and ground-level ozone. CAMR will build on CAIR regulations to significantly reduce mercury emissions from coal-fired power plants. Going beyond federal requirements, Florida's plan for implementing CAMR will result in greater mercury reductions than those required by the EPA.

This study will investigate, where feasible, any impacts these new regulations may have on the TEC and its emission levels.

In addition, the study will examine carbon dioxide despite the fact that it is not a reportable and measured emission. There is a substantiated probability of heightened federal restrictions on CO<sub>2</sub> emissions in the coming years. Rising sea levels associated with rising temperatures on earth over time have the potential to significantly impact coastal communities like Taylor County.

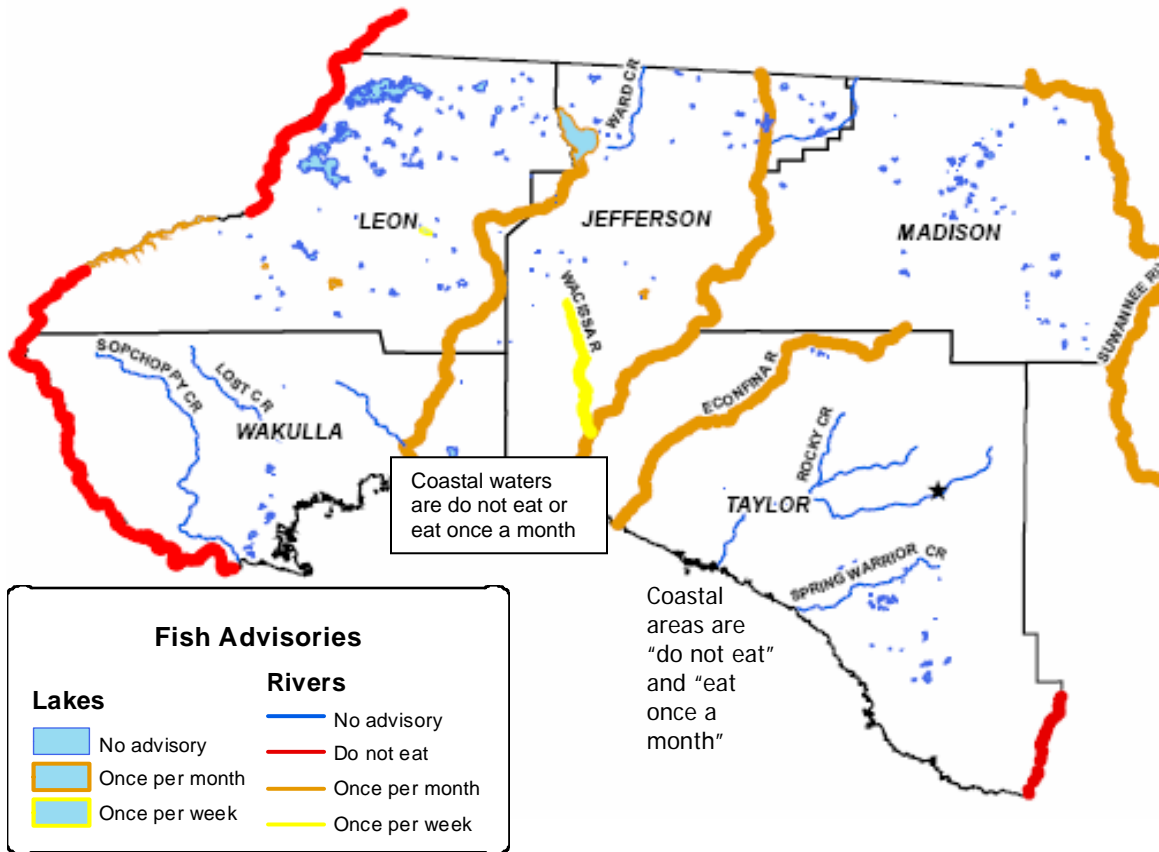
### **Water Quality**

The water issue most common in the concerns about the operation of the TEC is mercury pollution and poisoning. Baseline levels of mercury are interpreted into fish consumption warnings for Florida's waters by the Department of Health, the Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission.

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<sup>11</sup> Source: DEP Division of Air Resource Management, [www.dep.state.fl.us/air](http://www.dep.state.fl.us/air)

Chart 5: Map of fish consumption advisories\*



Citation: "Your guide to eating fish caught in Florida." Florida Department of Health, Prepared in cooperation with Florida Department of Environmental Protection and Florida Fish and Wildlife Conservation Commission.

\*These advisories are for women of childbearing age and children. The water body advisories represent the highest alert for any fish species.

Chart 5 shows a map of Taylor and surrounding counties and the current fish consumption warnings for the most at-risk population, women of childbearing age and children. The water body advisories represent the highest alert for any fish species.

Where feasible, this study will further investigate the impacts of mercury to Taylor County residents. Other ground and surface water issues, including baseline conditions, will be investigated in subsequent phases.

## Phase Two

With the approval of the TCDA, phases two and three will be adjusted to include the quantitative analysis of changes in life expectancy from ambient criteria pollutants and TEC jobs to Taylor residents. Investigations into other items listed

in the scope above include, but are not limited, to TEC impacts on illness and carbon dioxide, surface and groundwater impacts, issues of job training and economic multiplier effects. Phase two will collect the scientific peer reviewed data for the analysis and investigation of these concerns. Phase three will report the final Health Impact Assessment where the quantitative analysis and investigations will be reported. Recommendations to optimize health will be made in the phase three report.

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**Appendix One:**

Florida Department of Health, County Health Profile

**Appendix Two:**  
Prevalence of Major Behavioral Risk Factors in Taylor County

**Appendix Three:**  
Florida Department of Health, Mortality Atlas