PMBelCOL NPEmails

From: Tomeka Terry
Sent: Monday, September 22, 2008 1:34 PM
To: BelCol Resource
Subject: FW: Courtesy email copy of TVA's Response to Environmental Report - LTR 27 - SOCIOECONOMICS/ENVIRONMENTAL JUSTICE
Attachments: ER Ltr 27 - SE_RAI#02 _final.pdf

From: Spink, Thomas E [mailto:tespink@tva.gov]
Sent: Tuesday, August 12, 2008 3:52 PM
To: Mallecia Hood; Tomeka Terry; William Burton
Cc: Sterdis, Andrea Lynn; Neil Haggerty
Subject: Courtesy email copy of TVA's Response to Environmental Report - LTR 27 - SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Mallecia:

I have enclosed a pdf copy of our response to twelve RAI's related to Socioeconomics/Environmentl Justice with this email as a courtesy. As always, the official submittal has been submitted to the Document Control Desk via paper copy using Federal Express services. The paper copy should arrive on August 13, 2008.

Thomas E. Spink
Licensing Project Manager
Nuclear Generation Development
1101 Market Street, LP 5A
Chattanooga, TN 37402
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Hearing Identifier: Bellefonte_COL_NonPublic_EX
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Subject: FW: Courtesy email copy of TVA's Response to Environmental Report - LTR 27 - SOCIOECONOMICS/ENVIRONMENTAL JUSTICE
Sent Date: 9/22/2008 1:33:53 PM
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From: Tomeka Terry

Created By: Tomeka.Terry@nrc.gov

Recipients:
"BelCol Resource" <BelCol.Resource@nrc.gov>
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Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

August 11, 2008

10 CFR 52.80

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of	)	Docket Numbers	52-014 and 52-015
Tennessee Valley Authority	)		

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO ENVIRONMENTAL REPORT REQUEST FOR ADDITIONAL INFORMATION – SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Reference: Letter from Mallecia Hood (NRC) to Ashok S. Bhatnaker (TVA), Request for Additional Information Regarding the Environmental Review of the Combined License Application for Bellefonte Nuclear Plant, Units 3 and 4, dated July 11, 2008 [ML081840493].

This letter provides the Tennessee Valley Authority's (TVA) response to nine of the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) items included in the reference letter.

The enclosure to this letter provides a response to nine of the NRC RAIs related to Socioeconomics/Environmental Justice, as well as identifying any associated changes that will be made in a future revision of the BLN application. The status of the socioeconomics/ environmental justice RAIs is also provided in the enclosure.

If you should have any questions, please contact Thomas Spink at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7062, or via email at tespink@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 11th day of AUG, 2008.

Jack A. Bailey
Vice President, Nuclear Generation Development

Enclosure:

Response to Environmental Report Requests for Additional Information – Socioeconomics/ Environmental Justice

Attachments:

2.5.2-3. Pijawka, D. and J. Chalmers, "Impacts of Nuclear Generating Plants on Local Areas," *Economic Geography*, Vol. 59, No.1, January 1983. (Excerpts)

2.5.2-5A. U.S. Department of Energy, *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*, Vol.1, DOE/EIS-0288, March 1999. (Excerpts)

2.5.2-5B. U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division, RIMS II Multipliers (1997/2004), Table 1.4 Total Multipliers for Output, Earnings, and Employment by Industry Aggregation. (Excerpts)

4.4.2-7A. U.S. Census Bureau, State & County QuickFacts, Jackson County, Alabama, Website, http://quickfacts.census.gov/qfd/states/01/01071.html, accessed January 5, 2007. (Excerpts)

4.4.2-7B. U.S. Department of Education, National Center for Education Statistics, Search for Public School Districts – District Detail for Jackson County, Website, http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01, accessed November 9, 2006. (Excerpts)

4.4.2-7C. U.S. Department of Education, National Center for Education Statistics, Search for Public School Districts – District Detail for Scottsboro City, Website, http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01, accessed November 9, 2006. (Excerpts)

4.4.2-7D. National Center for Education Statistics, Statistical Analysis Report, Condition of America's Public School Facilities: 1999, Website, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000032, accessed July 31, 2008. (Excerpts)

cc (Enclosure and Attachments):
M. A. Hood, NRC/HQ

cc (w/o Enclosure and Attachments):
S.P. Frantz, Morgan Lewis
M.W.Gettler, FPL
R.C. Grumbir, NuStart
P.S. Hastings, NuStart
P. Hinnenkamp, Entergy
R.H. Kitchen, PGN
M.C. Kray, NuStart
A.M. Monroe, SCE&G
C.R. Pierce, SNC
L. Reyes, NRC/RII
R.F. Smith-Kevern, DOE/HQ
G.A. Zinke, NuStart

RESPONSE TO ENVIRONMENTAL REPORT REQUESTS FOR ADDITIONAL INFORMATION

SOCIOECONOMICS/ ENVIRONMENTAL JUSTICE

This enclosure provides the status of the 24 requests for additional information (RAI) related to Socioeconomics/Environmental Justice and provides the BLN responses to nine of these requests.

Status of Requests for Additional Information Related to Socioeconomics/Environmental Justice

RAI Number	Date of TVA Response
• 2.5.2-1	August 8, 2008. (Reference 1)
• 2.5.2-2	August 8, 2008. (Reference 1)
• 2.5.2-3	This letter – see following pages.
• 2.5.2-4	July 3, 2008 - see response to NRC Information Need SE-24. (Reference 2)
• 2.5.2-5	This letter – see following pages.
• 2.5.2-6	August 8, 2008. (Reference 1)
• 2.5.2-7	July 3, 2008 - see response to NRC Information Need SE-18. (Reference 2)
• 2.5.2-8	This letter – see following pages.
• 2.5.4-1	August 8, 2008. (Reference 1)
• 4.4.1-1	August 8, 2008. (Reference 1)
• 4.4.2-1	This letter – see following pages.
• 4.4.2-2	August 8, 2008. (Reference 1)
• 4.4.2-3	August 8, 2008. (Reference 1)
• 4.4.2-4	This letter – see following pages.
• 4.4.2-5	August 8, 2008. (Reference 1)
• 4.4.2-6	July 3, 2008 - see response to NRC Information Need SE-38. (Reference 2)
• 4.4.2-7	This letter – see following pages.
• 4.4.2-8	This letter – see following pages.
• 4.4.2-9	August 8, 2008. (Reference 1)
• 4.4.3-1	August 8, 2008. (Reference 1)
• 5.8.1-1	August 8, 2008. (Reference 1)
• 5.8.1-2	July 3, 2008 - see response to NRC Information Need SE-25. (Reference 2)
• 5.8.2-1	This letter – see following pages.
• 5.8.2-2	This letter – see following pages.

References:

1. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Bellefonte Combined License Application – Response to Environmental Report Request for Additional Information – Socioeconomics/Environmental Justice," dated August 8, 2008.

2. Letter from Andrea L. Sterdis (TVA) to NRC Document Control Desk, "Nuclear Regulatory Commission (NRC) – Bellefonte Nuclear Plant (BLN) – Response to NRC Information Needs Related to Socioeconomics/Environmental Justice," dated July 3, 2008. [ML081920213]

NRC Review of the BLN Environmental Report

NRC Environmental Category: SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

NRC RAI NUMBER: 2.5.2-3

Provide information about the labor market/ labor-shed for the project site that includes information about commuting patterns of workers into and out of neighboring counties and discuss how this area and these patterns relate to the 50-mile radius "region." (ER Section 2.5.2.1)

BLN RESPONSE:

As discussed in the BLN responses to RAIs 4.4.2-2 and 4.4.2-3 provided in the August 8, 2008, TVA letter (Reference 1), the counties included in the RIMS II analysis for the BLN 50-mile region are located in Alabama, Georgia, and Tennessee. Each county located wholly or partially within the 50-mile region, was included in the RIMS II analysis.

ER Subsection 4.4.2.1 and the BLN responses to Information Needs SE-09 / SE-31 and SE-32, provided in the July 3, 2008, TVA letter (Reference 2), discuss the anticipated BLN workforce, including anticipated in-migration. Based on current employment levels in the construction industry in Alabama, Georgia, and Tennessee, and given the substantial growth in heavy-construction jobs in the region between 1997 and 2002 (more than 16.5 percent increase in Alabama, 118.4 percent increase in Georgia, and 19.7 percent in Tennessee), it is assumed that 50 percent of the construction workforce comes from existing local/regional industry and the other 50 percent migrates into the region. Additionally, construction workers may choose to commute longer distances than the operating staff, due to the relatively short duration of many craft positions at the site, in comparison to the operations positions. Therefore, it is anticipated that many workers will commute into the region rather than relocate. The assumption that 50 percent of the workforce comes from outside the region is used in the analysis as an upper bounding approach for estimating incoming population.

A 1983 study conducted by Pijawka and Chalmers (Attachment 2.5.2-3) found that most nuclear plants were located within commuting range of large labor sheds. The location of the BLN site is consistent with the 1983 findings, as there are large metropolitan areas with adequate labor markets located within the BLN region or within close proximity. The BLN site is located approximately 38 mi. east of downtown Huntsville, Alabama, the largest city in the region with a 2005 estimated population of approximately 166,300. Chattanooga, Tennessee (approximately 44 mi. northeast) is the second largest city within the BLN region with a 2005 estimated population of approximately 154,800. A network of interstate highways, state highways, and county roads that traverse the region support workers commuting to and from the BLN site. Workers can commute to the BLN site using Interstate 24 and U.S. Highway 72 from Chattanooga, Tennessee, or U.S. Highway 72 from Huntsville, Alabama. U.S. 72 intersects Alabama State highways 35 and 279 in the BLN vicinity. State Highway 35 runs in a somewhat east-west direction from the eastern shore of the Tennessee River across the river and through Scottsboro, Alabama. State Highway 279 runs parallel to U.S. Highway 72 through Scottsboro, Alabama, oriented in a north-south direction.

References:

1. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Bellefonte Combined License Application – Response to Environmental Report Request for Additional Information – Socioeconomics/Environmental Justice," dated August 8, 2008.

2. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Socioeconomics/Environmental Justice," dated July 3, 2008 [ML081900451].

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENT:

The following document is provided as Attachment 2.5.2-3 to this enclosure:

2.5.2-3. Pijawka, D. and J. Chalmers, "Impacts of Nuclear Generating Plants on Local Areas," *Economic Geography*, Vol. 59, No.1, January 1983. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

NRC RAI NUMBERS: 2.5.2-5, 4.4.2-4, and 5.8.2-2

2.5.2-5: Provide information about pertinent tax rates, particularly in the proximate communities and Jackson County, and additional detail about how TVA's in lieu of taxes payments are calculated and distributed. Include in this discussion how TVA's in lieu of tax payments to Jackson County will be affected by the changing status of Bellefonte Units 1 and 2. Provide information about how Scottsboro and Jackson County schools are funded.

4.4.2-4: Please provide an analysis of estimated taxes and payments in lieu of taxes, including discussion of the time lag associated with tax collection. This includes the variety of taxes identified in ER Section 2.5.2.3. (Section 4.4.2.2.1). This analysis informs the assessment of impacts on local governmental jurisdictions. Include information on how site activities and change in Bellefonte Units 1 and 2 status will affect historical in–lieu-of-tax payments.

5.8.2-2: Provide a more quantified and detailed discussion of expected payments in lieu of taxes; include information about timing and distribution to local jurisdictions. As in ER Section 4.4.2.2, please address other tax revenues as well.

BLN RESPONSE:

TVA makes direct payments to Jackson County to compensate for the purchase of power property or reservoir property allocated to power (see Subsection 2.5.2.3). The amount paid to Jackson County under this guideline in FY 2007 was approximately $4800. Any such direct payment to a county does not change over time as long as the site remains a TVA power property. TVA also makes tax-equivalent payments (also identified as "payments made in lieu of taxes," as stated in the TVA Act) to the state of Alabama, some of which are distributed to Jackson County. ER Subsections 2.5.2.3, 4.4.2.1, and 5.8.2.2.1 are revised to include a discussion of the method of determining tax-equivalent payments and the amounts distributed.

The net book value of Bellefonte Units 1 and 2 is currently included in Alabama's asset base for the determination of the tax-equivalent distribution from TVA to the states. The net book value of each unit is being depreciated over a 10-year period, reducing the power property tax base for Alabama and Jackson County over the depreciation period. However, construction work in progress (CWIP) is included in the Section 13 (TVA Act) asset base. CWIP related to BLN Units 3 and 4 will be included in the distribution base in the year it is realized, potentially offsetting the depreciation of Units 1 and 2. The distribution of this tax money remains the same as the previously described arrangements.

The state of Alabama's allocation of in lieu of tax payments was $112.1 million during FY 2007. The state paid $87.4 million to the TVA-served counties. Of this, Jackson County received $10.4 million, which includes $4.2 million dispensed to the Jackson County and City of Scottsboro Public School systems. The remaining revenue is used by Jackson County to fund public services. A full discussion of the tax revenues and distribution is included in the ER revisions provided below.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 2, Subsection 2.5.2.3, beginning with the sixth paragraph, as follows:

TVA makes tax-equivalent payments to eight states, including Alabama. The State of Alabama then allocates its tax-equivalent payments from TVA in accordance with Title 40 "Revenue and Taxation," Chapter 28 "Distribution of Payments Made In Lieu of Taxes," Sections 40-28-1 through 40-28-4. Alabama distributes ~~75~~ 78 percent of the TVA tax-equivalent payments to the 16 TVA-served counties based on a formula from TVA's book value of power property and sales in each of these counties. These counties then share a portion of their payment with cities, the school systems, hospitals, etc., within their boundaries. The remainder of the tax~~-~~ equivalent payments ~~are~~ is either retained for the State's general fund or ~~are~~ distributed to counties not served by TVA. (Reference 28).

~~Although TVA makes a direct payment of $4753 annually to Jackson County, Alabama, there are no direct taxes paid to the county based on the BLN property.~~ Following the payment scheme outlined above, ~~an unofficial estimate of the amount of tax-equivalent payments distributed to Jackson County by the state of Alabama, based on the book value of the Bellefonte property, is approximately $3.8 million annually.~~ the state of Alabama allocation was $112.1 million during fiscal year (FY) 2007. The state paid $87.4 million to the TVA-served counties, including Jackson County, which received $10.4 million.

The TVA Act stipulates that, for TVA power property purchased from private ownership, TVA shall pay directly to counties the two-year average of county ad valorem property taxes, including taxes levied by taxing districts within the county, for the last two years of private ownership. The amount of these payments is subtracted from the state total allocation before payment to the state. The amount paid to Jackson County in FY 2007 under this guideline was approximately $4800. Any such direct payment to a county does not change over time as long as the site remains TVA power property.

The TVA book value for Alabama is subject to changes that affect the amount of tax-equivalent payments. The book value currently includes a book valuation of $3.1 billion for the existing facilities at the BLN site, which are in the process of being depreciated. The current book value of Bellefonte Units 1 and 2 is likely to be entirely or largely depreciated by the time BLN (i.e., Units 3 and 4) is operational. However, the book value for the new units compensates for this loss: for FY 2007, if the proposed Units 3 and 4 had been completed, and the current book valuation of Bellefonte Units 1 and 2 had been completely written off, the total payout to Jackson County would have been almost $13.6 million, which is almost $3.2 million more than the actual FY 2007 payout of $10.4 million. However, this estimate does not take into account a number of other likely future events. For example, completion of Watts Bar Nuclear Unit 2 would increase the TVA book value in Tennessee relative to the total, thereby somewhat decreasing the Alabama share of the total TVA book value, and therefore, the Alabama share of TVA payments. Other future events could also affect the payment to Jackson County, including fluctuation or growth in revenue from power sales, plant retirements and additions, and future depreciation of assets.

~~The amount of payments based on the operation of BLN cannot be known until the BLN enters an operational phase.~~The amount of the distribution is not based on operation of

the units. The construction costs associated with BLN will be a factor in determining the tax distribution base when they are incurred.

2. Change COLA Part 3, ER Chapter 4, Subsection 4.4.2.2.1, by inserting seven additional paragraphs between the existing second and third paragraphs, as follows:

Based on assumptions made on DOE/EIS-0288 data, the average person-year salary is expected to be $65,000 (Reference 17). For the BLN (i.e., Units 3 and 4) construction cycle, a total of 10,631 person-years are expected, resulting in a total economic input as a result of wages of approximately $691 million. Based on the RIMS II direct-effect economic multiplier for construction (Reference 18) within the region, the total economic impact related to wages is expected to be approximately $994.7 million.

The state of Alabama has a general sales tax rate of 4 percent that applies to most purchases of goods and services. In addition, Jackson County has a 2 percent general sales tax rate. Towns and cities also have their own sales taxes at varying rates. The county rate of 2 percent would yield to Jackson County about 0.75 percent of total wages in sales tax, or about $7,500 for every $1 million in wages. All of the county sales tax is allocated to the Jackson County School System.

As stated in ER Subsection 2.5.2.3, payments made in lieu of taxes received from the TVA to Jackson County via the State of Alabama in FY 2007, based on the Bellefonte Units 1 and 2 property value, totaled $10.4 million. While the TVA book value of Bellefonte Units 1 and 2 decreases due to amortization, the book value of BLN (i.e., Units 3 and 4) increases due to capital expenditures. This may or may not result in the amount of payments in lieu of taxes remaining at or above this level during construction. Factors that could affect the amount of in lieu of taxes depend on the amount of BLN capital expenditures, the timing of the BLN capital expenditures, and other TVA capital expenditures. Based on DOE/EIS-0288 data, 40 percent of the annual allocation goes to the Jackson County and City of Scottsboro Public School systems each year (Reference 17). In FY 2007, 40 percent of the annual allocation to Jackson County ($10.4 million) amounted to approximately $4.2 million for the two school systems. The remaining revenue is used by Jackson County to fund public services.

As discussed in ER Subsection 2.5.2.8.2, for the 2004 – 2005 school year, an average of approximately $7100 per student was spent on education between the Jackson County and City of Scottsboro Public School systems. It is estimated that the direct population increase from the BLN on-site construction workforce will result in 1350 new students entering the Jackson County education system during peak construction period. This increased student population would result in an increase in spending of approximately $9.6 million per year. This could potentially result in an approximate $5.4 million shortfall in school system funding, although local taxes only comprise 21.3 to 26.2 percent of the school system funding with Federal, State, and other sources contributing the balance of funds.

Education costs during initial construction, up until the third quarter of the third year, would be well below the costs incurred during the peak construction phase and would allow a gradual phase-in of revenues and expenses to meet the costs associated with the increased student population. In addition, from the last year of construction through the BLN operational phase, the annual payment in lieu of taxes is expected to meet educational expenditure demand.

Additional tax revenues are to be generated by this increased economic activity involving the plant and plant workers. Such revenues (e.g., property taxes, income taxes, real estate transfer fees, and motor vehicle taxes) are collected by or on behalf of the state government and then distributed to the jurisdictions, including schools and public services.

The effect of an influx of families on other areas of public finance (e.g., fire, police, ambulance, and hospitals) should be minimal. Additional and new equipment would be required for the police and fire departments, but these items are expected to be covered by the additional tax revenues and payments in lieu of taxes. Potential impacts on community services are further discussed in Subsection 4.4.2.3.

Given the structure by which the TVA makes payments in lieu of taxes, the general distribution structure of funding by the state of Alabama, as well as the increase in personal sales and property tax, the potential impact of taxes within the region is expected to be SMALL and beneficial. The potential impact within Jackson County, Alabama, is expected to be a MODERATE to LARGE beneficial impact.

3. Change COLA Part 3, ER Chapter 4, Subsection 4.4.4, to add references, as follows:

17. U.S. Department of Energy, *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*, Vol.1, DOE/EIS-0288, March 1999.

18. U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division, RIMS II Multipliers (1997/2004), Table 1.4 Total Multipliers for Output, Earnings, and Employment by Industry Aggregation.

4. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.2.1, beginning with the third paragraph, as follows:

~~Because the BLN is not currently operational, annual tax payments are not available at this time. However, tax equivalent payments for the BLN as a result of operation are expected to be similar to other TVA-owned properties.~~ Based on the tax calculation procedures described in Subsection 2.5.2.3 and the property value of BLN (i.e., Units 3 and 4), tax-equivalent payments to Jackson County from the State of Alabama are estimated at $13.6 million, an increase of $3.2 million over FY 2007 estimates. This includes the assumption that tax-equivalent payments based on Bellefonte Units 1 and 2 will no longer be made by the time that BLN (i.e., Units 3 and 4) is operational. Based on DOE/EIS-0288 data, 40 percent of the annual allocation to Jackson County, approximately $5.4 million, is paid to the city and county school systems, while the remaining 60 percent, approximately $8.2 million, funds public services within the county (Reference 18).

The state of Alabama has a general sales tax rate of 4 percent that applies to most purchases of goods and services. In addition, Jackson County has a 2 percent general sales tax rate. Towns and cities also have their own sales taxes at varying rates. The county rate of 2 percent would yield to Jackson County about 0.75 percent of total wages in sales tax, or about $7,500 for every $1 million in wages. All of the county sales tax is allocated to the Jackson County School System.

Additional tax revenues are to be generated by BLN operation. Such revenues (e.g., property taxes, income taxes, real estate transfer fees, and motor vehicle taxes) are

collected by or on behalf of the state government and then distributed to the jurisdictions, including schools and public services.

At the beginning of the new units' operation, population in the area is expected to decrease due to the departure of the construction workforce. At the same time, the total amount of tax-equivalent payments is estimated to be greater at the end of BLN Units 3 and 4 construction than at the beginning.

The impacts of plant operation on tax revenue in the region are considered SMALL and beneficial because of the distribution system of the revenues. The tax revenue is given to all areas that are powered by TVA, ~~not~~ rather than just the county in which the plant is located. Also, ~~20~~ 17 percent of the revenue is allocated to the Alabama general fund and is used for services and improvements anywhere in the state, while in Tennessee almost 50 percent is given to the state (References 7 and 9).

5. Change COLA Part 3, ER Chapter 5, Subsection 5.8.4, to add a reference, as follows:

18. U.S. Department of Energy, *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*, Vol.1, DOE/EIS-0288, March 1999.

ATTACHMENTS:

The following documents are provided as Attachments 2.5.2-5A and 2.5.2-5B to this enclosure:

2.5.2-5A. U.S. Department of Energy, *Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*, Vol.1, DOE/EIS-0288, March 1999. (Excerpts)

2.5.2-5B. U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division, RIMS II Multipliers (1997/2004), Table 1.4 Total Multipliers for Output, Earnings, and Employment by Industry Aggregation. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

NRC RAI NUMBER: 2.5.2-8

Provide either service ratios or other measures of adequacy (e.g., comparison to national or state standards or averages) or an assessment of adequacy by local officials for key facilities and services in the proximate communities (police, fire, medical, education).

BLN RESPONSE:

Based on a discussion with the NRC reviewers on July 14, 2008 (Reference 1), it is TVA's understanding that the information requested by this RAI has been fundamentally, but not fully, addressed to the reviewer's satisfaction by the BLN response to NRC Information Needs SE-01 / SE-07, SE-09 / SE-31, SE-19 / SE-35, and SE-21 in the TVA letter, dated July 3, 2008 (Reference 2). Consequently, a clarification to this RAI was provided by the reviewer, requesting the following supplemental information:

> *"This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception that clarification is needed that the ratio estimates at the time of peak construction are based on the total population (construction-related population increase plus projected baseline population in that year)."*

The requested clarification is addressed as follows:

Service provider (police, fire, medical, and educational) ratios have been revised and are based on the total population (i.e., construction-related or operations-related population increase plus the projected baseline population in that year).

The baseline year for Jackson County population is 2005, with a total population of 53,650 per U.S. Census Bureau data. Peak construction occurs in 2015, when the projected total population of Jackson County is approximately 69,050 (7800 construction-related in-migrants, plus a projected county baseline population of 61,250). For operations, the evaluation is based on the year 2017, with a total population of approximately 63,650 (2000 operations-related in-migrants, plus a projected county baseline of 61,650).

For the purposes of this analysis, the number of police officers and firefighters in Jackson County are assumed to remain the same at 95 and 435, respectively, for construction and operations, because no projection rates are available to quantify growth or decline in police or fire service capacities. Qualitative assessments of the providers' capacities, expansion plans, and ability to handle growth and downturns were provided in response to Information Need SE-20 / SE-44 included in TVA's July 3, 2008 letter (Reference 2). TVA refers the reviewers to the July 3, 2008 letter for that qualitative discussion.

At baseline (using 2005 population data) the police officer/resident ratio is 1:565. The firefighter/resident ratio is 1:123.

At peak construction (2015), the police officer/resident ratio is 1:727. The firefighter/resident ratio is 1:159. Although these ratios represent an increase (from baseline) during construction of BLN, this increase would be short-term, and the expected ratios are within the national recommended range for police (1 police officer for every 250 to 1000 persons) and above the national ratio for firefighters (1 firefighter for every 262 persons), as discussed and referenced in Subsection 2.5.2.7.2.

At operations (2017), the police officer/resident ratio is anticipated to be 1:670. The firefighter/resident ratio is anticipated to be 1:146. Even with the anticipated increase in Jackson County population due to BLN operation and normal growth, the predicted ratios for police officers and firefighters per resident fall within the national recommended range for police (1 police officer for every 250 to 1000 persons) and above the national ratio for firefighters (1 firefighter for every 262 persons), as discussed and referenced in Subsection 2.5.2.7.2.

An assessment of Jackson County medical service adequacy is discussed in Subsection 2.5.2.7.2, with 41 doctors and one, 50-bed hospital reported for Jackson County at baseline. A March 2003 Alabama Rural Health Association study (provided at the BLN site audit) categorizes Jackson County as rural. The state ratio for rural areas is reported to be 5.74 doctors per 10,000 people. However, that same study reports the ratio of primary-care-physicians-to-persons in Jackson County is 6.2 doctors per 10,000 people. To maintain this ratio during construction, the number of doctors needed would be 42. During operations, the number of doctors needed to maintain this ratio would be 38.

Student/teacher ratios are provided in detail in the response to NRC RAIs 4.4.2-7 / 4.4.2-8 included in this enclosure. TVA refers the reviewers to that RAI response in regards to education service ratios. Projected school expenditures per student at the peak construction period for the BLN-related student population increase are provided in the response to RAIs 2.5.2-5 / 4.4.2-4 / 5.8.2-2, also included in this enclosure. Spending on educational services in the Scottsboro City and Jackson County school districts and the district expenditure per student are described in the response to NRC Information Need SE-21 provided in TVA's July 3, 2008 letter.

This response is PLANT-SPECIFIC.

References:

1. NRC Communication Summary, "Summary of Telecommunication with Tennessee Valley Authority to Discuss Clarification on Request for Additional Information (RAI) for Bellefonte Units 3 and 4." Contact: Mallecia Hood (DSER/NRO), dated July 28, 2008 [ML082070062].
2. Letter from Jack Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Socioeconomics/Environmental Justice," dated July 3, 2008 [ML081900451].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 4, Subsection 4.4.2.3, fourth paragraph **to update ER text changes** provided in response to Information Need SE-09 / SE-31 included in TVA's July 3, 2008 letter, as follows:

> There are 95 sworn police officers and 435 firefighters in Jackson County. The ratio of ~~current residents to~~ police officers to current residents in Jackson County, Alabama, is 1:565, ~~565:1,~~ and the ratio of firefighters to current residents ~~ratio~~ is 1:123~~123:1~~. With the increase in population due to the total on-site workforce during the peak construction phase~~workers~~ and their families plus normal population growth, the ~~police~~ ratio of police to residents would become 1:727~~628:1,~~ and the ratio of firefighters to residents ~~ratio~~ would become 1:159~~137:1~~ in Jackson County. Although these ratios increase during the construction of the BLN, this increase would only be ~~short term~~ short-term, and the expected ratios are within the national recommended range for police (1 police officer for every 250 to 1000 persons) and above the national ratio for firefighters (1 firefighter for every 262 persons), as discussed and referenced in Subsection 2.5.2.7.2.

2. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.3.1, Police and Fire Protection Services subsection, first and second paragraph, **to update ER text changes** provided in response to Information Need SE-09 / SE-31 included in TVA's July 3, 2008 letter, as follows:

   ~~Because~~Assuming the number of police officers in Jackson County does not ~~is not expected to~~ increase during construction or operation, the ~~resident-to-~~police-officer-to-resident ratio is anticipated to be 1:670~~583~~ ~~persons per officer~~ during operations, a decrease of 57~~45~~ persons per officer from the construction period. According to the U.S. military, ~~resident-to-police~~ the recommended police officer-to-resident ratios should be between 1 and 4 officers per 1000 citizens, or 1 police officer for every 250 to 1000 persons ~~250 to 1000 persons per police officer~~ (Reference 14). Police-officer-to-resident ratios in Jackson County during ~~C~~construction and operations ~~values~~ fall within this~~ese~~ recommended range~~ratios~~.

   ~~Because~~Assuming the number of firefighters is not expected to increase during construction or operation, the ~~resident-to-~~firefighter-to-resident ratio is anticipated to be 1:146~~127~~ ~~persons per firefighter~~ during operation, ~~a decrease of 10 persons per firefighter~~ an increase from 1:159 ratio during the peak construction period. The derived ~~resident-to-~~firefighter-to-resident ratio for the United States in 2006 was 1:262 ~~residents per firefighter~~ (References 15 and 16). Firefighter-to-resident ratios in Jackson County during construction and operations are greater than the national average.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

NRC RAI NUMBERS: 4.4.2-1 and 5.8.2-1

4.4.2-1: Throughout the discussion of construction phase impacts, please indicate the temporal progression building toward peak construction workforce and transitioning to the lower operations workforce.

5.8.2-1: Please clarify the analysis of indirect and induced jobs and income (i.e., the multiplier analysis) and confirm that the approach is consistent with the approach in ER Section 4.4.2.2. Include outage worker employment and income in the multiplier estimates. Include the multiplier effect of operations nonlabor expenditures, and clarify the geographic areas of analysis and the basis for their selection. (ER Section 5.8.2.2)

BLN RESPONSE:

Based on a discussion with the NRC reviewers on July 14, 2008 (Reference 1), it is TVA's understanding that the information requested by these RAIs has been partially addressed to the reviewer's satisfaction by the BLN response to NRC Information Needs SE-32 and SE-09 / SE-31 in TVA's letter dated July 3, 2008 (Reference 2). Consequently, a clarification to this RAI was provided by the reviewer, requesting the following supplemental information:

4.4.2-1: *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of explaining how the distinction between "operations" and construction workers during construction is carried through the subsequent calculations (e.g., immigration, commuting, wages, etc.) and clarifying the assumptions underlying those calculations.*

5.8.2-1: *This request has not been satisfied by the TVA letters received to date. In particular it is not clear whether the "operations" workers on site during construction are treated as construction or operations workers with respect to their multiplier effect.*

The requested clarification is addressed as follows:

A description of the temporal progression of the operation and construction workforce was provided in the BLN response to NRC Information Needs SE-09 / SE-31, which included a revised Figure 4.4-2 and new Table 4.4-X1. Both the figure and table present the workforce data categorized by craft. The total on-site workforce is estimated to be approximately 3900 workers at peak, which includes the 3250 construction workforce, plus approximately 650 operation workers (security personnel are included among these operation workers) who begin working during the construction period. Following construction, the total operating staff, including security personnel, is estimated to be approximately 1000.

During the construction period, 50 percent of construction workers, and 50 percent of operations workers are assumed to in-migrate.

In order to provide an upward bounding estimate consistent with analysis provided in Section 4.4, the transportation analysis in ER Subsection 5.8.1.2 was changed to consider one car per operational employee, thereby omitting the carpooling assumption. No carpooling is assumed for construction

workers, and no carpooling is assumed for operations workers. TVA refers the reviewers to the response for RAIs 4.4.1-1 and 5.8.1-1 provided in TVA's August 8, 2008, letter (Reference 3).

With regard to income and wages, operations workers are treated as operations workers during the construction period, in determining income and wages generated. For the discussion on worker income (construction and operations workers) and contributions to the state tax base, and the multiplier effect of operations (and construction) non-labor expenditures, TVA refers the reviewers to the response to RAI 10.4.1-1 provided in TVA's August 11, 2008, letter (Reference 4).

Operations workers on site during construction are treated as operations workers with respect to the application of the RIMS II multiplier. The RIMS II (utilities) multiplier for operations jobs is 1.759. Thus, for every job of operation worker, an estimated additional 0.759 jobs are created in the region. The indirect jobs due to operations are forecasted to begin at the end of 2012; approximately 500 indirect jobs are created during the peak construction period in 2015, with a high of 760 indirect jobs at the end of the construction ramp down phase.

The following narrative describes how the RIMS II multipliers were applied during the construction period to differentiate between construction and operations workers regarding indirect job creation. Based on application of RIMS II multipliers for the region and the total number of new direct jobs created by the BLN project, indirect jobs are anticipated to be created by BLN construction jobs beginning in 2010, with approximately 200 indirect jobs by 2012 and 1370 indirect jobs at peak construction in 2015. The indirect jobs due to operations are forecasted to begin at the end of 2012, with approximately 500 jobs created at peak construction in 2015. However, the highest number of indirect jobs due to operations (760) are generated at the end of construction ramp down. When indirect jobs are combined with the BLN construction and operations jobs, the number of jobs created by the BLN project totals approximately 5800 at peak construction in 2015. There is a net loss of approximately 1110 indirect jobs, from the peak construction time (approximately 1870 indirect jobs) to the beginning of the operation period (approximately 760 indirect jobs). The total jobs loss from the peak construction to the beginning of commercial operation is approximately 4010. Each county located within the 50-mile BLN region is included in the RIMS II analysis. The basis of the RIMS II multipliers and their application is further discussed in the response to RAIs 4.4.2-2 and 4.4.2-3, provided in TVA's letter of August 8, 2008 (Reference 3).

Following construction, it is assumed that the operations workforce (approximately 1000 workers) is located within the 50-mile region, with 50 percent of the total operations workers having previously in-migrated to Jackson County during or near the end of the construction phase.

Additionally, approximately 600 to 800 temporary employees are required for the scheduled refueling outage every 18 months (per unit). These workers are expected to work at the plant for a 30-day period. These values have been utilized in the impact analyses for social and public services also provided in the responses to Information Needs SE-09 / SE-31.

ER Section 5.8 and Subsection 4.4.2.2, which were previously revised in the responses to Information Needs SE-09 / SE-3 and SE-32, are updated to clarify operation worker estimates, anticipated numbers of in-migrating workers, and indirect job estimates.

References:

1. NRC Communication Summary, "Summary of Telecommunication with Tennessee Valley Authority to Discuss Clarification on Request for Additional Information (RAI) for Bellefonte Units 3 and 4." Contact: Mallecia Hood (DSER/NRO), dated July 28, 2008 [ML082070062].
2. Letter from Andrea L. Sterdis (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Socioeconomics/Environmental Justice," dated July 3, 2008 [ML081900451].
3. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Bellefonte Combined License Application – Response to Environmental Report Request for Additional Information – Socioeconomics/Environmental Justice," dated August 8, 2008.
4. Letter from Andrea L. Sterdis (TVA) to NRC Document Control Desk, "Bellefonte Combined License Application – Response to Environmental Report Request for Additional Information – Need for Power / Benefit Cost," dated August 11, 2008.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 4, Subsection 4.4.2.2, by providing updates to changes noted in the response to Information Need SE-32 in TVA's July 3, 2008 letter and the combined response to Sufficiency Review comments ER36, ER63, and ER65 in TVA's May 2, 2008 letter. The previous text changes are included here, along with new revisions, as follows:

   The economy of the region surrounding the BLN, including industry, workforce, unemployment, and future economic outlook, is described in Subsection 2.5.2.

   The in-migration of construction workers is likely to create new indirect service jobs in the area and increase the amount of money used to purchase goods and services. The U.S. Department of Commerce Bureau of Economic Analysis (BEA), Economics and Statistics Division, provides multipliers for industry jobs, earnings, and expenditures. The economic model they use is called the Regional Input-Output Modeling System (RIMS II). This model incorporates buying and selling linkages among regional industries creating multipliers for both jobs and monetary expenditures. ~~The resulting multipliers were used to estimate the number of indirect jobs and expenditure of money in Jackson County, Alabama.~~

   The multiplier from RIMS II analysis for construction jobs is 1.4218. Thus, ~~F~~for every ~~in-migrating~~newly created construction job~~worker~~, an estimated additional ~~0.4230~~0.422 jobs ~~is~~are created in the region. The RIMS II (utilities) multiplier for operations jobs is 1.759. Thus, for every job of operation worker, an estimated additional 0.759 jobs are created in the region. ~~The expenditures of the peak construction workforce in the region for shelter, food and services could, through the multiplier effect of expenditures, create a number of new jobs.~~ Operations jobs occur as the construction jobs approach the end of the construction phase, with some overlap. The peak period for construction and operations workforces combined is between July and October 2015.

   Starting in 2010, indirect jobs are created by construction jobs; approximately ~~100~~200 new indirect jobs are created by 2012 and 1370~~670~~ new indirect jobs during the peak construction period in 2015. The indirect jobs due to operations are forecasted to begin at the end of 2012; approximately 500~~6~~ indirect jobs are created during the peak construction

period in 2015, with a high of 76035 indirect jobs at the end of the construction ramp down. When combined with the construction and operations jobs, total indirect jobs (1870176) contribute to a peak of approximately 5770020 jobs in 2015. A net loss of 1110441 indirect jobs, from the peak construction time to the beginning of the operations period, is expected to be partially offset by the normal projected population increases that would help maintain indirect jobs created during the construction phase. The total jobs loss from the peak construction to the beginning of commercial operation is 40103315. An influx of 1500 workers (50 percent of the 3000 construction workforce) would create 635 indirect jobs for a total of 3635 new jobs within the region. Any permanent effects are discussed in Chapter 5.

2. Change COLA Part 3, ER Chapter 5, Subsection 5.8.1, third paragraph, as follows:

   An estimated 1000850 operations workers are needed for operation of the BLN. The impacts from these workers on the local and regional area are discussed in Subsection 5.8.2.

3. Change COLA Part 3, ER Chapter 5, Subsection 5.8.1.2, to add changes to the third and fourth paragraphs provided in the response to RAIs 4.4.1-1 and 5.8.1-1 in TVA's letter of August 8, 2008, as follows:

   For plant operations, it was assumed that the BLN site would operate in three shifts. The day shift would be composed of 60 percent of the workers, the night shift would be composed of 30 percent of the workers, and the midnight (graveyard) shift would be composed of 10 percent of the workers. It was also assumed that 20 percent of all the workers would carpool, and the remaining 80 percent of the workers would not carpool with another plant employee. The BLN site expects to employs approximately 1000850 operations workers at the new units. Therefore, the 1000850 workers needed for operation of the new facility would add approximately 1000680 additional vehicles on the roadway. Of these, approximately 600408 are associated with the day shift, 300204 are associated with the night shift, and 10068 are associated with the midnight (graveyard) shift. Assuming the most of the vehicles are on the roadway at the end of the day shift and the start of the night shift (shift change), there is a maximum of 900612 additional vehicles entering and leaving the site at that time. Additional impacts may be present during outages and during refueling periods when more workers are present. Additional information on transportation, including current traffic counts, is discussed in Subsection 2.5.2.

   Given the current volume of traffic, as indicated by Annual Average Daily Traffic (AADT) counts in Subsection 2.5.2, on the road network, the impact due to the addition of 900 612 vehicles is considered SMALL, and potential mitigation is not warranted. During refueling and other outage periods traffic increases. Possible mitigation measures include staggering outage shifts opposite traditional high-traffic periods, mandatory carpooling, and busing in of employees, if necessary. Additionally, because 650 operation workers and their vehicles are anticipated to be phased into the BLN site during the construction stage (see Subsection 4.4.1.2), the initial impact during operation is anticipated to be lessened due to the temporal phasing.

4. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.1, first and second paragraphs, as follows:

   The 2007 estimated permanent population within the 50-mi. BLN region is 1,158,869. Population projections are discussed in Subsection 2.5.1. Acknowledging that 650 operation workers (including security personnel) have been accounted for in Subsection 4.4.2.1, the impact analysis is based on the remaining 350 operation workers. The BLN site is expected to employ approximately 850 operations workers at the new units. Based on preliminary

estimates, and to provide a maximum impact scenario, it is assumed that 50 percent of the new units' employees migrate into the region, and that each operations worker brings their family. The assumed family size of four is based on U.S. Census Bureau 2000 data (Reference 2), which states that the average family size in the United States is 3.14 persons. For estimating family size, the value of 3.14 persons per family was rounded up to bound the U.S. Census Bureau value. Expectations are that the worker family size would be typical of the U.S. Census Bureau data. The U.S. Census Bureau data is used instead of Jackson County family size, because the in-migrating construction workers are expected to come from outside Jackson County. ~~The average family size in the United States is 3.18 in 2000. To be conservative, an average family size of four was used to estimate the increase in population within the 50-mi. region.~~ As stated previously, the remaining operation workforce of 350 ~~An operational workforce of 850~~ increases the population in the 50-mi. region by approximately 700 ~~1700~~ people. Of the operations workers who migrate into the region, it is assumed that all settle in Jackson County. In 2015, the Jackson County estimated population is 61,249. Based on these estimates, the influx of operations workers and families in-migrating at this time would likely represent a 1 ~~2.8~~ percent increase in population in Jackson County. The operations workers and their families represent a very small percent increase in the existing population.

Within the communities in the vicinity, the influx of operational workers during outages helps reduce the ~~bust~~ effect of population decline caused by the departure of construction workers at the end of construction ramp down. At the current rate of population growth, it would take approximately 15~~fifteen~~ years for the population in the vicinity to reach the population peak experienced during construction. However, the approximate 600 to~~-~~ 800 temporary employees required for the scheduled refueling outage every 18 months per unit act to offset this impact. These workers are expected to work at the plant for a 30-day period. The impact of plant operations on local and regional demography is considered to be SMALL, as the percent increase in population is below 4~~four~~ percent for Jackson County, and mitigation is not warranted.

5. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.2, second paragraph, as follows:

For every plant operations employee, an estimated additional 0.759 jobs are created in the 50-mi. region, acknowledging that 650 operation workers have been accounted for in Subsection 4.4.2, the impact associated with the remaining 350 operation workers ~~which~~ means that 350 ~~850~~ direct operations jobs resulted in ~~an additional~~ 260~~645~~ indirect jobs for a total of approximately 610~~1495~~ new jobs in the region. For the operations phase, it is assumed that the operations workforce is in place having in-migrated during or near the end of the construction phase. Because most indirect jobs are service-related and not highly specialized, it is likely that most, if not all, indirect jobs are filled by the existing population, including both unemployed workers and persons not currently in the workforce within the 50-mi. region. This is a positive impact on the economy by providing new business and job opportunities for local residents. In addition, these businesses and employees generate additional profits, wages, and salaries, upon which taxes are paid.

6. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.3.1, to update ER changes provided in response to Information Needs SE-09 / SE-31 in TVA's July 3, 2008, letter and comment ER64 in TVA's May 2, 2008, letter, as follows:

Water Supply Facilities

Subsection 2.5.2 describes the public water supply systems in the area, their capacities, and current demands. Subsection 4.4.2.3 describes the public water supply system usage during construction. The BLN site is not anticipating the use of groundwater as a safety-related water source, and it does not plan to use groundwater as its primary water supply resource for any purpose. Potable water is supplied by the Scottsboro Municipal Water System, operated by the city of Scottsboro, Alabama.

The demand on potable water utilities is anticipated to decrease during operations at the BLN site. Acknowledging that 650 operation workers have been accounted for in Subsection 4.4.2.3, the impacts are associated with the remaining 350, and ~~T~~taking into consideration the estimated number of operational workers ~~(1000850)~~ with families moving into Jackson County, the population is expected to decrease by 7100~~5800~~4300 people (estimated construction population increase [7800~~6000~~], minus the result of multiplying one-half of the anticipated operational workers by the estimated family size of four [700~~2000~~1700]). During operation, the Scottsboro Municipal Water System would use approximately 77.2~~77~~ percent (6.2 Mgd) of its normal capacity of 8 Mgd. It is anticipated that the average per capita amount of water consumed per day is 90 gal. (Reference 3). Based on these values, an overall decrease in consumption is anticipated at approximately 522,000~~387,000~~ gal., from the construction phase to the operational phase. This represents a reduction of 6.6~~5~~ percent usage of system capacity.

The current maximum capacities for the potable water supplies would not be reached during the peak construction phase, the period of highest use of service. Because the Scottsboro Municipal Water System is expected to be capable of handling the additional water use for construction, capacity is not expected to be reached during operation, when water demand decreases and approaches preconstruction levels.

Impacts to municipal water supplies from the operations-related population increase are considered SMALL and mitigation is not warranted.

7. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.3.2, fourth paragraph, as follows:

Acknowledging that 650 operation workers have been accounted for in Subsection 4.4.2.4, the impacts are associated with the remaining 350 operation workers. ~~The plant employs approximately 1000850 people for operations.~~ As stated previously, based on an assumption that 50 percent of the workers in-migrate to Jackson County, a conservative estimate of 175 ~~425~~ housing units are needed for the new workers. Jackson County has a total of 2553 vacant housing units, with 894 available for sale or rent.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

NRC RAI NUMBER: 4.4.2-7 and 4.4.2-8

4.4.2-7: Provide a more detailed analysis of the impact on public schools in the project vicinity, including identifying the schools in the geographic area expecting to receive the greatest population impact from the project. Information about the demographics of construction workers and their families would enhance the analysis. Please combine more specific information about the expected school-age population and its geographic distribution with more specific information about the schools in the vicinity and their capacity to respond to the temporary increases. (ER Section 4.4.2.5)

4.4.2-8: Discuss in greater detail the consequences of education impacts, and identify more appropriate mitigation measures. (ER Section 4.4.2.4)

BLN RESPONSE:

Based on a discussion with the NRC reviewers on July 14, 2008 (Reference 1), it is TVA's understanding that the information requested by RAI 4.4.2-7 has been partially addressed to the reviewer's satisfaction by the BLN response to NRC Information Needs SE-21 and SE-09 / SE-31 in the TVA letter dated July 3, 2008 (Reference 2). Consequently, a clarification to RAI was provided by the reviewer, requesting the following supplemental information:

4.4.2-7: *This request has been partially satisfied by the TVA letter dated July 03, 2008 with the exception of describing the expected impacts on the school system.*

The requested clarification is addressed as follows:

The public school systems within Jackson County (Scottsboro City and Jackson County) are likely to receive the greatest impact from the BLN project in the way of an increased school-age population, as described in the response to Information Need SE-21. Subsection 4.4.2.1 and the response to Information Needs SE-09 / SE-31 indicate the BLN project would gradually boost the population of Jackson County over a five-year period, increasing the population by approximately 100 people in year 2010, and by approximately 7800 people at peak construction in 2015. Scottsboro, Hollywood, and communities along the major transportation routes in Jackson County, are expected to receive the majority of the incoming workers. As an upper bounding estimate, it is assumed that all workers and their families will settle in Jackson County. Under that scenario, the influx of BLN construction workers and families would contribute to the Jackson County population by increasing the population approximately 1 percent at the beginning of construction and by approximately 12 percent at peak construction in 2015, then contribute to an approximate 3 percent reduction in population at the end of construction (completion of Unit 4), assuming workers and their families leave Jackson County once construction is complete.

Should families with school age children settle outside of Jackson County, they are expected to move into nearby cities (such as Huntsville or Fort Payne, AL and Chattanooga, TN) or into communities located along the major transportation routes between these cities. Because these cities already support a greater population (and likely greater school-age population) than Jackson County, the impacts to these school districts from the in-migration of some BLN workers and their families would be negligible.

During peak construction, the anticipated school-age population increase in Jackson County due to the BLN project is approximately 1350 children, based on U.S. Census Bureau 2005 data which estimates 17

percent of Jackson County population is between the ages of 5 and 18 (7800 BLN-related population multiplied by 17 percent) (Attachment 4.4.2-7A).

Data on Jackson County and Scottsboro City school districts for the 2004 - 2005 school year indicate a total enrollment of 8734 students in the two school systems (Subsection 2.5.2.8.2). Jackson County and Scottsboro City school districts employed 478 and 203 teachers, respectively, for a total of 681 teachers during the 2004 - 2005 school year (Attachments 4.4.2-7B and 4.4.2-7C), which yields an average student-to-teacher ratio of approximately 12.8:1 within Jackson County, as a whole. If no additional teachers were hired and approximately 1350 additional students moved into Jackson County at peak construction due to the BLN project, the resultant ratio would be approximately 14.8:1 ([1350 plus 8734 students] divided by 681 teachers). To maintain the 2004 - 2005 ratio of 12.8:1, a total of approximately 788 teachers (or approximately 107 additional teachers) would be required by the time of peak construction.

In 2015, assuming normal growth of the current population, the total estimated number of school-age students (BLN-related population increase plus projected baseline population) in Jackson County is estimated at approximately 11,765. With no increase in the number of teachers, the overall student-to-teacher ratio would be 17.3:1. To maintain the 2004 - 2005 ratio of 12.8:1, a total of approximately 920 teachers (or 240 additional teachers) would be needed by the time of peak construction.

This impact on Jackson County schools is expected to be lessened by some students enrolling in private schools or in schools outside of Jackson County, along with the gradual increase in the school-age population leading up to the peak construction period in 2015. Because the BLN-related population increase is planned to increase gradually over a 5-year period (Subsection 4.4.2.1, as revised in response to Information Need SE-09), school districts in Jackson County are expected to have adequate time to respond to increased resource needs that result from school-age population increases due both to the BLN project and normal population growth.

In addition to a shortage of teachers and staff, other potential impacts to Jackson County schools from temporary rapid growth due to the BLN construction project include overcrowding of classrooms and other school facilities, a shortage of classroom equipment and materials, and the need for additional school buses.

Mitigative measures could include hiring additional teachers and other required staff, and purchasing or leasing modular classrooms, additional materials, and school buses. Temporary or modular buildings offset temporary growth by providing classroom space, and they allow school systems time to build classrooms and facilities. The National Center for Education Statistics (NCES) acknowledges that temporary or modular buildings are often used by schools to reduce overcrowding, as discussed in Attachment 4.4.2-7D. Other measures identified by NCES that could help reduce school overcrowding include adopting year-round or split-day schedules, staggering lunch schedules, and using off-site instructional facilities. A discussion of tax revenues generated by the construction of the BLN, some of which may be used to support schools, is provided in Subsection 4.4.2.2.1.

Teachers and staff could be recruited through local training facilities, such as the Ernest Pruett Center of Technology, and through colleges and universities in the BLN region. In addition, collaborative approaches to addressing potential education impacts could help mitigate impacts and support education goals.

TVA recognizes the opportunity to partner with local community colleges and technical schools to ensure the local population acquires skills that enhance their eligibility for future job opportunities in trained craft trades and engineering positions. Because there are approximately four years of lead time prior to the start of plant construction, TVA is developing a marketing strategy that includes high-school and middle-school students, and adults in the surrounding communities. This marketing strategy for

recruiting will include branding to present a consistent look and message. TVA conducts training programs at the Ernest Pruett Center of Technology (EPCOT) for the Widows Creek Fossil Plant. TVA would likely establish a similar arrangement with EPCOT for training needs at BLN.

Subsection 4.4.2.5 is revised to include an analysis of student-to-teacher ratios that considers temporal changes in the BLN worker population. Subsection 4.4.4 is revised to include four additional references.

U.S. Census Bureau 2005 data and NCES data were used in the analysis of the temporal increase and decrease in student populations in Jackson County. The census year used depends on the type of demographic material that is needed for the analysis and availability of data. For all analyses, the most recent data set available is incorporated.

References:

1. NRC Communication Summary, "Summary of Telecommunication with Tennessee Valley Authority to Discuss Clarification on Request for Additional Information (RAI) for Bellefonte Units 3 and 4." Contact: Mallecia Hood (DSER/NRO), dated July 28, 2008 [ML082070062].
2. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Socioeconomics/Environmental Justice," dated July 3, 2008 [ML081900451].

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 4, Subsection 4.4.2.5, as follows:

A detailed description of the BLN regional public education system is described in Subsection 2.5.2.

The public school systems within Jackson County (Scottsboro City and Jackson County) are likely to receive the greatest impact from the BLN project in the way of an increased school-age population. The effects on school systems outside of Jackson County are expected to be negligible, because workers migrating to areas outside Jackson County are expected to move into nearby cities (such as Huntsville or Fort Payne, Alabama and Chattanooga, Tennessee) or into communities located along the major transportation routes between these cities, which already support a greater population (and likely greater school-age population) than Jackson County.

At peak construction, it is estimated that ~~at a worst case scenario, 1500~~1950 workers and their families in-migrate ~~in~~to the BLN region, resulting in an estimated total of ~~6000~~7800 additional people (~~1500~~1950 multiplied by family size of four). ~~According to t~~The ~~2005~~ U.S. Census Bureau estimate for 2005 for Jackson County~~,~~ indicates ~~16.8~~17 percent of ~~Alabama's~~ the county's total population are school-age children (between the ages of 5 and 18) (Reference 19~~2~~). The anticipated school-age population derived from the peak construction ~~family~~ total is approximately ~~1080~~1350 (~~6000~~7800 multiplied by ~~16.8~~17 percent). As an upper bounding estimate of population increase in Jackson County, ~~I~~it is assumed that all of the in-migrants settle in Jackson County. ~~Currently there are 8734 school-age students in Jackson County, this represents an 11.54 percent increase in student population.~~

Based on the 2004 - 2005 enrollment data for the Jackson County and Scottsboro City School Districts, the total number of students enrolled was 8734 (Subsection 2.5.2.8.2).

Jackson County and Scottsboro City school districts employed 478 and 203 teachers, respectively, for a total of 681 during the 2004 - 2005 school year (References 20 and 21), which yields an average student-to-teacher ratio of approximately 12.8:1 within Jackson County, as a whole. If no additional teachers were hired and approximately 1350 additional students moved into Jackson County at peak construction due to the BLN project, the ratio would be approximately 14.8:1 ([1350 plus 8734 students] divided by 681 teachers). To maintain the 2004 - 2005 ratio of 12.8:1, a total of approximately 788 teachers (or 107 additional teachers) would be required by the time of peak construction.

In 2015, assuming normal growth of the current population, the total estimated number of school-age students (BLN-related population increase plus projected baseline population), in Jackson County is approximately 11,765. With no increase in the number of teachers, the overall student-to-teacher ratio would be 17.3:1. To maintain the 2004 - 2005 ratio of 12.8:1, a total of approximately 920 teachers (or approximately 240 additional teachers) would be needed by the time of peak construction.

This impact on Jackson County schools is expected to be lessened by some students enrolling in private schools or in schools outside of Jackson County, along with the gradual increase in the school-age population leading up to the peak construction period in 2015. Because the BLN-related population increase is planned to increase gradually over a 5-year period (Subsection 4.4.2.1), school districts in Jackson County are expected to have adequate time to respond to increased resource needs that result from school-age population increases due both to the BLN project and normal population growth.

In addition to a shortage of teachers and staff, other potential impacts to Jackson County schools could include overcrowding of classrooms and other school facilities, a shortage of classroom equipment and materials, and the need for additional school buses. The impacts of construction on the educational system of Jackson County, Alabama are~~is~~ expected to be MODERATE to LARGE but temporary, depending on the speed with which current school district expansion plans are implemented. ~~Possible mitigation measures for the impacts could include hiring additional teachers and other relevant personnel and purchasing of modular classrooms, busses, supplies, etc., as needed. In the long run, the costs of providing education for additional students should be offset by the increase in local government revenues generated by the plant.~~

Mitigative measures could include hiring additional teachers and other required staff, and purchasing or leasing modular classrooms, additional materials, and school buses. Temporary or modular buildings offset temporary growth by providing classroom space, and they allow school systems time to build classrooms and facilities. The National Center for Education Statistics (NCES) acknowledges that temporary or modular buildings are often used by schools to reduce overcrowding (Reference 21). Other measures identified by NCES that could help reduce school overcrowding include adopting year-round or split-day schedules, staggering lunch schedules, and using off-site instructional facilities. A discussion of tax revenues generated by the construction of BLN, some of which may be used to support schools, is located in Subsection 4.4.2.2.1.

Teachers and staff can be recruited through local training facilities, such as the Ernest Pruett Center of Technology, and through colleges, and universities in the BLN region. In

addition, collaborative approaches to addressing potential education impacts could help mitigate impacts and support education goals.

TVA recognizes the opportunity to partner with local community colleges and technical schools to ensure the local population acquires skills that enhance their eligibility for future job opportunities in trained craft trades and engineering positions. Because there are approximately 4 years of lead time prior to the start of plant construction, TVA is developing a marketing strategy that includes high-school and middle-school students, and adults in the surrounding communities. This marketing strategy for recruiting will include branding to present a consistent look and message. TVA conducts training programs at the Ernest Pruett Center of Technology (EPCOT) for the Widows Creek Fossil Plant. TVA would likely establish a similar arrangement with EPCOT for training needs at BLN.

2. Change COLA Part 3, ER Chapter 4, Subsection 4.4.4, to add references, as follows below.

19. U.S. Census Bureau, State & County QuickFacts, Jackson County, Alabama, 2005, Website, http://quickfacts.census.gov/qfd/states/01/01071.html, accessed January 5, 2007.

20. U.S. Department of Education, National Center for Education Statistics, Search for Public School Districts – District Detail for Jackson County, Website, http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01, accessed November 9, 2006.

21. U.S. Department of Education, National Center for Education Statistics, Search for Public School Districts – District Detail for Scottsboro City, Website, http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01, accessed November 9, 2006.

22. National Center for Education Statistics, Statistical Analysis Report, Condition of America's Public School Facilities: 1999, Website, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000032, accessed July 2008.

3. Change COLA Part 3, ER Chapter 5, Subsection 5.8.2.3.3, first two paragraphs and insert a new paragraph between the existing second and third paragraphs, as follows:

As a maximum likely impact scenario, it is assumed that the new workforce moving to the area relocates to Jackson County with their families, increasing the population in Jackson County by approximately ~~1700~~2000 people.

According to the ~~2000~~U.S Census Bureau estimate for 2005, 17~~18.9~~ percent of Jackson County's population was between the ages of 5 and 18 (Reference 20~~6~~). Based on this number, it is estimated that the ~~increase in~~ number of school-age children added to the Jackson County schools due to the BLN project ~~from plant workers is~~ would be 340~~296~~. For the 2004 - 2005 school year, the total number of students in Jackson County, including Scottsboro City, was 8734 (References 4 and 5). ~~This~~These additional 340 students represent~~s~~ an approximate 4 percent ~~3.3 percent~~ increase ~~in~~ over the 2004 - 2005 student population.

In 2017, assuming normal growth of the current population, the total estimated number of school-age students (BLN-related population increase plus projected baseline population), in Jackson County is approximately 10,820. With no increase in the number of teachers, the overall student-to-teacher ratio would be 15.9:1. To maintain the 2004-

2005 ratio of 12.8:1, a total of approximately 845 teachers (or approximately 165 additional teachers) would be needed during BLN operations.

4. Change COLA Part 3, ER Chapter 5, Subsection 5.8.4, to add a reference, as follows below:

20. U.S. Census Bureau, State & County QuickFacts, Jackson County, Alabama, 2005, Website, http://quickfacts.census.gov/qfd/states/01/01071.html, accessed January 5, 2007.

ATTACHMENTS:

The following documents are provided as Attachments 4.4.2-7A through 4.2.2-D to this enclosure:

4.4.2-7A. U.S. Census Bureau, State & County QuickFacts, Jackson County, Alabama, Website, http://quickfacts.census.gov/qfd/states/01/01071.html, accessed January 5, 2007. (Excerpts)

4.4.2-7B. U.S. Department of Education, National Center for Education Statistics, Search for Public School Districts – District Detail for Jackson County, Website, http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01, accessed November 9, 2006. (Excerpts)

4.4.2-7C. U.S. Department of Education, National Center for Education Statistics, Search for Public School Districts – District Detail for Scottsboro City, Website, http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01, accessed November 9, 2006. (Excerpts)

4.4.2-7D. National Center for Education Statistics, Statistical Analysis Report, Condition of America's Public School Facilities: 1999, Website, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000032, accessed July 31, 2008. (Excerpts)

ATTACHMENT 2.5.2-3
PIJAWKA, D., AND J. CHALMERS
ECONOMIC GEOGRAPHY
IMPACTS OF NUCLEAR GENERATING PLANTS ON LOCAL AREAS
JANUARY 1983

Pijawka, D. and J. Chalmers

Economic Geography

Impacts of Nuclear Generating Plants on Local Areas

(16 pages: Title page and pages 66 – 80)

January 1983

ATTACHMENT 2.5.2-3

IMPACTS OF NUCLEAR GENERATING PLANTS ON LOCAL AREAS

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Impacts resulting from building and operating twelve nuclear generating stations were not generally characteristic of impacts associated with resource-based energy developments. Economic benefits to local areas were not large due to significant commutation levels, income leakage from the rural areas, and relatively few local purchases of construction material. Revenue impacts from nuclear plants have shown important gains to local jurisdictions. Nevertheless, revenue impacts were found to be wide ranging, depending on state utility tax structures. Socioeconomic changes due to nuclear generating plants have not resulted in public expressions of concern but have sensitized communities to growth management issues.

This paper is a summary of the impacts of constructing and operating nuclear generating stations. It is based on empirical analyses of 12 nuclear facilities supplemented by the available secondary literature. The case studies were based on three specific objectives. The first objective was to identify the effects resulting from the construction and operation of each of the nuclear power stations. This task necessitated a clear identification of the difference in geographic conditions as they occurred with the nuclear station and those that prevailed had the station not been built. The principal elements that were examined in the retrospective analyses included changes in economic, demographic, housing, and fiscal characteristics and the public response engendered because of these changes. The second objective was to determine the significance of the identified effects to each community. This goal was accomplished by assessing the evaluation of the plant-related effects by residents of the host communities and by measuring the effects in terms of their magnitude, duration, context, and distribution. The third objective was to identify the determinants of the project-related effects. This task required knowledge of what combination of site, project, or other determinants was responsible for the effects. Table 1 identifies the twelve projects and their locations.

The impact assessment process has evolved rapidly since the mid-1970s. During that time, two changes in the assessment process have influenced the conceptual framework adopted for the study. First, assessment as an end in itself has been de-emphasized relative to assessment as a means to effective planning. As a result, assessments have begun stressing those economic and geographic variables that are important to persons responsible for anticipating and mitigating the consequences of large-scale industrial development. This change has created an increased concern with the size, composition, and spatial distribution of both demographic and economic effects and

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TABLE 1

AREA CHARACTERISTICS OF THE TWELVE PROJECT LOCATIONS

	Nearest City of 50,000+	Distance to Nearest City of 50,000+ (mi.)	Population Within 5 Miles	1980 Host County Population	Average Annual Growth 1970–1980 (Percent)
Arkansas	Little Rock, Ark.	65	7,149	Pope 35,000	2.8
Calvert Cliffs	Washington, D.C.	38	3,435	Calvert 33,000	3.6
Cook	South Bend, Ind.	26	10,589	Berrien 172,900	0.6
Crystal River	Clearwater, Fla.	55	324	Citrus 54,703	11.0
Diablo Canyon	Santa Barbara, Calif.	107	10	San Luis Obispo 144,744	3.9
FitzPatrick/ Nine Mile Point	Syracuse, N.Y.	36	3,000	Oswego 107,300	1.0
Oconee	Greenville, S.C.	26	3,274	Oconee 47,122	1.8
Peach Bottom	Baltimore, Md.	35	6,145	York 350,400	0.8
Rancho Seco	Sacramento, Calif.	25	352	Sacramento 785,300	2.1
St. Lucie	West Palm Beach, Fla.	90	1,185	St. Lucie 75,900	4.6
Surry	Newport News, Va.	17	769	Surry 5,967	0.1
Three Mile Island	Harrisburg, Penn.	9	36,272	Dauphin 225,400	0.1

their role in determining the demand for housing and public facilities/services. Second, assessments have begun to emphasize the evaluation by area residents of the project-related changes. The evaluation of project impacts by affected groups has begun to play an increasingly important role in the assessment process as decision makers realize the importance of anticipating public response to programs and projects. Therefore, the conceptual framework of this study utilized an integrated approach that emphasized the socioeconomic characteristics which are important to mitigation planning. In addition, the study was designed to allow for the identification of the objective changes due to the project, community's evaluation of those effects, and an overall determination of project significance.

APPROACH TO THE ASSESSMENT OF SOCIOECONOMIC CHANGE

Despite the magnitude of labor and capital inputs into the construction and operation of a nuclear generating station, three variables are central to understanding the socioeconomic effects of a plant in the area in which it is located: (1) the size of the work force residing in the local area; (2) the amount of project-related materials, equipment, and services purchased in the area; and (3) the project-related taxes accruing to local taxing jurisdictions. A project's direct employment and associated wage and salary income may provide the local area with an important economic stimulus as local residents and migrant workers obtain project-related jobs. Moreover, as project-

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related income is spent and respent by workers and by the utility and its contractors, additional nonbasic employment and income will be generated. In addition, the project's effects on the local tax base will result in a variety of fiscal changes, including impacts on the provision of public services and facilities.

The conceptual framework utilized in the study represents a relatively simple set of cause-and-effect relationships that link the direct attributes of building and operating a nuclear generating station to an integrated chain of socioeconomic responses. For example, the economic effects directly associated with a project will lead to induced economic effects. These employment and income effects are important in their own right. They are also important because they represent the demand for labor which, in conjunction with the local supply of labor, determines the labor force in-migration necessary to balance local labor market conditions. Net migration due to the project, either in the form of in-migration or reduced out-migration, will be the principal determinant of project-induced population change, which will, in turn, affect housing demand and settlement patterns.

The estimation of the economic consequences of construction and operation of nuclear generating stations was affected by the use of an economic base analysis (supplemented with an input-output analysis). The premise of such an analysis was that the economic activities of the project —the direct employment at the project, the purchase of goods and services for the project, and other market effects of the project (for example, the consequences of the massive taxes paid by many of the utilities)—creates additional economic activity in the study area. The determination of total project effects on employment and income in each study area required the quantification of both the direct project activity and the additional induced non-project activity.

There are three components of total project-related basic income employment. The first of the three components is designated as "direct" basic income and employment. Workers employed in the actual construction or operation of the plant are referred to as "direct" basic employees; the income they earn is "direct" basic income. The second component of total project-related basic income and employment is referred to as "indirect basic," the earnings and employment resulting from the purchase of goods and services in the study area for plant construction and operation. The amount of indirect basic income produced by a given value of purchases is determined by the ratio of indirect basic income to product value, which varies according to the type of goods and type of establishment involved in the transactions. The indirect basic income and employment in the study area resulting from the project are calculated by applying an employment-to-value-of-purchases ratio derived from the Regional Industrial Multiplier System (RIMS)[1] to the total value of materials purchased by the utility in the study area.

The third component is referred to as "other" basic. This category of basic income and employment accounts for additional change in basic employment or income. In particular, the project may result in wage-induced effects or fiscally induced effects. In the case of wages, it is often suggested that higher wages paid at the nuclear station may tend to attract

[1] In general, the RIMS technique develops industry-specific input-output multipliers based on national interindustry relationships at the 496-sector level of disaggregation, adjusted to reflect the availability of required inputs from suppliers in the county. In the simplest case, if an industry does not exist in the county economy, any requirements from that industry are assumed to be supplied by imports from outside the county economy. If an industry does exist in the county at the same, or greater, proportion to the county economy as the industry is to the national economy, the county demands from that industry are assumed to be met within the county economy. If an industry represents a smaller proportion of the county economy than it does of the national economy, some of the county demand is assumed to be supplied from within the county and some is assumed to be imported.

workers from lower-paying jobs. If those workers could not be replaced, or if the resulting higher wages rendered the activities unprofitable and they subsequently ceased to exist, the resulting reduction in income and employment would be considered a reduction in "other" basic.

The other possibility is that the large amounts of plant-related tax revenues associated with some nuclear stations may generate public sector employment. However, it is important to distinguish this "other" basic employment in the government sector from nonbasic government employment that results from the multiplier effect of basic income. Most public sector employment (such as school employees, sanitation workers, and police personnel) is a direct function of economic and demographic growth; thus, only if there has been an increase in government employment beyond that expected to accompany associated population, employment, and income growth would part of the government employment growth be classified as "other" basic.

Nonbasic employment and income, the final component of project-related employment and income effects, result from the expenditure (and re-expenditure) of basic income in the local economy. The amount of project-related nonbasic employment and income in the study area economy is determined by the interaction of two factors: (1) the amount of "effective" basic income created by the project, and (2) the size of the nonbasic-to-basic employment and income multipliers in the local economy. Both of these factors are influenced by the study area's economic characteristics.

Two principal factors affect the amount of effective basic income results from a project: (1) the residential location of the workers earning the basic income, and (2) the magnitude of outside financial commitments (i.e., the maintenance of a household outside the study area) among workers residing in the study area. The effects of these factors are analyzed by dividing the project-related basic workers in four groups: nonmovers (local residents), movers accompanied by families (in-migrants), movers unaccompanied by families (or single), and daily long-distance commuters.

Based on information concerning residential location, commuting patterns, and outside financial commitments, as well as an examination of the availability of goods and services in the local economy, the basic income of each of the four groups is weighted so that its effect, in terms of generating induced economic activity within the study area, will be commensurate across groups. The resulting weighted income estimate is referred to as "effective" basic income. Because the county-specific multipliers are based on the consumption patterns of average county residents who are principally nonmovers, they serve as the standard for defining effective basic income; all of their income is treated as effective (i.e., their income is weighted by a factor of 1.0). For each of the remaining categories of workers, data in the Consumer Expenditure Survey, U.S. Bureau of Labor Statistics were utilized to determine the proportion of income spent in the local area by those workers compared to the amount spent by nonmovers.

The above analysis was completed in detail for each case study for the peak construction year and a benchmark operations year. The final step in the estimation of project-related economic effects was to take those estimates and calculate the ratios of total project-induced employment and income to direct basic employment and income for these two years. Ratios were then interpolated for all intervening years. This provided the basis for estimating project-induced effects over the entire period of a plant's history from construction to operation and based on the annual series of direct basic employment. Figure 1 provides a summary of the steps used to estimate the total project-related employment and income effects.

The determination of project-related demographic effects was keyed to estimates of basic and nonbasic employment associated with each nuclear station. Two

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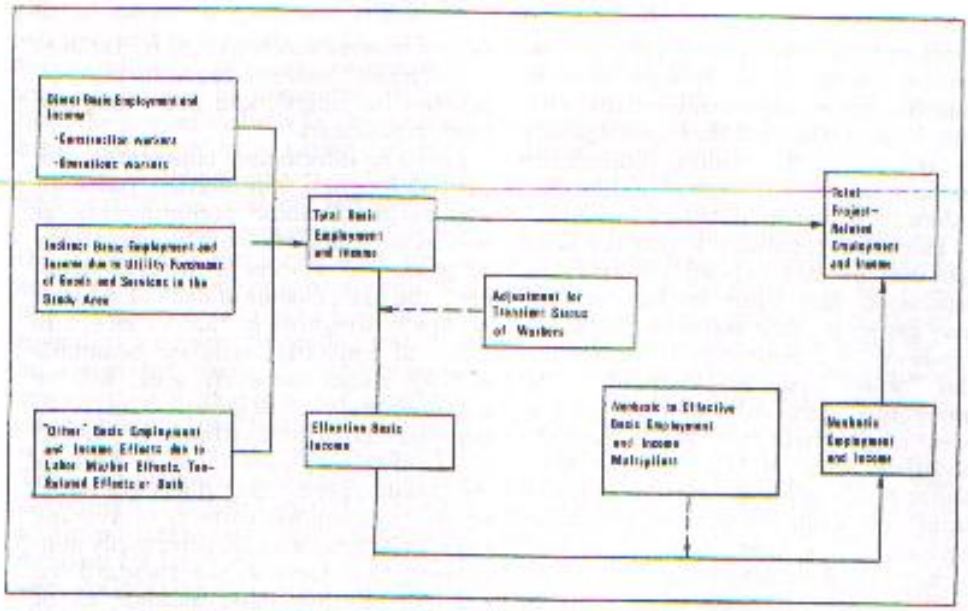

Fig. 1. Estimation of Project-Related Employment and Income Effects.

sources of population change were considered: (1) increases due to the in-migration of workers and their household members; and (2) increases resulting from the diminished out-migration of local residents and their household members. The project-related population increase due to migration into the study area was composed of movers and their families. The distribution of the basic and nonbasic jobs among the four categories of workers was based partly on local labor market conditions and commutation patterns and partly on survey data assembled for similar projects. Average family size for the direct basic construction workers was also based on construction worker survey data, while family size data from direct basic operations workers, indirect and "other" basic workers, and nonbasic workers were derived by state-specific census data.

Workers and their household members who would normally have migrated out of the area during the project period to obtain employment, but stayed because they found work in project-related jobs, comprise the second component of population change. To estimate the magnitude of this project-induced population effect, the number of nonmovers employed in project-related jobs was considered in light of other local employment opportunities and migration patterns for the study area. In most of the study areas, the strong labor demand relative to labor supply and the associated in-migration made it clear that this effect was of little quantitative importance. However, in a few cases, where study areas had been experiencing little or no growth and significant out-migration, it was assumed that a portion of the jobs obtained by local residents may have prevented out-migration that would otherwise have continued.

The examination of the effect of the nuclear stations on local government presented difficult methodological problems because of the number of jurisdictional units in each study area and because of the complexities associated with an analysis of several service areas for each jurisdiction. Therefore, the study focused on

the structure of political units in the study area, the revenues and expenditures of major governmental agencies, and the cost, availability, and quality of selected public services. These three areas received emphasis because they provided sensitive and comparable indicators of project effects and because they affected many aspects of social organization in the community. A detailed analysis was then made of the direct revenue flow from the project to local government jurisdictions. Changes in tax bases as well as in tax rates were examined over time to estimate project effects. No attempt was made to estimate revenue flows from induced residential or commercial property or from higher levels of consumption-induced sales in the study areas. Following an examination of the direct revenue effects, total expenditures and their functional distribution were scrutinized for any project-related effects. Because of the large number of expenditure categories and their varied determinants, few effects could be attributed to the nuclear stations without a more detailed analysis. Thus, four public services—education, transportation, public safety, and social services—were selected for more detailed examination. The objective was to examine these public services for project-related changes in quality, cost, or availability.

SETTLEMENT PATTERN OF THE WORK FORCE

The findings show that the nearest city of at least 50,000 persons was usually located less than 50 miles from the nuclear sites, and that even at nuclear sites located in rural areas a number of residential alternatives were available for workers who in-migrated. Because residential alternatives were available, a dispersed settlement pattern of movers was observed. In addition, most of the plants were found to be located within commuting range of large laborsheds. Such locational characteristics had the effect of reducing the level of mover in-migration, thus diminishing potential adverse effects both on the provision and level of public services and on the social structure of the host community. However, a large commuter work force and a generally dispersed residential pattern also resulted in a dispersed pattern of economic benefits (Table 1).

Research on socioeconomic impacts of energy projects has shown that the degree of geographic isolation of a host community is an important factor in explaining the magnitude of socioeconomic impacts [*5; 10; 11*]. The major socioeconomic impacts occurring in energy "boom towns," for example, have been attributed to the concentration of migrant workers and their dependents into one community. The resulting impacts were often due to the lack of absorptive capacity of the community's intrastructure to accommodate the population influx [*10; 11*]. Pressures exerted on existing public services would lessen if the movers were geographically dispersed. This important factor in impact mitigation strategies is becoming increasingly recognized.

Early studies of the socioeconomic effects of nuclear generating stations applied the findings of major energy resources development to areas in which nuclear plants were to be sited, and the resulting imports were projected to be substantial [*3; 10; 14*]. However, by the late 1970s this approach came under increased criticism. A 1977 review of the state of knowledge of effects of nuclear developments argued that the knowledge of the impacts of energy resource development, particularly in the western states, was irrelevant for the study of nuclear power plants [*10*]. The major factor identified in explaining the difference in the magnitude of impacts between energy resource projects and those of nuclear plants was the difference in siting patterns. Nuclear power plants, in contrast to areas where energy resources tend to be developed, were generally located relatively close to large metropolitan areas (their electrical load centers) and in areas with well-developed infrastruc-

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tures that have accommodated nuclear facilities without excessive strain on existing community services. In fact, the study examined 93 nuclear sites and found that 85 percent of the sites were located within 60 miles of a large metropolitan area. This would result, it was argued, in substantial worker commutation rather than worker in-migration, and this, in turn, would reduce the level of the project demands on local areas.

Applying the findings from energy resource development to the impact of nuclear power plants was found increasingly to be inappropriate, and similarities with the effects of rural industrialization have subsequently been suggested as an alternative [*12; 14*]. Because of the high level of commuting associated with rural industrialization, sizeable income leakages were measured in areas in which rural factories were sited. In addition, the demands on host communities for housing, community services, and education were also small. Furthermore, because commuters generally constituted a substantial part of the rural factory employment, the multiplicative income and employment effects were generally low.

Several studies have suggested that the impacts of nuclear power plants have been tempered by proximity to their load centers [*4; 7; 8; 9; 14; 15*]. In his review of the impact of TVA nuclear plants and the Pilgrim Plant in Massachusetts, Bjornstad concluded that because nuclear plants are located near areas having large labor pools, mass in-migration to the host communities was avoided and, consequently, few adverse effects occurred to community services. In the Pilgrim case, a large, union-qualified commuter work force resided in Boston; workers in the specific local area were generally not qualified for union jobs. Consequently, although the large commutation pattern resulted in income being taken out of the local area, there was concomitantly minimal stress on public services [*1; 7*].

Labor Force at Peak Construction

The size of the labor force at peak construction at the 12 nuclear stations ranged between 1,227 and 2,872 workers. Although the size of the peak work force may be related to the number of units being constructed, other modifying factors (such as project scheduling and worker strikes) were also important. However, there was no clear relationship between plant capacity and the size of the labor force. As a percent of the total on-site work force, nonmovers ranged from 2 percent to 30 percent. In general, the number of workers employed from the host communities during both the construction period and operations period was small compared to the total work force in the community. In most of the rural areas, the number of skilled workers was generally small and the hiring of local workers was lower than had been originally expected. Union halls were often located in the large metropolitan areas outside the study areas, and worker commutation to the site was significant. At some sties, however, local hiring increased when the utility instituted training programs to upgrade local skills. In four cases that experienced the largest shares of nonmover workers, the local areas were characterized by rapid growth, nearby locations of union halls, and large indigenous construction work forces.

The percent of movers (in-migrants) at the 12 sites ranged from 3.5 percent to 61.6 percent of the total on-site work force, with a mean of 17.6 percent. An analysis of 28 construction worker surveys at 13 nuclear sites [*8*] estimated that the mover proportion ranged from 14 percent to 50 percent of the total work force. That study noted extreme values in mover proportions to be rare, and that low extreme values were usually associated with subcounty study areas. As the study area for measuring impacts became smaller, workers who in-migrated to the region but not to the defined study area were not considered as movers; they were counted as commuters who drive daily to the site to work. The difference between the findings of the two studies

can be accounted for by differences in the definition of "mover." Malhotra [8] defined a mover as a worker who changed residence to work at the site, and he estimated the number of movers through a survey of workers taken at the sites. In this investigation, a mover was a worker who had in-migrated to a specified area to work at the site. If we factor out the extreme low values represented by the subcounty areas, the mover proportions resemble those found in the Malhotra study.

During the operation period the percentage of movers to total workers at the site increased compared to the percentages during the construction period. Residents in the rural areas generally did not have the specialized technical skills required for nuclear plant operation, and technical operations workers tended to be in-migrants. Malhotra [8] found that the migration proportion for nonconstruction workers (e.g., engineers or clerical) was higher than for the construction workers, although he did not specifically deal with the differences between the construction period and operations period per se.

A number of factors are suggested to explain the variation across sites in mover proportions. These include: (1) the location of large metropolitan centers within commuting distance of the site; (2) the level of skilled manpower in the local areas; and (3) availability of housing. In a number of cases, the percentage of movers in the study area would have increased if a greater number of workers could have been accommodated through expansion of mobile home parks and adjustments to housing stock. The variation in the proportion of movers within the local areas reflected the ability of communities near the site to absorb workers, and this ability varied across sites. The proportion of movers and nonmovers in local areas was found to be lower among the more rural sites that were characterized by low population levels. This reflected the low number of available skilled construction workers in the rural areas, the nearness to a metropolitan center, and the alternative housing centers within commuting distance to the site. Table 2 shows the work force breakdown by nonmovers, movers, and commuters for the 12 nuclear plants.

EMPLOYMENT AND INCOME

The direct basic income averaged $35 million for all 12 sites for the peak construction year. The range in income generated across the 12 sites was large and was due to differences in both work force size and regional wage rates. Effective basic income ranged from $2.08 million to $38.1 million during peak construction. During the 1978 benchmark operations year, the range in effective income was $100,000 to $13 million. The rural local areas could not supply the substantial amounts of equipment and supplies needed for construction, and the effects of such purchases (indirect income) on the study area economies were insignificant. Even in the few cases where local purchases were perceived as important, indirect basic employment was less than two percent of basic employment. Local indirect basic employment can be effectively ignored in assessing economic impacts from nuclear power plants.

The fact that the 12 nuclear plants were located in rural areas adjacent to small communities meant that these places have had neither the capacity nor the required labor skills to support the construction of nuclear generating facilities. Other studies support the finding that indirect employment and income effects have been insignificant. In his assessment of the Turkey Point facility in Florida, Johnson [6] estimated that most of the technical equipment and materials were purchased outside the region, and that only 1.3 percent of building materials for construction were purchased in the local county. A projective study [9] of the impacts of nuclear plants on four Maryland counties concluded that small counties without large communities would not necessarily be able to respond to large,

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TABLE 2

WORK FORCE CHARACTERISTICS: NONMOVERS, MOVERS, AND COMMUTERS
(Peak Construction Year and 1978)

	Peak Construction Year								1978							
	Work Force TOTAL	Nonmovers #	Nonmovers %	Movers #	Movers %	Total Study Area #	Total Study Area %	Commuters #	Commuters %	Work Force TOTAL	Nonmovers #	Nonmovers %	Movers #	Movers %	Total Study Area #	Total Study Area %	Commuters #	Commuters %
Arkansas	1,000	315	30.0	333	35.0	656	65.0	351	35.0	720	217	31.0	253	35.0	470	6.0	255	35.0
Calvert Cliffs	2,584	475	23.6	580	28.1	1,055	51.1	1,009	48.9	848	274	28.7	251	42.8	54	9.2	317	54.5
Cook	2,585	68	2.0	88	3.5	137	5.4	2,388	94.6	756	64	5.8	37	4.9	81	10.7	678	84.1
Crystal River	1,040	215	12.9	212	12.9	427	25.8	1,225	74.2	270	90	33.0	103	39.6	198	72.6	75	27.5
Diablo Canyon	2,116	495	85.4	1,504	81.6	1,799	85.0	317	15.0	1,317	318	24.0	805	61.1	1,121	85.1	196	14.9
FitzPatrick/ Nine Mile Point	2,259	668	28.7	335	14.8	986	43.5	1,281	56.5	1,022	343	33.5	300	15.6	545	43.9	1,696	56.2
Oconee	3,342	595	12.6	300	12.8	595	25.4	1,747	74.6	747	317	42.4	62	8.3	379	50.7	368	49.3
Peach Bottom	2,230	246	11.0	169	7.6	415	18.6	1,815	81.4	414	56	13.5	22	5.3	46	11.0	280	68.1
Rancho Seco	1,227	61	5.1	55	4.7	121	10.0	1,106	90.0	387	31	8.2	14	2.5	45	7.5	532	92.5
St. Lucie	1,936	372	19.2	378	19.5	750	38.7	1,188	61.3	1,340	286	19.7	355	22.1	594	41.8	764	58.2
Surry	1,851	55	5.2	50	4.5	175	9.8	1,675	90.5	414	49	11.6	22	5.3	70	16.9	344	83.1
Three Mile Island	2,672	97	5.1	165	5.8	258	8.9	2,614	91.1	855	125	14.6	53	6.2	178	20.8	680	79.2
MEAN			14.7		17.6		32.3		67.7			21.0		21.0		42.0		58.0

rapid change nor capture a large share of new development. Moreover, it was also projected that existing firms would be adversely affected by competition from new businesses that may enter the local economy because of plant-induced economic activity [9]. In two of the 12 cases studied, this competitive market factor was observable, and in one case, the new competition adversely affected the continued viability of some existing but marginal firms. In Salem County, Pennsylvania, the Susquehanna Steam Electric Station produced an average of $40 million in basic income but little in terms of material purchases: construction materials were purchased from nonlocal suppliers because these goods were not available locally [12].

"Other" basic income (measured in terms of labor market effects due to such things as labor shortages, higher wages, and employment changes due to fiscal impacts) were found not to be a significant factor during the construction period. In only one case was there evidence of fiscally induced basic employment and this was not considered to have been an important change. There was also no evidence of any major or long-term problem with wage competition.

The average number of nonbasic jobs in the 12 study areas during the peak construction year was estimated to be 332 and nonbasic income to be $1.9 million. These estimates were derived from the determinations of effective basic income. The average effective basic income to direct basic income for the 12 sites was 0.286; that is, for every one dollar paid out in direct basic wages, 28 cents would go to local residents. Local spending would be less due to income leakages from the study areas. The nonbasic employment response was determined to be only 0.16 nonbasic jobs per one direct basic job. This is considered a comparatively small multiplier effect, but it was not unexpected. To reiterate, although the 12 nuclear plants were found in rural areas, they were, nonetheless, also located relatively near large metropolitan centers. Given the generally dispersed geographic location of workers and the substantial amount of communication that occurred, it was not unexpected that significant income leakages would result.

During the operations period, an aver-

age of 200 nonbasic jobs in the study areas were related to the nuclear stations. The ratio of effective basic income to direct basic income during plant operations averaged 0.46 for the 12 sites compared to 0.29 during peak construction. The induced jobs averaged 0.23 nonbasic jobs for each basic job during operation compared to 0.16 during peak construction. As a standard, the number of nonbasic jobs generated during the operations phase were approximately 50 percent more than those generated during construction. This reflects the proportionately greater number of movers into the study area during operations.

The fact that a greater percent of movers tended to locate near the plants during the operation period resulted from work force composition and consumer patterns that differ from those during construction. As permanent in-migrants, there was a tendency to spend more earned income within the local areas. In contrast, the construction period was characterized by significant worker commutation, which had the effect of reducing potential income from the project to the local area. Further, the proportion of movers with families present is higher for workers in nonconstruction crafts. Thus, the proportionately greater number of movers with dependents during the operation period would have the effect of enlarging the basic to nonbasic income ratio.

Overall, the economic effects associated with nuclear plants were found to be small relative to much of the impact literature, particularly the findings from the research on energy resources development. The small relative impacts reflect significant income leakage from direct basic income to effective basic income, which is a consequence of both the small size of the local economy and the substantial worker commutation. These findings are supported by a number of studies on the economic impacts of nuclear plants. In a study of the Turkey Point plant in Florida, up to 50 percent of the earned income generated by the plant was estimated to have left the area because of commuting. The author concluded that, although the facility was a positive net benefit, the impacts were not sufficient to make any permanent change on the local economic structure [4]. In reviewing the applicability of the finding of the rural industrialization literature to the kinds and nature of impacts of nuclear power plants, the study found that the multiplicative employment effects to local areas (of both rural industrialization projects and nuclear facilities) would be small because of income leakages due to commuting. Employment multipliers of 1.2 or 1.3 were noted as common.

DEMOGRAPHIC EFFECTS

At peak construction, the average of total in-migration and diminished out-migration for the 12 study areas was 1,200 persons. However, the magnitude of the effect of population change is less likely to be determined by the absolute size of the change than it is by the percent of the increase relative to the size of the existing populations. Thus, relative to the size of the existing population, the percent increase in population directly attributable to the nuclear plants ranged from 1.3 percent to 19.1 percent. For the 12 sites, the average population change as a percent of the study area was only 3.7 percent. The extreme upper value (19.1 percent) was anomolous and resulted from a moderately sized in-migration into a small sub-county study area. Population change was not assessed to be a major impact, neither in terms of relative size nor in terms of impact on social patterns or demographic structure. Because the population change was relatively small, the increase was readily absorbed in all cases.

Other studies on population change brought about by nuclear plants generally support these conclusions. For example, in the four counties studied for nuclear plant effects in Maryland, population increases ranged from five percent to 13 percent of the existing population [9]. The Federal Energy Agency's study of the impacts of nuclear plants showed

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that, despite large on-site work forces during construction, the size of the in-migrant labor force was small due to large commutation levels [12]. Further, population impacts measured for the first three years of construction of the nuclear units at WNP1 and WNP4 in the state of Washington showed that population growth due to the project was less than two percent of the total host county population [4].

HOUSING SECTOR IMPACTS

Impacts on the housing sector in terms of price and overcrowding were temporary and relatively unimportant. The number of housing units in demand during peak construction at the 12 sites ranged from 58 units to 1,297 units, but as a percent of total housing stock in the local areas, housing demand ranged from 1.2 percent to over 25 percent. In those areas where the housing market was tight prior to plant construction, the demands for accommodation by construction workers exacerbated existing conditions and heightened the competition for housing, resulting in house value and rent excalation. Nevertheless, in most cases either the host community or alternative communities were able to accommodate workers and their dependents without excessive stress on the market. In none of the cases was the shortage in housing a long-term community problem. This was due, in part, to the decline in worker demand for housing when construction activity terminated. Where pre-project housing markets were especially tight, successful adjustments were made to the housing stock to accommodate those workers who wanted to rent houses or reside in mobile homes. Studies that have examined housing effects from nuclear plant construction support the conclusions that adverse housing impacts were either short-lived or not an important issue in the host communities [11; 9].

PUBLIC SECTOR EFFECTS

The fact that utility tax and revenue allocations tend to vary substantially among states has been noted in a number of studies that assessed the fiscal effects of nuclear plants [3; 7]. The findings show that a number of tax generating revenue arrangements exist which affect the extent to which local areas have benefitted from the utility tax revenues. These include: (1) publically owned utilities that pay no taxes on nuclear plants; (2) utilities that pay taxes on their nuclear power plants to their respective states which, in turn, reallocate revenues to communities within the state; (3) utilities which pay taxes directly to the local taxing jurisdiction; and (4) municipalities that impose a wage tax that affects workers at a nuclear construction site.

The liability of the power plants for local property taxes depend upon complex tax laws which vary from state to state. At the Cook plant, the facility contributed over 95 percent of the assessed value and taxes for the county. In contrast, the Rancho Seco plant did not contribute to local property taxes because it was built and operated by a tax-exempt municipal utility. The two Pennsylvania plants paid taxes to the state which then distributed the revenue on a per capita basis. This resulted in only minor revenue increases for the local areas at Three Mile Island and Peach Bottom. The greatest tax return to the Pennsylvania study areas was from a 1.0 percent earned-income tax levy.

The proportion of the study area budgets contributed by the power stations varied according to the size of the tax base. Thus, while the taxes paid to Surry County were the smallest for a county-level area, they accounted for almost 35 percent of the Surry County budget in 1978. Diablo Canyon, which paid over $12.4 million in taxes to the San Luis Obispo County taxing jurisdictions in 1977, accounted for about 20 percent of the local budget. The larger tax base of San Luis Obispo County modified the percentage effect of the plant's tax payments even though they were about eight times as high as the absolute dollar

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amounts paid to Surry County. The payments made on behalf of the Arkansas and Calvert Cliffs plants resulted in the greatest proportional contribution to area revenues, close to 50 percent in both cases.

The size of the revenues among the 12 sites varied substantially, but the importance of plant-induced revenues was determined by the proportion of the plant revenues to the total budget of the study area. For revenue paying plants, the proportion of plant revenues to the total budget in one year (1976) ranged from 0.3 percent to over 50 percent. The utilities at six of the 12 plants contributed over 20 percent to the total budgets of the study areas in which the nuclear facilities were located. Table 3 shows the fiscal effects of the 12 nuclear plants.

In cases where there were few in-migrants, a lack of locally purchased construction materials, and a prevalence of large income leakages, the revenues generated by nuclear plants became the most significant benefit of the plants. In addition, these revenues became particularly important because large proportions were often allocated to upgrade, improve, and expand educational facilities and services. In no case was the stress on the provision of public services so large as to offset the benefits gained through the allocation of tax revenues or the reduction of property tax rates.

Of the four major public service areas examined—education, transportation, public safety, and social services—the study found that there had been little demand for project-related expansion in public safety and social services. Traffic congestion, however, was found to be a serious problem at most sites. Project-related demands on the school system occurred at some of the sites, but in all these cases successful adjustments were made to absorb the students without deleterious effects on educational quality. Moreover, the stress placed on the enrollment capacity of the local school systems was generally short-lived and resolved through facility expansion programs. Plant-related stress on enrollment capacity was usually the result of adding to a system already overcrowded due to population growth unrelated to the nuclear facilities. Of total pupil enrollment at the 12 sites, an average of only 2.8 percent was attributable to the nuclear plants. It should be noted, however, that at the tax-paying sites, plant-generated revenues contributed an average of 40 percent of total school district revenues.

SIGNIFICANCE OF SOCIOECONOMIC EFFECTS

The significance of the socioeconomic effects of nuclear generating plants was determined by evaluating the individual effects (economic, demographic, housing, public sector) along five dimensions. These included measurements of the magnitude and duration of the effect; the degree to which these effects were distributed among the various social groups; the evaluation by social groups of the importance of the effect to the group and to the community as a whole; and the relative importance of the impact against other non-plant changes. For each effect an overall rating of impact significance was assigned (Table 4).

At five of the 12 sites, the overall measure of significance of the plant was rated as low; at two the rating was low to moderately significant; at four sites the effects were considered moderately significant; and in one site the overall significance of the plant was rated between moderately and highly significant. In nine cases, no or low significance was associated with housing effects. The economic effects were usually of low to moderate significance. The fact that the plants were located in rural areas with little economic capability to provide construction equipment or a trained labor pool reduced the potential for larger impacts. The nature of the economic changes was often short-term and not distributed throughout all sectors of the population. Compared to the effects of non-nuclear energy development in the western states, the impacts of nuclear

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TABLE 3

FISCAL EFFECTS OF NUCLEAR PLANTS

On Local Areas
in ($000)

Nuclear Plants	1974 Local Budget	1974 Project Revenue	1974 Percent of Local Budget	1978 Local Budget	1978 Project Revenue	1978 Percent of Local Budget
Arkansas	7,435	3,830	51.5	13,413	6,772	50.5
Calvert Cliffs	6,485	N/A	N/A	23,614	11,267	47.7
Crystal River	26,833	1,159	4.4	42,543	3,039	7.1
Diablo Canyon	40,860	6,376	15.8	59,469	12,413	20.9
FitzPatrick	17,004	3,585	21.0	28,191	8,118	28.8
Oconee	10,249	2,878	28.1	18,514	3,782	20.1
Peach Bottom	300	185	61.4	184	30	16.7
St. Lucie	27,261	106	0.4	40,943	4,149	10.1
Surry	3,300	1,130	34.2	4,257	1,496	34.9

power plants have been modest. Because the plants that were studied were located close to large metropolitan centers with large labor pools, commutation levels were large, thus lessening potential impacts from large-scale in-migration. Housing needs were satisfied by a dispersed settlement pattern around the nuclear sites, and this also lessened the economic/demographic impacts that have been associated with energy developments in more geographically isolated communities.

The stress placed on public services due to plant-related changes, particularly worker in-migration, has been minimal. What has been rated as significant, however, has been the substantial revenues that have accrued to some of the local taxing jurisdictions in which the plants were located. The fiscal impacts from six plants were rated as highly significant and for another four plants, moderately significant. The Rancho Seco plant was publicly owned and a property tax was therefore not levied. The utility taxes in Pennsylvania were distributed statewide: the two Pennsylvania plants were levied a one percent income tax to take advantage of the large construction work force at each site. The revenues, however, were relatively low and judged not to be important.

PUBLIC RESPONSE TO THE EFFECTS OF NUCLEAR STATIONS

There were few community concerns expressed over the economic, demographic, housing, and fiscal changes induced by the plants. While prices for housing may have escalated, the effect was not long-term and no controversy surfaced in the communities studied over housing. There were a number of jurisdictional disputes, however, over the distribution of tax revenues. These were isolated disputes that did not result in the emergence of any major community conflict. Overall, few problems were observed in the area of provision of public services.

In most cases, the siting and operation of the nuclear plants sensitized residents and local government officials to growth management issues, even though the nuclear projects in themselves were not necessarily responsible for growth problems. In five of the case studies, greater attention was placed on zoning and land use planning subsequent to nuclear plant construction. Examination of this trend found that the public perception of the plants as growth-inducing was not an insignificant factor. At some sites, con-

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TABLE 4

SIGNIFICANCE OF EFFECTS OF NUCLEAR GENERATING STATIONS

	EFFECTS					
	Economic	Demographic	Housing	Public Sector	Social	Overall Significance
Arkansas	H	M	M–H	H	L	M–H
Calvert Cliffs	M	M	N	H	L	M
Cook	L	N	N	M	M	L–M
Crystal River	L–M	L	L–M	M	N	L–M
Diablo Canyon	L	L	L	M	L	L
FitzPatrick/ Nine Mile Point	M	L	M	H	N	M
Oconee	M	L	L	H	L	M
Peach Bottom	L	L	L	L	N	L
Rancho Seco	L	L	L	N	N	L
St. Lucie	L	L	L	M	N	L
Surry	M	M	L	H	M	M
Three Mile Island	L	L	L	L	N	L

N—None L—Low M—Moderate H—High

cern over community growth, concomitant with revenues from the plants, resulted in increased professional specialization and expansion of planning functions in local government. This tendency was also observed by the Oak Ridge National Laboratory's post-licensing studies where political impacts included: (1) issues over growth management; (2) hiring of planners; (3) changes in the style of decision making; and (4) increasing the specialization of administrative functions [*13*; *15*].

Socioeconomic effects to local areas from the construction and operation of nuclear facilities did not generally result in major community issues. Local public response to nuclear facilities was often a manifestation of concern over the safety of nuclear technology and preservation of environment quality. In a number of the cases issues over environment and safety however did not emerge, and community support of the facilities was strong and long-lasting. This was especially true in those places having a long history of economic instability where industrial and urban growth was an important and pervasive community value. The Oak Ridge National Laboratory's post-licensing studies [*11*] concluded that support for nuclear facilities was associated with an ideology of economic growth [*15*].

SUMMARY

The findings suggest that the impacts resulting from building and operating a nuclear generating facility are not generally characteristic of impacts associated with resource-based energy developments and are more akin to impacts of rural industrialization. Economic benefits accruing to local areas were not significant due to large commutation levels, income leakage from the rural areas, and relatively few local purchases of construction material. While housing effects were also found to be of low to moderate significance, the literature has not systematically and carefully evaluated these dimensions with respect to project attribution, and the findings have, consequently, been inconsistent with respect to the magnitude of these two effects. In addition, the studies on revenue impacts

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from nuclear plants generally have shown important gains absolute to local jurisdictions. Nevertheless, the study found revenue impacts to be wide ranging. At some sites, with relatively large absolute revenues from the nuclear facilities, the significance of these revenues were low to moderate depending on the relative weight of the revenues compared to other revenue generating sources and the public evaluation of the importance of these revenues.

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U.S. Department of Energy

Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor

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(10 pages: Cover, cover sheet, and pages 5-58 through 5-65)

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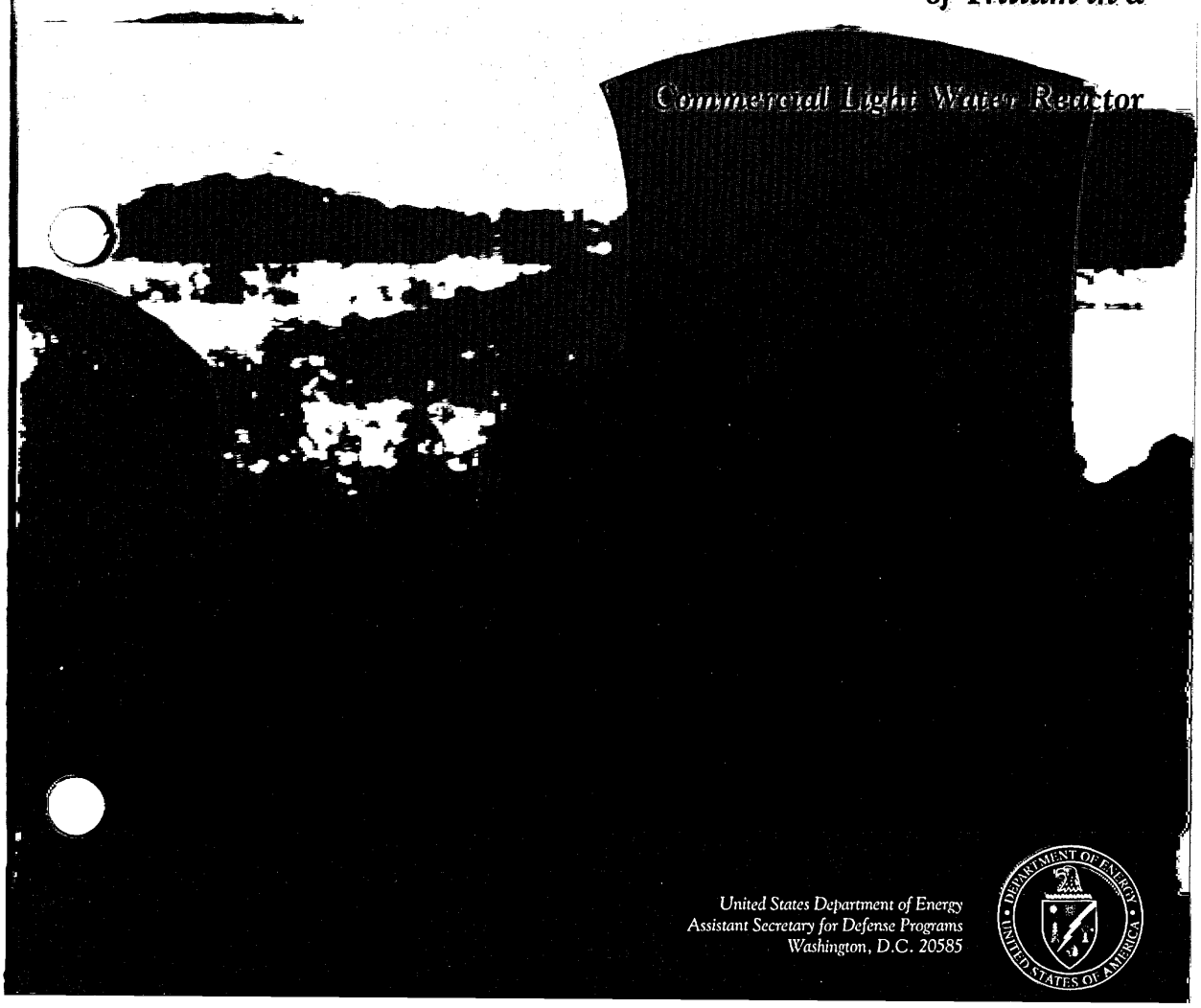
Summary

FINAL ENVIRONMENTAL IMPACT STATEMENT

for the Production

of Tritium in a

Commercial Light Water Reactor



United States Department of Energy
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COVER SHEET

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Title: Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor

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Abstract: The U.S. Department of Energy (DOE) is responsible for providing the nation with nuclear weapons and ensuring that these weapons remain safe and reliable. Tritium, a radioactive isotope of hydrogen, is an essential component of every weapon in the current and projected U.S. nuclear weapons stockpile. Unlike other materials utilized in nuclear weapons, tritium decays at a rate of 5.5 percent per year. Accordingly, as long as the nation relies on a nuclear deterrent, the tritium in each nuclear weapon must be replenished periodically. Currently the U.S. nuclear weapons complex does not have the capability to produce the amounts of tritium that will be required to continue supporting the nation's stockpile. The *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (Final Programmatic EIS), DOE/EIS-0161, issued in October 1995, evaluated the alternatives for the siting, construction, and operation of tritium supply and recycling facilities at five DOE sites for four different production technologies. This Programmatic EIS also evaluated the impacts of using a commercial light water reactor (CLWR) without specifying a reactor location. In the Record of Decision for the Final Programmatic EIS (60 FR 63878), issued December 12, 1995, DOE decided to pursue a dual-track approach on the two most promising tritium supply alternatives: (1) to initiate purchase of an existing commercial reactor (operating or partially complete) or reactor irradiation services; and (2) to design, build, and test critical components of an accelerator system for tritium production. At that time, DOE announced that the final decision would be made by the Secretary of Energy at the end of 1998.

Table 5–32 Staffing for Completion and Operation of Bellefonte 1

Construction Year	*Staffing (Peak)*
1	1,500
2	2,700
3	4,100
4	4,500
5	2,600
6	800+ (operations begin)
7	800
8	800
9	800
10 to 40+	800

Sources: TVA 1998a, TVA 1997e.

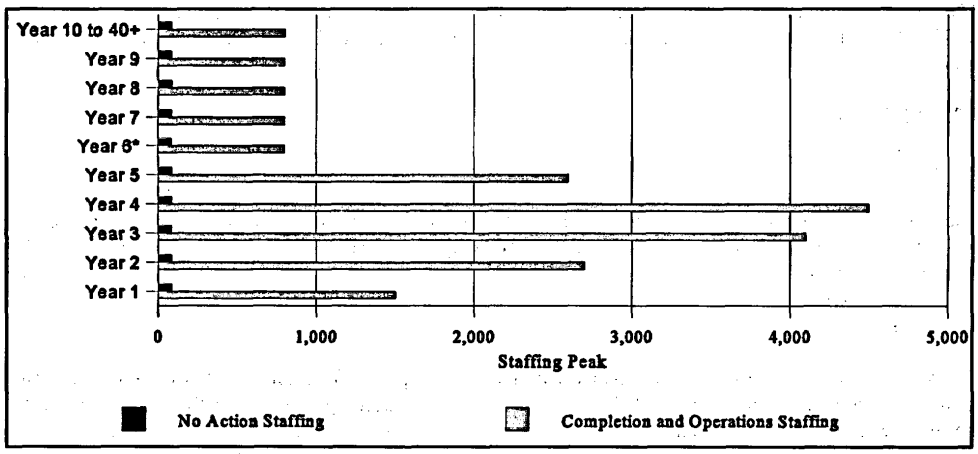

Figure 5–1 Staffing for Completion and Operation of Bellefonte 1, Compared to No Action from First Year of Construction

* Operations begin.
Source: TVA 1998a, TVA 1997e.

Income estimates for construction and operations staff are based on local earnings of about $65,000 per person-year, an estimate that is 30 percent higher than the estimated labor cost to complete and operate the facility as a nonnuclear plant. Such high compensation reflects the requirements levels for many categories of nuclear construction and operations and would provide increased revenues to the local economy.

Another potentially important socioeconomic benefit is the direct and indirect income associated with the procurement of equipment and supplies for completion of the plant. Millions of dollars would be added to the local economy during the construction and operations periods.

The largest impacts would be experienced in the Scottsboro-Hollywood area of Jackson County. A larger region of influence encompassing the commuting area would have a lesser effect. The reasons for the

concentration of socioeconomic impacts within Jackson County and Scottsboro-Hollywood are several. First, Scottsboro-Hollywood—population approximately 15,000 (DOC 1998c),—is the only densely populated area within Jackson County. Second, due to the sparseness of the plant environs, local spending and indirect income generation from that spending are concentrated in the Scottsboro-Hollywood area. Third, procurement of goods and services by the plant and TVA outside Jackson County would be modest. Major impacts such as those relating to schools and taxes would be felt within the county, but not within the region of influence outside the county.

Population and Housing

The completion of Bellefonte 1 would result in a temporary increase in population and income in the region of influence as a direct and indirect result of increased employment at the site. An estimated 33 percent of the construction workers and 50 percent of the operations workers would be expected to move into the area. This is consistent with the values in the *Final Environmental Impact Statement for the Bellefonte Conversion Project* (TVA 1997f).

About 75 percent of the construction workers and 90 percent of the operations workers would be expected to live in Jackson County. About 70 percent could be expected to live in the Scottsboro-Hollywood area, assuming housing were available. About 20 percent likely would be located along Routes 79 and 72 in the valley between Guntersville and Bridgeport, with the remainder scattered throughout the county.

The influx of construction and plant operations personnel, plus families, would increase the population of Jackson County by about 3,200, or more than 6 percent. This influx within a period of four years would be about 70 percent greater than local growth in the seven years from 1990 through 1997. Within the Scottsboro-Hollywood area, the estimated peak population influx of about 2,200 workers and family members would represent a 14 percent overall population increase. Adding indirect employees and their families, the population influx into the Scottsboro-Hollywood area could exceed 25 percent at the peak. Peak population growth in Jackson County, including indirect employees and their families, would probably be no more than about 10 percent. Population impacts outside Jackson County would be negligible.

Most construction workers prefer not to buy permanent housing. Their housing needs would include rental homes and apartments, mobile homes, and camper-trailers. Operations workers generally purchase permanent single-family housing. Up to 70 percent of all incoming construction workers and 90 percent of all operations workers would be expected to bring their families. That number could be appreciably lower than 70 percent, depending on the availability of rentals and trailer parks for camper-trailers. Currently, trailer parks near the Bellefonte site are close to capacity. A trailer park with an estimated capacity of 250 campers/trailers is planned for operation near the site in the fall of 1998. Additional trailer parks could be built in three to four months if construction activity at the plant increased rapidly. DOE is estimating maximum housing and, more importantly, school system impacts, based on the expectation that up to 70 percent of construction workers moving into the area would bring their families.

Demand for housing by construction and operations workers in the vicinity of Bellefonte would increase during the completion and operation of the plant. Data indicate that vacant permanent housing for sale and rent in the vicinity of the Bellefonte plant is insufficient to meet this demand. It is anticipated, however, that the completion and operation of Bellefonte will stimulate the construction of additional permanent housing, the opening of new trailer parks, and the expansion of existing parks to meet this demand, thereby producing a positive effect on the regional economy. It is expected that these new units also would meet permanent housing requirements for plant operations workers and their families.

Employment and Income

Peak employment during construction has been estimated at 4,500. Average employment for construction workers during the four years of the construction phase would be about 2,400 per year. Operations workers would average 800 per year over the operational life of the plant. Indirect employment (e.g., food, retail, banking) could reach an average at least equal to the number of operations workers. During the construction phase, indirect employment would be considerably higher. The effect of this change in employment at the county level would be high. Unemployment in 1997 averaged 8.2 percent. This could decline by very roughly half over the first few years of construction, and then unemployment likely would stabilize at least two points below the average. The unemployment rate would not drop by as much as the employment requirements would suggest. As the construction project escalated and the labor market tightened, the labor pool would expand from the influx of immigrating workers.

Total person-years of employment during construction, including operations staff, have been estimated at about 12,800 over the five-year construction phase. This level of employment should generate about $835 million in direct labor earnings to the region of influence (i.e., wages and benefits). A large fraction of the locally generated income would be spent locally, and indirect economic impacts would be expected. By means of an income multiplier of 1.7, total earnings during the period would exceed approximately $1.4 billion. This multiplier compares to the roughly 1.8 to 2.5 multipliers TVA used to estimate the impact of conversion of Bellefonte 1 to a nonnuclear plant (TVA 1997f).

Regional earnings during the period of plant operation have been estimated at a minimum of $100 million per year. This estimate was developed using a multiplier of 1.8. The higher multiplier reflects the longer-term, more level injection of income into the region during operations than during construction. It is consistent with the multipliers used by TVA for the largest conversion scenario at Bellefonte.

Public Finance and Schools

Construction and operation of Bellefonte 1 as a nuclear unit would generate about $5.5 million per year in tax-equivalent payments (payments in-lieu-of-taxes) for Alabama. Tax revenues to the region of influence and Jackson County and, in part, to the Scottsboro-Hollywood area are derived from real estate taxes, motor vehicle taxes, and motor vehicle and mobile home sales taxes. Income and sales taxes are collected at the state level. Jackson County collected approximately $9.4 million (roughly $200 per capita) in taxes in 1997.

Completion of the plant would affect the school systems of Jackson County and Scottsboro City. The county school system has approximately 6,500 students; the city system, approximately 3,000. Roughly two-thirds of the students (about 6,300) are in the Scottsboro-Hollywood area and the Guntersville-to-Bridgeport corridor, the major impact areas within the county and the region of influence. School facilities within the Scottsboro-Hollywood area and the Guntersville-Bridgeport corridor have the capacity to accommodate about 7,850 students. The peak influx of schoolchildren associated with in-migrating construction and operations workers in the fourth year of construction would be an estimated 970 for the whole of Jackson County, consisting of about 640 in the Scottsboro-Hollywood area, 220 in the Guntersville-Bridgeport corridor, and the remainder in other parts of the county. DOE believes these estimates to be conservative. As discussed in the section on housing, more construction workers than expected could choose to live without their families in camper-trailers rather than with their families in apartments, mobile homes, or single-family homes. As a result, the increase in the number of schoolchildren associated with construction and operations workers would be lower than expected. The number of schoolchildren from the families of in-migrating operations workers would decline to about 325 from the sixth year onward. The impacts of schoolchildren from in-migrating families not directly associated with Bellefonte would be additional.

The Scottsboro school transportation system (excluding Hollywood) operates 26 buses on a dual-route system and 8 on a single-route system (for a maximum of 3,600 students). The actual number of students transported is less than 3,000, leaving a surplus of more than 600. The conversion of some of the 8 single-route buses to a dual-route system could accommodate the peak influx of about 600 students in the Scottsboro system (excluding about 40 students in Hollywood) from families of in-migrating construction and operation workers.

The Jackson County school transportation system would experience an impact similar to the Scottsboro school transportation system. By increasing the number of dual-route operations, the additional number of schoolchildren associated with construction and operation workers could be accommodated.

The combined Jackson County and Scottsboro Boards of Education receive about 40 percent of TVA's payment in-lieu-of-taxes. Completion of Bellefonte 1 would increase TVA's payment to about $5.5 million. Assuming that the 40 percent share were maintained, this would translate into a payment to the Jackson County and Scottsboro boards of about $2.2 million. Over the long term, a payment of $2.2 million would exceed the increase in school costs attributable to students whose families directly support the operation of Bellefonte 1.

In the short term, however, construction of Bellefonte 1 would impose costs averaging almost twice Jackson County's likely long-term receipts from the TVA payment. The TVA payment would not reach the $5.5 million level until plant operations began. Educational costs in the Scottsboro school system could increase by an estimated average of $3 million per year (1997$) for the three busiest years of the construction phase. This estimate includes the cost of hiring 37 additional teachers for the estimated 530 new students averaged over the three peak years of construction to maintain the current student-teacher ratio of about 14:1. The peak year of construction could require an additional 5 teachers over the three-year average of 37 to maintain the current student-teacher ratio. Average educational costs could rise to an estimated $5,432 per student (1997$), based on actual costs of $5,120 per student for the 1995-96 school year plus inflation.

For the Jackson County school system (excluding Scottsboro but including Hollywood), educational costs could increase by an average of less than $1.8 million per year (1997$) for the three busiest years of the construction phase. This estimate includes the cost of hiring 23 additional teachers for the estimated 305 new students averaged over the three peak years to maintain the current student-teacher ratio of about 14:1. The peak year of construction could require an additional 4 teachers over the three-year average of 23 to maintain the current student-teacher ratio. Average educational costs could rise to an estimated at $5,716 per student (1997$), based on actual costs for the 1997-98 school year.

Assuming inflation-related increases of 3 percent per year in costs per student from the amounts reported above, average annual costs for the three-year period beginning with the 2001-2002 school year could rise to an estimated $3.4 million per year for Scottsboro and $1.9 million for the rest of Jackson County. These amounts are in the range of 18 percent and 4 percent of the current school system budgets for Scottsboro and Jackson County, respectively. The costs per student from in-migrating families not directly associated with Bellefonte would be additional.

Costs for the first two years would be well below the three-year construction period average and would allow a gradual phase-in of revenues and expenses to meet the costs associated with the increased student population. **Figures 5-2** and **5-3** reflect the projected budget requirements for the first four years of construction versus the No Action Alternative for the Scottsboro and Jackson County school boards. To meet its expenses, the Scottsboro Board of Education could request additional funding from the State of Alabama.

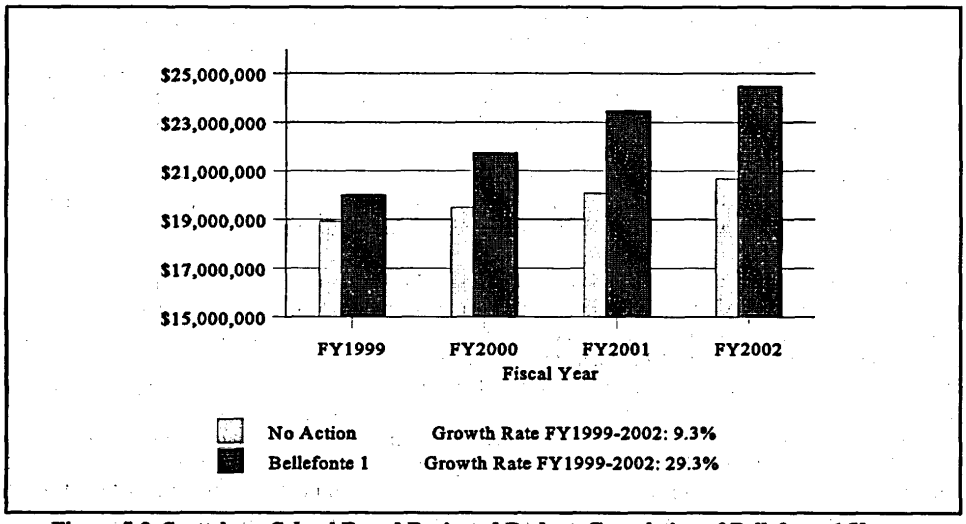

Figure 5-2 Scottsboro School Board Projected Budget, Completion of Bellefonte 1 Versus the No Action Alternative (FY 1999-2002)

Source: Scottsboro 1998.

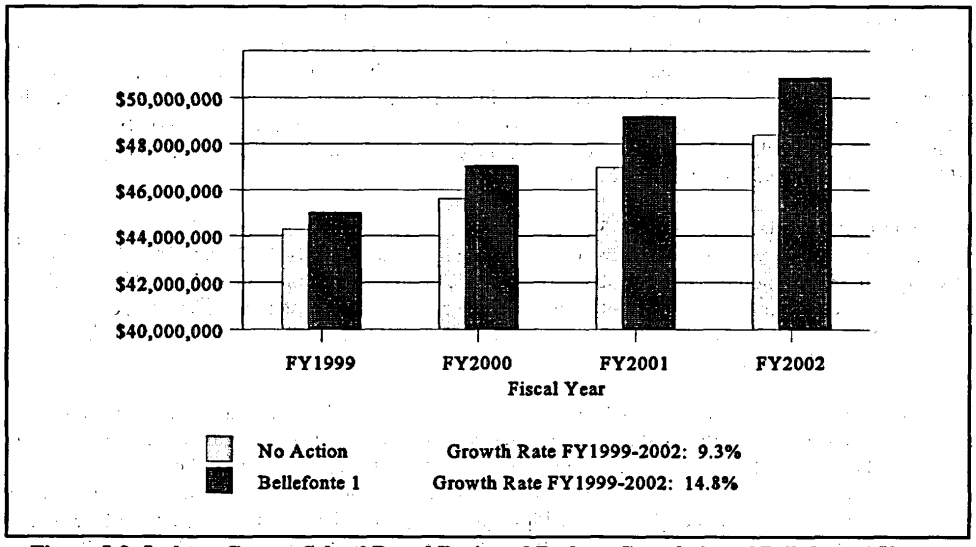

Figure 5-3 Jackson County School Board Projected Budget, Completion of Bellefonte 1 Versus the No Action Alternative (FY 1999-2002)

Source: Scottsboro 1998.

Additional tax revenues also would be generated by the increased economic activity involving the plant and plant workers. Such revenues (e.g., property taxes, income taxes, real estate transfer fees, sales taxes, motor vehicle taxes) are collected by or on behalf of the state government and then distributed to the jurisdictions.

The effect of an influx of families on other areas of public finance (e.g., fire, police, ambulance, hospitals) should be minimal. Additional and new equipment would be required for the police and fire departments, but these items could probably be accommodated within the overall expanding budgets arising from additional tax revenues and payments in-lieu-of-taxes.

Local Transportation

Traffic generated by construction activities associated with the completion of Bellefonte 1 could strain the capacity of the local road network. Traffic impacts during construction would be temporary and similar to the impacts described for the Bellefonte conversion project (TVA 1997f). During peak construction periods, U.S. Highway 72 could experience a 46 percent increase in traffic volume during morning and evening rush hours to the north, and a 48 percent increase in traffic volume to the south. Access roads to the Bellefonte site could experience more than an 80 percent increase in traffic volumes during these hours.

Increased traffic volumes during plant operations, attributable both to the commuting of 800 additional plant employees and to truck transport requirements, would decrease the available capacity of site access roads during morning and evening rush hours. The impacts would be lower than those experienced during peak construction. During plant operations, U.S. Highway 72 could experience a 13 percent increase in traffic volume during morning and evening rush hours to the north, and a 14 percent increase in traffic volume to the south. Access roads to the Bellefonte site could experience a 43 to 59 percent increase in traffic volumes during these hours. Additional truck traffic during plant operations would include a total of 16 shipments of TPBARs to and from the plant per year.

Possible measures that could be used to mitigate traffic volume impacts are physical improvements to the local roads or road network to increase capacity, including construction of additional vehicle lanes throughout road segments, construction of passing lanes in certain locations, or realignment to eliminate some of the no-passing zones. Employee programs that provide flexible hours also could reduce road travel during peak hours, and restrictions for trucks traveling during the peak hours could be made. Also, establishing employee programs and incentives for ride-sharing could be encouraged, and bus and/or vanpool programs could be initiated.

5.2.3.8.2 Bellefonte 1 and 2

No Action

The No Action Alternative requires continuation of the deferred status of Bellefonte 1 and 2. Therefore, no socioeconomic impacts are expected. Approximately 80 employees maintain the partially completed plant in its lay-up condition.

Tritium Production

Estimates of the staffing requirements needed to complete and operate Bellefonte 1 and 2 as a nuclear power plant are presented as **Table 5–33**. About 15,600 person-years will be needed through the six-year construction phase and 1,000 persons per year will be needed for plant operations. In terms of construction workers, completion of Bellefonte 1 and 2 is estimated to require about 10 percent more labor hours than completion of Bellefonte 1 alone, because all the common facilities were completed as part of Bellefonte 1. Peak employment would be about the same in either case; the additional Bellefonte 2–related employment would

occur mainly in the fifth and sixth years of the construction program. A comparison of the peak staffing levels by year for the No Action Alternative and for the completion of Bellefonte 1 and 2 is provided in Figure 5–4.

Table 5–33 Staffing For Completion And Operation of Bellefonte 1 and 2

Construction Year	*Staffing (Peak)*
1	1,400
2	3,000
3	4,000
4	4,500
5	3,900 (Bellefonte 1 operates)
6	2,000 (Bellefonte 2 operates)
7	1,000
8	1,000
9	1,000
10 to 40+	1,000

Source: TVA 1998a.

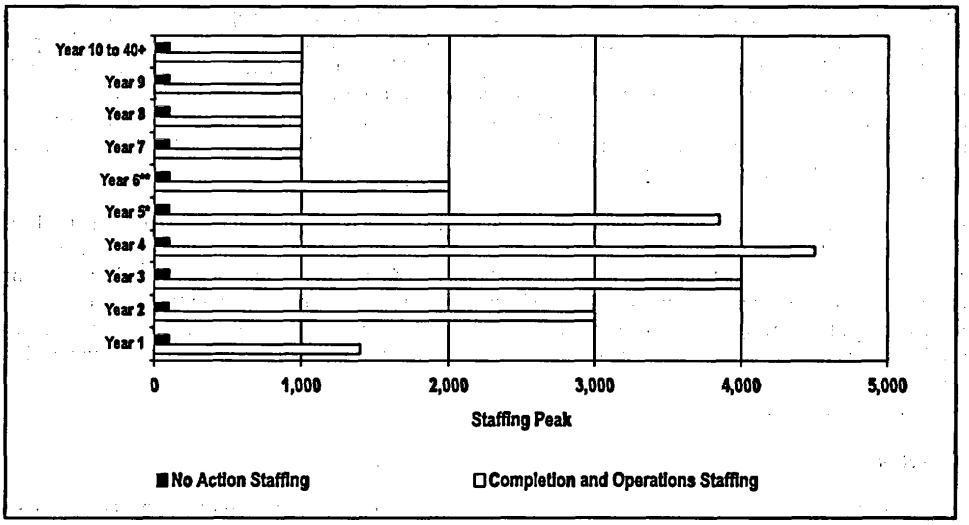

Figure 5–4 Staffing for Completion and Operation of Bellefonte 1 and 2, Compared to No Action from First Year of Construction

*Operations at Bellefonte 1 begin.
**Operations at Bellefonte 2 begin.
Sources: TVA 1998a, TVA 1997e.

Income estimates for construction and operations staff are based on local earnings of about $65,000 per person-year, an estimate that is 30 percent higher than the estimated labor cost to complete and operate the facility as a nonnuclear plant. Such high compensation reflects the requirements levels for many categories of nuclear construction and operations and would provide increased revenues to the local economy.

Another potentially important socioeconomic benefit is the direct and indirect income associated with the procurement of equipment and supplies for completion of the plant. Millions of dollars would continue to be added to the local economy during the construction and operations period.

The largest impacts would be experienced in the Scottsboro-Hollywood area of Jackson County. A larger region of influence encompassing the commuting area would have a lesser effect. The reasons for the concentration of socioeconomic impacts within Jackson County and Scottsboro-Hollywood are several. First, Scottsboro-Hollywood—population approximately 15,000 (DOC 1998c)—is the only densely populated area within Jackson County. Second, due to the sparseness of the plant environs, local spending and indirect income generation from that spending are concentrated in the Scottsboro-Hollywood area. Third, procurement of goods and services by the plant and TVA outside Jackson County would be modest. Major impacts such as those relating to schools and taxes would be felt within the county, but not within the region of influence outside the county.

Population and Housing

The completion of Bellefonte 1 and 2 would result in a temporary increase in population and income in the region of influence as a direct and indirect result of increased employment at the site. An estimated 33 percent of the construction workers and 50 percent of the operations workers would be expected to move into the area. This is consistent with the values in the *Final Environmental Impact Statement for the Bellefonte Conversion Project* (TVA 1997f).

About 75 percent of the construction workers and 90 percent of the operations workers who moved would be expected to live in Jackson County. About 70 percent could be expected to live in the Scottsboro-Hollywood area, assuming housing were available. About 20 percent likely would be located along Route 79 and Route 72 in the valley between Guntersville and Bridgeport, with the remainder scattered throughout the county.

The influx of construction and plant operations personnel, plus families, would increase the population of Jackson County by about 3,500, or more than 7 percent. This influx within a period of four years would be about 80 percent greater than local growth in the seven years from 1990 through 1997. Within the Scottsboro-Hollywood area, the estimated peak population influx of about 2,300 workers and family members would represent a 15 percent overall population increase. Adding indirect employees and their families, the population influx into the Scottsboro-Hollywood area could exceed 25 percent at the peak. Peak population growth in Jackson County, including indirect employees and their families, would probably be no more than about 12 percent. Population impacts outside Jackson County would be small.

Most construction workers prefer not to buy permanent housing. Their housing needs would include rental homes and apartments, mobile homes, and camper-trailers. Operations workers generally purchase permanent single-family housing. Up to 70 percent of all incoming construction workers and 90 percent of all operations workers would be expected to bring their families. That number could be appreciably lower than 70 percent, depending on the availability of rentals and trailer parks for camper-trailers. Currently, trailer parks near the Bellefonte site are close to capacity. A trailer park with an estimated capacity of 250 campers/trailers is planned for operation near the site in the fall of 1998. Additional trailer parks could be built in three to four months if construction activity at the plant increased rapidly. DOE is estimating maximum housing and, more importantly, school system impacts, based on the expectation that up to 70 percent of construction workers moving into the area would bring their families.

Demand for housing by construction and operations workers in the vicinity of Bellefonte would increase during the completion and operation of the plant. Data indicate that vacant permanent housing for sale and rent in the vicinity of the Bellefonte plant is insufficient to meet this demand. It is anticipated, however, that the completion and operation of Bellefonte would stimulate the construction of additional permanent housing, the

U.S. Department of Commerce
Bureau of Economic Analysis
Regional Economic Analysis Division

RIMS II Multipliers (1997/2004)
Table 1.4 Total Multipliers for Output, Earnings, and Employment by Industry Aggregation.
(13 pages: Cover and pages 1 through 12)

ATTACHMENT 2.5.2-5B

Bureau of Economic Analysis

Regional Economic Accounts

Contact RIMS II:

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Regional Input-Output Modeling System (RIMS II)

Multipliers based on 2004 national annual input-output data and 2004 regional data are available for any single or multi-county region. Multipliers based on 1997 national benchmark input-output data and 2004 regional data are also available.

What's New

- 2004 multipliers released November 2006
- RIMS II Online Order and Delivery System
- PowerPoint tutorial on downloading and viewing multipliers (PowerPoint • 1,507 KB)
- RIMS II Viewer (Version 2.4) released April 2007

About RIMS II

- Hurricane Katrina and RIMS II
- Common uses
- Brief description of RIMS II
- User Handbook (PDF • 677 KB)
- Training Session NEW **June 21, 2007**
- Sign up for RIMS II announcements

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- Information on ordering RIMS II multipliers *(Go directly to online ordering system)*
- Multiplier industry groups
- RIMS II Viewer software system requirements

Last updated: Wednesday, May 02, 2007

RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
1111A0 Oilseed farming	1.3410	0.1757	6.3390	1.7289	1.4824
1111B0 Grain farming	1.3148	0.1697	5.8870	1.7137	1.5141
111200 Vegetable and melon farming	1.2821	0.2371	11.1162	1.3953	1.2172
1113A0 Fruit farming	1.3203	0.3015	13.6761	1.3543	1.2072
111335 Tree nut farming	1.2998	0.3153	11.1502	1.3083	1.2604
111400 Greenhouse and nursery production	1.1875	0.3266	12.8539	1.1640	1.1147
111910 Tobacco farming	1.2872	0.2164	9.6641	1.4478	1.2391
111920 Cotton farming	1.3927	0.2310	8.8439	1.7361	1.5465
1119A0 Sugarcane and sugar beet farming	1.0000	0.0000	0.0000	0.0000	0.0000
1119B0 All other crop farming	1.3342	0.1793	6.3488	1.7166	1.4859
112100 Cattle ranching and farming	1.5441	0.1984	6.6572	2.0034	1.7075
112300 Poultry and egg production	1.9419	0.2512	6.3431	2.5240	2.3123
112A00 Animal production, except cattle and poultry and eggs	1.6985	0.2199	6.8651	2.2204	1.8160
113A00 Forest nurseries, forest products, and timber tracts	1.3037	0.1922	5.6501	1.9560	3.0493
113300 Logging	1.4543	0.2558	6.5900	1.5265	1.5647
114100 Fishing	1.0000	0.0000	0.0000	0.0000	0.0000
114200 Hunting and trapping	1.2173	0.1688	10.2844	1.6541	1.3671
115000 Agriculture and forestry support activities	1.3003	0.4945	23.2907	1.2051	1.1042
211000 Oil and gas extraction	1.0000	0.0000	0.0000	0.0000	0.0000
212100 Coal mining	1.3572	0.2797	4.5772	1.4615	1.7201
212210 Iron ore mining	1.0000	0.0000	0.0000	0.0000	0.0000
212230 Copper, nickel, lead, and zinc mining	1.0000	0.0000	0.0000	0.0000	0.0000
2122A0 Gold, silver, and other metal ore mining	1.0000	0.0000	0.0000	0.0000	0.0000
212310 Stone mining and quarrying	1.3414	0.3248	6.4806	1.3756	1.4519
212320 Sand, gravel, clay, and refractory mining	1.2953	0.3277	6.1031	1.2968	1.3954
212390 Other nonmetallic mineral mining	1.3772	0.2804	5.8670	1.5024	1.6041
213111 Drilling oil and gas wells	1.0000	0.0000	0.0000	0.0000	0.0000
213112 Support activities for oil and gas operations	1.3523	0.4259	8.0990	1.3116	1.3690
21311A Support activities for other mining	1.4780	0.4293	11.3132	1.5682	1.7267
2211A0 Power generation and supply	1.2100	0.2333	3.5047	1.3342	1.7796
221200 Natural gas distribution	1.0980	0.1483	2.2590	1.2377	1.5056
221300 Water, sewage and other systems	1.2954	0.3134	7.2099	1.3823	1.4684
230000 Construction	1.5812	0.5016	14.2652	1.4426	1.4218
311111 Dog and cat food manufacturing	1.8779	0.2397	5.3098	2.5451	2.8164
311119 Other animal food manufacturing	1.7805	0.2307	5.4996	2.4501	2.3658
311211 Flour milling	1.4426	0.2007	4.5572	2.1311	2.2435
311212 Rice milling	1.0000	0.0000	0.0000	0.0000	0.0000
311213 Malt manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311221 Wet corn milling	1.0000	0.0000	0.0000	0.0000	0.0000
311222 Soybean processing	1.5808	0.1945	4.2999	2.0650	2.9082
311223 Other oilseed processing	1.0000	0.0000	0.0000	0.0000	0.0000

(Continued)

Region Definition: Blount, AL; Cherokee, AL; Cullman, AL; DeKalb, AL; Etowah, AL; Jackson, AL; Limestone, AL; Madison, AL; Marshall, AL; Morgan, AL; Catoosa, GA; Chattooga, GA; Dade, GA; Floyd, GA; Gordon, GA; Walker, GA; Whitfield, GA; Coffee, TN; Franklin, TN; Grundy, TN; Hamilton, TN; Lincoln, TN; Marion, TN; Moore, TN; Sequatchie, TN

*Includes Government enterprises.

1. Each entry in column 1 represents the total dollar change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

2. Each entry in column 2 represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

3. Each entry in column 3 represents the total change in number of jobs that occurs in all industries for each additional 1 million dollars of output delivered to final demand by the industry corresponding to the entry. Because the employment multipliers are based on 2004 data, the output delivered to final demand should be in 2004 dollars.

4. Each entry in column 4 represents the total dollar change in earnings of households employed by all industries for each additional dollar of earnings paid directly to households employed by the industry corresponding to the entry.

5. Each entry in column 5 represents the total change in number of jobs in all industries for each additional job in the industry corresponding to the entry.

NOTE.--Multipliers are based on the 1997 Benchmark Input-Output Table for the Nation and 2004 regional data. Appendix B identifies the industries corresponding to the entries.

SOURCE.--Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
311225 Fats and oils refining and blending	1.9706	0.2468	5.7020	2.6207	2.8191
311230 Breakfast cereal manufacturing	1.5880	0.2362	4.6557	2.5079	3.5477
311310 Sugar manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311320 Confectionery manufacturing from cacao beans	1.0000	0.0000	0.0000	0.0000	0.0000
311330 Confectionery manufacturing from purchased chocolate	1.3146	0.1912	4.7724	1.7197	1.6818
311340 Nonchocolate confectionery manufacturing	1.3615	0.2292	5.2659	1.6028	1.6139
311410 Frozen food manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311420 Fruit and vegetable canning and drying	1.0000	0.0000	0.0000	0.0000	0.0000
311511 Fluid milk manufacturing	1.4730	0.1806	4.4416	1.8961	2.1069
311512 Creamery butter manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311513 Cheese manufacturing	1.4320	0.1765	4.6117	1.8743	1.9549
311514 Dry, condensed, and evaporated dairy products	1.0000	0.0000	0.0000	0.0000	0.0000
311520 Ice cream and frozen dessert manufacturing	1.4434	0.2109	5.6207	1.8727	1.7409
311611 Animal, except poultry, slaughtering	1.4486	0.1688	5.2471	1.7927	1.7186
311612 Meat processed from carcasses	1.4778	0.1993	5.2667	1.9251	1.8818
311613 Rendering and meat byproduct processing	1.3501	0.1828	4.2685	1.6696	1.7398
311615 Poultry processing	2.3699	0.3340	10.0203	2.6322	2.0958
311700 Seafood product preparation and packaging	1.0000	0.0000	0.0000	0.0000	0.0000
31181A Bread and bakery product, except frozen, manufacturing	1.3898	0.3227	8.8967	1.3393	1.2875
311813 Frozen cakes and other pastries manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311821 Cookie and cracker manufacturing	1.4620	0.2530	5.6446	1.7030	1.7882
311822 Mixes and dough made from purchased flour	1.5734	0.2114	4.9984	2.0845	2.0687
311823 Dry pasta manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311830 Tortilla manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311911 Roasted nuts and peanut butter manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311919 Other snack food manufacturing	1.4898	0.2252	5.1853	1.9186	1.9802
311920 Coffee and tea manufacturing	1.6008	0.2464	5.7352	2.6168	2.4249
311930 Flavoring syrup and concentrate manufacturing	1.1726	0.1352	1.9964	1.4357	2.0084
311941 Mayonnaise, dressing, and sauce manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311942 Spice and extract manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
311990 All other food manufacturing	1.5533	0.2479	6.2591	1.8445	1.7821
312110 Soft drink and ice manufacturing	1.5114	0.2034	4.2607	2.0455	2.3801
312120 Breweries	1.0000	0.0000	0.0000	0.0000	0.0000
312130 Wineries	1.3284	0.1919	5.4605	1.8296	1.6061
312140 Distilleries	1.2620	0.1615	2.6937	1.6400	2.2100
312210 Tobacco stemming and redrying	1.0000	0.0000	0.0000	0.0000	0.0000
312221 Cigarette manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
312229 Other tobacco product manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
313100 Fiber, yarn, and thread mills	1.8828	0.3071	8.3728	2.2253	1.9567
313210 Broadwoven fabric mills	1.8474	0.3430	9.2843	1.9469	1.8242
313220 Narrow fabric mills and schiffli embroidery	1.6694	0.3937	12.0885	1.5401	1.3841

(Continued)

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4. Each entry in column 4 represents the total dollar change in earnings of households employed by all industries for each additional dollar of earnings paid directly to households employed by the industry corresponding to the entry.
5. Each entry in column 5 represents the total change in number of jobs in all industries for each additional job in the industry corresponding to the entry.

NOTE.--Multipliers are based on the 1997 Benchmark Input-Output Table for the Nation and 2004 regional data. Appendix B identifies the industries corresponding to the entries.

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	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
313230 Nonwoven fabric mills	1.8286	0.3019	6.0008	2.0576	2.4206
313240 Knit fabric mills	1.8939	0.3392	9.4849	1.9938	1.8186
313310 Textile and fabric finishing mills	1.8526	0.3214	8.4749	2.1691	2.0874
313320 Fabric coating mills	1.7344	0.3077	8.3967	1.9082	1.7178
314110 Carpet and rug mills	1.9798	0.2868	7.3868	2.7144	2.5089
314120 Curtain and linen mills	1.8262	0.3127	9.6513	2.0998	1.7938
314910 Textile bag and canvas mills	1.7035	0.3911	11.8467	1.5949	1.4681
314992 Tire cord and tire fabric mills	1.9234	0.3000	6.8024	2.3114	2.2379
31499A Other miscellaneous textile product mills	1.6902	0.3471	11.0560	1.7007	1.4960
315111 Sheer hosiery mills	1.8471	0.3873	11.8679	1.7476	1.5420
315119 Other hosiery and sock mills	1.7812	0.3883	12.5634	1.6913	1.5126
315190 Other apparel knitting mills	1.0000	0.0000	0.0000	0.0000	0.0000
315200 Cut and sew apparel manufacturing	1.7002	0.3353	10.7536	1.8149	1.6210
315900 Accessories and other apparel manufacturing	1.6726	0.3789	13.0202	1.6156	1.4334
316100 Leather and hide tanning and finishing	1.5870	0.2323	7.6356	1.8296	1.6437
316200 Footwear manufacturing	1.7010	0.3606	13.3460	1.7260	1.4156
316900 Other leather product manufacturing	1.4787	0.3007	10.6910	1.4811	1.3216
321113 Sawmills	1.8929	0.3066	8.4565	2.3084	2.1699
321114 Wood preservation	2.0774	0.3062	7.8327	3.1122	3.2620
32121A Veneer and plywood manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
32121B Engineered wood member and truss manufacturing	1.7346	0.3508	10.4148	1.7543	1.6281
321219 Reconstituted wood product manufacturing	1.7681	0.3030	6.9765	1.9583	2.0421
321911 Wood windows and door manufacturing	1.7100	0.3558	10.2860	1.7367	1.6404
321912 Cut stock, resawing lumber, and planing	1.9105	0.3342	10.4698	2.1473	1.8306
321918 Other millwork, including flooring	1.8377	0.3668	10.5366	1.8684	1.7544
321920 Wood container and pallet manufacturing	1.7891	0.3776	13.0437	1.7204	1.4798
321991 Manufactured home, mobile home, manufacturing	1.6865	0.3250	9.3706	1.8051	1.6298
321992 Prefabricated wood building manufacturing	1.7737	0.3655	10.8323	1.8522	1.7053
321999 Miscellaneous wood product manufacturing	1.6583	0.3842	12.1734	1.5946	1.4452
322110 Pulp mills	1.7665	0.3145	5.8312	2.0404	3.1472
3221A0 Paper and paperboard mills	1.6121	0.2563	4.6713	2.0240	2.8914
322210 Paperboard container manufacturing	1.7905	0.3146	6.4720	1.9052	1.9015
32222A Coated and laminated paper and packaging materials	1.7355	0.2705	5.5472	2.1979	2.4188
32222B Coated and uncoated paper bag manufacturing	1.7865	0.3175	7.3008	1.9803	1.8412
322225 Flexible packaging foil manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
322226 Surface-coated paperboard manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
322231 Die-cut paper office supplies manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
322232 Envelope manufacturing	1.7722	0.3703	7.8102	1.7540	1.7785
322233 Stationery and related product manufacturing	1.7730	0.2751	6.1523	2.2948	2.1660
322291 Sanitary paper product manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
322299 All other converted paper product manufacturing	1.6087	0.3005	7.0747	1.7542	1.6555

(Continued)

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SOURCE.--Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
32311A Commercial printing	1.5620	0.3814	8.9315	1.4799	1.4474
323116 Manifold business forms printing	1.5743	0.2942	6.4199	1.6950	1.7661
323117 Books printing	1.5050	0.3735	9.2056	1.4175	1.3583
323118 Blankbook and looseleaf binder manufacturing	1.5801	0.3320	10.3144	1.6768	1.5254
323121 Tradebinding and related work	1.3911	0.4652	18.5936	1.2576	1.1486
323122 Prepress services	1.2434	0.4594	8.5109	1.1847	1.2441
324110 Petroleum refineries	1.0000	0.0000	0.0000	0.0000	0.0000
324121 Asphalt paving mixture and block manufacturing	1.4284	0.2349	4.4588	1.9725	2.3909
324122 Asphalt shingle and coating materials manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
324191 Petroleum lubricating oil and grease manufacturing	1.4826	0.2866	4.8592	1.6774	2.1472
324199 All other petroleum and coal products manufacturing	1.2072	0.2729	3.9727	1.2876	1.5588
325110 Petrochemical manufacturing	1.5566	0.2098	3.5259	2.4051	3.9706
325120 Industrial gas manufacturing	1.3675	0.2129	3.5725	1.8630	2.3780
325130 Synthetic dye and pigment manufacturing	1.4782	0.2458	4.1366	1.9083	2.5215
325180 Other basic inorganic chemical manufacturing	1.4546	0.2448	4.0968	1.9141	2.6678
325190 Other basic organic chemical manufacturing	1.6459	0.2351	4.1177	2.5090	3.8088
325211 Plastics material and resin manufacturing	1.7092	0.2238	3.9219	2.5660	3.5850
325212 Synthetic rubber manufacturing	1.5844	0.2274	4.2516	2.1217	2.4473
325221 Cellulosic organic fiber manufacturing	1.5980	0.2958	4.6275	1.8090	2.5401
325222 Noncellulosic organic fiber manufacturing	1.6793	0.2690	4.9530	2.1654	2.5772
325311 Nitrogenous fertilizer manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
325312 Phosphatic fertilizer manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
325314 Fertilizer, mixing only, manufacturing	1.3508	0.1771	3.8866	2.0298	2.0808
325320 Pesticide and other agricultural chemical manufacturing	1.4398	0.1854	3.3308	2.1256	2.8852
325400 Pharmaceutical and medicine manufacturing	1.3733	0.2075	3.2840	1.7843	2.5063
325510 Paint and coating manufacturing	1.6704	0.2492	4.6750	2.1463	2.5064
325520 Adhesive manufacturing	1.6356	0.2538	5.0464	2.0988	2.3333
325611 Soap and other detergent manufacturing	1.5641	0.2099	3.9451	2.4066	3.1066
325612 Polish and other sanitation good manufacturing	1.4838	0.2083	4.1289	2.1346	2.5539
325613 Surface active agent manufacturing	1.7057	0.2416	4.1557	2.3520	3.2987
325620 Toilet preparation manufacturing	1.4227	0.1910	4.3247	2.0706	2.1272
325910 Printing ink manufacturing	1.6370	0.2593	4.5613	2.0414	2.5273
325920 Explosives manufacturing	1.2757	0.3214	5.9065	1.2802	1.3950
325991 Custom compounding of purchased resins	1.7181	0.2625	5.2166	2.0171	2.1627
325992 Photographic film and chemical manufacturing	1.4171	0.2451	4.6338	1.6554	1.9031
325998 Other miscellaneous chemical product manufacturing	1.5901	0.2541	4.7980	2.0888	2.4834
326110 Plastics packaging materials, film and sheet	1.7590	0.2830	6.5292	1.9602	1.8554
326120 Plastics pipe, fittings, and profile shapes	1.7934	0.2937	6.3821	1.9758	1.9254
326130 Laminated plastics plate, sheet, and shapes	1.0000	0.0000	0.0000	0.0000	0.0000
3261A0 Foam product manufacturing	1.7127	0.2841	7.2432	1.9066	1.7042
326160 Plastics bottle manufacturing	1.7845	0.2887	6.6543	1.9719	1.8942

(Continued)

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RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
326192 Resilient floor covering manufacturing	1.4947	0.2352	5.6612	1.6948	1.5777
32619A Plastics plumbing fixtures and all other plastics products	1.6410	0.3336	8.7448	1.5961	1.4648
326210 Tire manufacturing	1.6846	0.3166	6.4204	1.7426	1.9279
326220 Rubber and plastics hose and belting manufacturing	1.5828	0.3028	7.6213	1.6633	1.5872
326290 Other rubber product manufacturing	1.6148	0.3315	8.2050	1.6262	1.5622
327111 Vitreous china plumbing fixture manufacturing	1.3780	0.3543	7.8272	1.3536	1.3848
327112 Vitreous china and earthenware articles manufacturing	1.4007	0.4067	16.0804	1.3340	1.1800
327113 Porcelain electrical supply manufacturing	1.4736	0.3946	9.2485	1.4583	1.4877
327121 Brick and structural clay tile manufacturing	1.4111	0.3629	8.0191	1.3963	1.4493
327122 Ceramic wall and floor tile manufacturing	1.4712	0.3680	8.9458	1.4448	1.4200
32712A Clay refractory and other structural clay products	1.0000	0.0000	0.0000	0.0000	0.0000
327125 Nonclay refractory manufacturing	1.3788	0.2956	6.6684	1.4792	1.5392
327213 Glass container manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
32721A Glass and glass products, except glass containers	1.4848	0.3065	6.6538	1.5753	1.6414
327310 Cement manufacturing	1.4291	0.2123	4.0979	1.8581	2.2016
327320 Ready-mix concrete manufacturing	1.6562	0.3203	7.3091	1.8387	1.8477
327331 Concrete block and brick manufacturing	1.5385	0.3498	8.0404	1.5767	1.6087
327332 Concrete pipe manufacturing	1.5589	0.3525	8.8400	1.5814	1.5479
327390 Other concrete product manufacturing	1.5210	0.3786	9.2820	1.4823	1.4596
327410 Lime manufacturing	1.5377	0.2964	5.7624	1.7469	2.0175
327420 Gypsum product manufacturing	1.6283	0.2513	5.1089	2.1770	2.5727
327910 Abrasive product manufacturing	1.4558	0.2735	6.1639	1.6232	1.7205
327991 Cut stone and stone product manufacturing	1.5236	0.4144	11.9022	1.4695	1.3721
327992 Ground or treated minerals and earths manufacturing	1.3088	0.2252	4.8071	1.4865	1.5924
327993 Mineral wool manufacturing	1.4655	0.2888	6.2661	1.5574	1.6368
327999 Miscellaneous nonmetallic mineral products	1.5008	0.2972	6.2173	1.6046	1.7220
331111 Iron and steel mills	1.5067	0.2531	4.4878	1.9187	2.5846
331112 Ferroalloy and related product manufacturing	1.4315	0.2283	4.4331	1.7272	1.9262
331210 Iron, steel pipe and tube from purchased steel	1.4667	0.2360	4.9657	1.7273	1.7692
331221 Rolled steel shape manufacturing	1.6197	0.2324	4.7052	2.2950	2.6560
331222 Steel wire drawing	1.5046	0.2613	5.2774	1.7077	1.8227
331311 Alumina refining	1.0000	0.0000	0.0000	0.0000	0.0000
331312 Primary aluminum production	1.0000	0.0000	0.0000	0.0000	0.0000
331314 Secondary smelting and alloying of aluminum	1.4734	0.2147	4.7620	2.2998	2.5144
331315 Aluminum sheet, plate, and foil manufacturing	1.5796	0.2098	4.0852	2.2475	3.0139
331316 Aluminum extruded product manufacturing	1.4801	0.2532	5.6518	1.6359	1.6821
331319 Other aluminum rolling and drawing	1.5006	0.1874	4.3143	2.0082	1.9791
331411 Primary smelting and refining of copper	1.0000	0.0000	0.0000	0.0000	0.0000
331419 Primary nonferrous metal, except copper and aluminum	1.0000	0.0000	0.0000	0.0000	0.0000
331421 Copper rolling, drawing, and extruding	1.3222	0.1813	3.6158	1.7138	1.9489
331422 Copper wire, except mechanical, drawing	1.8866	0.2987	6.0662	2.2983	2.6110

(Continued)

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RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
331423 Secondary processing of copper	1.0000	0.0000	0.0000	0.0000	0.0000
331491 Nonferrous metal, except copper and aluminum, shaping	1.5437	0.2544	5.2698	1.8356	2.0195
331492 Secondary processing of other nonferrous	1.4367	0.2494	5.3356	1.8163	1.9761
331510 Ferrous metal foundries	1.4061	0.3788	7.7238	1.3833	1.4634
33152A Aluminum foundries	1.5469	0.3754	8.9943	1.4788	1.4590
33152B Nonferrous foundries, except aluminum	1.5247	0.3807	9.8619	1.4682	1.4145
332111 Iron and steel forging	1.4650	0.3083	6.7423	1.5195	1.5466
332112 Nonferrous forging	1.0000	0.0000	0.0000	0.0000	0.0000
332114 Custom roll forming	1.5858	0.2833	7.3076	1.7675	1.6128
33211A All other forging and stamping	1.5232	0.3612	9.2755	1.4740	1.4031
332211 Cutlery and flatware, except precious, manufacturing	1.3671	0.2470	5.5902	1.5586	1.5889
332212 Hand and edge tool manufacturing	1.4218	0.3579	7.9246	1.4022	1.4283
332213 Saw blade and handsaw manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
332214 Kitchen utensil, pot, and pan manufacturing	1.6639	0.3261	8.4790	1.9118	1.7872
332311 Prefabricated metal buildings and components	1.6689	0.3311	8.2200	1.7670	1.6576
332312 Fabricated structural metal manufacturing	1.5456	0.3060	6.9487	1.6344	1.6614
332313 Plate work manufacturing	1.4242	0.3704	8.1333	1.3475	1.3679
332321 Metal window and door manufacturing	1.5143	0.2981	7.4978	1.5538	1.4742
332322 Sheet metal work manufacturing	1.4752	0.3551	9.2015	1.4087	1.3471
332323 Ornamental and architectural metal work manufacturing	1.4847	0.3455	9.2427	1.4432	1.3586
332410 Power boiler and heat exchanger manufacturing	1.4660	0.3470	8.0001	1.4278	1.4330
332420 Metal tank, heavy gauge, manufacturing	1.4982	0.3463	7.8799	1.4750	1.4882
332430 Metal can, box, and other container manufacturing	1.8634	0.2685	6.2431	2.3874	2.2633
33299A Ammunition manufacturing	1.4696	0.3623	6.9877	1.4882	1.6678
332994 Small arms manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
332995 Other ordnance and accessories manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
332500 Hardware manufacturing	1.4484	0.3127	7.6130	1.4922	1.4668
332600 Spring and wire product manufacturing	1.4921	0.3363	8.4990	1.4736	1.4262
332710 Machine shops	1.4329	0.4629	11.8879	1.3415	1.3052
332720 Turned product and screw, nut, and bolt manufacturing	1.3882	0.3699	8.6288	1.3416	1.3552
332811 Metal heat treating	1.3763	0.3117	7.2377	1.3957	1.3878
332812 Metal coating and nonprecious engraving	1.5067	0.2909	6.9674	1.5502	1.4907
332813 Electroplating, anodizing, and coloring metal	1.4044	0.4347	12.1801	1.2794	1.2272
332910 Metal valve manufacturing	1.4581	0.3073	6.6536	1.5519	1.6242
332991 Ball and roller bearing manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
332996 Fabricated pipe and pipe fitting manufacturing	1.4712	0.3145	8.1113	1.5025	1.4203
332997 Industrial pattern manufacturing	1.3094	0.5060	13.0849	1.2078	1.1852
332998 Enameled iron and metal sanitary ware manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
332999 Miscellaneous fabricated metal product manufacturing	1.5092	0.3342	8.9068	1.5121	1.4260
333111 Farm machinery and equipment manufacturing	1.5607	0.2818	6.7598	1.9072	1.8298
333112 Lawn and garden equipment manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000

(Continued)

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	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
333120 Construction machinery manufacturing	1.6426	0.2917	6.1319	2.0556	2.2558
333131 Mining machinery and equipment manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
333132 Oil and gas field machinery and equipment	1.0000	0.0000	0.0000	0.0000	0.0000
333210 Sawmill and woodworking machinery	1.4941	0.3646	7.8649	1.5137	1.5704
333220 Plastics and rubber industry machinery	1.0000	0.0000	0.0000	0.0000	0.0000
333291 Paper industry machinery manufacturing	1.4550	0.3451	6.6909	1.5003	1.6511
333292 Textile machinery manufacturing	1.4635	0.3761	8.6406	1.4589	1.4744
333293 Printing machinery and equipment manufacturing	1.4380	0.3639	7.2007	1.4712	1.6103
333294 Food product machinery manufacturing	1.4918	0.3725	7.6557	1.5053	1.6130
333295 Semiconductor machinery manufacturing	1.5217	0.2831	6.2345	1.8712	1.9848
333298 All other industrial machinery manufacturing	1.5379	0.3720	7.4149	1.5441	1.6796
33331A Automatic vending, commercial laundry and drycleaning machinery	1.5858	0.3150	7.6004	1.7214	1.6790
333313 Office machinery manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
333314 Optical instrument and lens manufacturing	1.4716	0.3741	7.4682	1.4517	1.5560
333315 Photographic and photocopying equipment manufacturing	1.5327	0.2713	5.7072	1.9371	2.1994
333319 Other commercial and service industry machinery manufacturing	1.5510	0.3460	7.3834	1.6034	1.6737
333411 Air purification equipment manufacturing	1.4831	0.3306	8.5567	1.5091	1.4220
333412 Industrial and commercial fan and blower manufacturing	1.4495	0.3340	8.0699	1.4663	1.4316
333414 Heating equipment, except warm air furnaces	1.3937	0.2959	8.0427	1.4595	1.3689
333415 AC, refrigeration, and forced air heating	1.6307	0.3090	6.9948	1.8943	1.9299
333511 Industrial mold manufacturing	1.3914	0.5048	11.1575	1.2563	1.2809
333512 Metal cutting machine tool manufacturing	1.4185	0.3560	8.3335	1.4569	1.4426
333513 Metal forming machine tool manufacturing	1.3804	0.3700	7.7892	1.3701	1.4160
333514 Special tool, die, jig, and fixture manufacturing	1.3769	0.4857	11.0504	1.2700	1.2721
333515 Cutting tool and machine tool accessory manufacturing	1.3920	0.4064	8.4849	1.3228	1.3669
33351A Rolling mill and other metalworking machinery	1.3884	0.3504	6.5217	1.4127	1.5640
333611 Turbine and turbine generator set units manufacturing	1.4732	0.2802	5.4931	1.7292	1.9901
33361A Speed changers and mechanical power transmission equipment	1.4059	0.3453	7.8408	1.4264	1.4319
333618 Other engine equipment manufacturing	1.6390	0.2813	6.5665	2.2287	2.1663
333911 Pump and pumping equipment manufacturing	1.5070	0.3390	6.4993	1.6054	1.8192
333912 Air and gas compressor manufacturing	1.4734	0.2955	6.6069	1.6703	1.7091
333913 Measuring and dispensing pump manufacturing	1.5310	0.3250	8.2684	1.7231	1.6425
333921 Elevator and moving stairway manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
333922 Conveyor and conveying equipment manufacturing	1.4460	0.3590	7.5005	1.4365	1.4967
333923 Overhead cranes, hoists, and monorail systems	1.5694	0.3141	6.9417	1.7514	1.8014
333924 Industrial truck, trailer, and stacker manufacturing	1.6509	0.3255	7.5424	1.9456	1.8935
333991 Power-driven handtool manufacturing	1.4691	0.2670	5.5226	1.7636	2.0242
333992 Welding and soldering equipment manufacturing	1.5245	0.3242	7.6833	1.5833	1.5413
333993 Packaging machinery manufacturing	1.3775	0.3635	6.9764	1.3697	1.4619
333994 Industrial process furnace and oven manufacturing	1.3998	0.3321	6.8818	1.4408	1.5050
333995 Fluid power cylinder and actuator manufacturing	1.4021	0.3579	8.3017	1.4135	1.4111

(Continued)

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RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
333996 Fluid power pump and motor manufacturing	1.4625	0.3526	6.7653	1.5410	1.7105
33399A Scales, balances, and miscellaneous general purpose machinery	1.4739	0.3619	7.9821	1.4834	1.5178
334111 Electronic computer manufacturing	1.4693	0.2174	4.0967	2.1720	2.6007
334112 Computer storage device manufacturing	1.3020	0.2308	3.5758	1.5351	1.9631
334113 Computer terminal manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
334119 Other computer peripheral equipment manufacturing	1.5405	0.3365	5.4820	1.6948	2.2388
334210 Telephone apparatus manufacturing	1.3441	0.2386	4.0198	1.5887	2.0103
334220 Broadcast and wireless communications equipment	1.3363	0.2857	3.8877	1.4417	2.0287
334290 Other communications equipment manufacturing	1.4278	0.3502	6.6626	1.4673	1.6354
334300 Audio and video equipment manufacturing	1.5336	0.2574	5.4805	2.0547	2.3450
334411 Electron tube manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
334413 Semiconductors and related device manufacturing	1.2564	0.2144	3.8343	1.5374	1.7849
33441A All other electronic component manufacturing	1.4338	0.3298	7.7335	1.5018	1.4949
334510 Electromedical apparatus manufacturing	1.4320	0.3613	5.7549	1.4314	1.7435
334511 Search, detection, and navigation instruments	1.3098	0.4182	7.9105	1.2585	1.3342
334512 Automatic environmental control manufacturing	1.4134	0.3585	7.7977	1.4289	1.4684
334513 Industrial process variable instruments	1.4053	0.3914	8.3987	1.3971	1.4831
334514 Totalizing fluid meters and counting devices	1.0000	0.0000	0.0000	0.0000	0.0000
334515 Electricity and signal testing instruments	1.3290	0.3238	5.4823	1.3764	1.5770
334516 Analytical laboratory instrument manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
334517 Irradiation apparatus manufacturing	1.5113	0.3195	5.2545	1.6628	2.2711
33451A Watch, clock, and other measuring and controlling device manufacturing	1.4365	0.3973	7.5050	1.3952	1.5064
334611 Software reproducing	1.2200	0.3152	4.3431	1.1774	1.3334
334612 Audio and video media reproduction	1.3259	0.2914	7.4458	1.3588	1.3140
334613 Magnetic and optical recording media manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
335110 Electric lamp bulb and part manufacturing	1.5287	0.3009	6.1368	1.6595	1.7904
335120 Lighting fixture manufacturing	1.6177	0.3300	7.2229	1.8197	1.9065
335211 Electric housewares and household fan manufacturing	1.6332	0.2819	6.8418	2.0955	2.0313
335212 Household vacuum cleaner manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
335221 Household cooking appliance manufacturing	1.6710	0.2980	7.1937	2.1438	2.0909
335222 Household refrigerator and home freezer manufacturing	1.7589	0.3338	6.7453	1.9991	2.3393
335224 Household laundry equipment manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
335228 Other major household appliance manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
335311 Electric power and specialty transformer manufacturing	1.5715	0.3122	5.8720	1.7645	2.0814
335312 Motor and generator manufacturing	1.5603	0.3182	6.7279	1.7118	1.8186
335313 Switchgear and switchboard apparatus manufacturing	1.4120	0.3000	5.1817	1.5174	1.8053
335314 Relay and industrial control manufacturing	1.5531	0.3590	8.0622	1.6139	1.6214
335911 Storage battery manufacturing	1.4537	0.2923	5.5335	1.6140	1.8875
335912 Primary battery manufacturing	1.5712	0.2532	5.3951	2.1008	2.3537
335921 Fiber optic cable manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000

(Continued)

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SOURCE.--Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
335929 Other communication and energy wire manufacturing	1.7785	0.2720	6.1884	2.1531	2.1224
335930 Wiring device manufacturing	1.4637	0.3162	7.6705	1.5414	1.4901
335991 Carbon and graphite product manufacturing	1.3388	0.2670	4.8120	1.4686	1.6960
335999 Miscellaneous electrical equipment manufacturing	1.5568	0.3561	6.8080	1.6165	1.8122
336110 Automobile and light truck manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
336120 Heavy duty truck manufacturing	1.9541	0.2958	5.9972	3.1191	3.9031
336211 Motor vehicle body manufacturing	1.8481	0.3334	7.1554	2.2678	2.4649
336212 Truck trailer manufacturing	1.8514	0.3402	7.8910	2.1082	2.0691
336213 Motor home manufacturing	1.8035	0.3053	6.6993	2.2867	2.4551
336214 Travel trailer and camper manufacturing	1.7026	0.3410	8.3433	1.8198	1.7503
336300 Motor vehicle parts manufacturing	1.6723	0.3433	6.9692	1.8667	2.0966
336411 Aircraft manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
336412 Aircraft engine and engine parts manufacturing	1.2582	0.2648	4.9805	1.3727	1.5076
336413 Other aircraft parts and equipment	1.4147	0.3972	7.2416	1.3821	1.5481
336414 Guided missile and space vehicle manufacturing	1.5212	0.3534	5.0662	1.7087	2.3991
33641A Propulsion units and parts for space vehicles and guided missiles	1.4369	0.4659	7.1522	1.3825	1.5597
336500 Railroad rolling stock manufacturing	1.5760	0.3020	6.2928	1.8730	1.9903
336611 Ship building and repairing	1.0000	0.0000	0.0000	0.0000	0.0000
336612 Boat building	1.6116	0.3176	7.3537	1.6584	1.6708
336991 Motorcycle, bicycle, and parts manufacturing	1.6007	0.3254	6.6193	1.8085	1.9699
336992 Military armored vehicles and tank parts manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
336999 All other transportation equipment manufacturing	1.7064	0.2682	5.4638	2.3148	2.7806
337110 Wood kitchen cabinet and countertop manufacturing	1.5741	0.3699	11.7447	1.5004	1.3750
337121 Upholstered household furniture manufacturing	1.8809	0.4159	12.5796	1.7805	1.6220
337122 Nonupholstered wood household furniture manufacturing	1.6129	0.3715	12.7963	1.5490	1.3521
337124 Metal household furniture manufacturing	1.5355	0.3249	10.5262	1.5453	1.3634
337127 Institutional furniture manufacturing	1.4823	0.3342	9.5674	1.4762	1.3894
33712A Other household and institutional furniture	1.6916	0.3544	10.9068	1.6153	1.4051
337211 Wood office furniture manufacturing	1.5395	0.3635	10.2018	1.4863	1.4116
337212 Custom architectural woodwork and millwork	1.3895	0.4124	11.5109	1.2726	1.2417
337214 Office furniture, except wood, manufacturing	1.5329	0.3116	7.7681	1.6033	1.5907
337215 Showcases, partitions, shelving, and lockers	1.4974	0.3668	10.1652	1.4148	1.3475
337910 Mattress manufacturing	1.8125	0.3270	9.0307	2.1454	1.9860
337920 Blind and shade manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
339111 Laboratory apparatus and furniture manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
339112 Surgical and medical instrument manufacturing	1.3858	0.3269	5.3401	1.4120	1.7150
339113 Surgical appliance and supplies manufacturing	1.4282	0.3065	5.3036	1.4912	1.7742
339114 Dental equipment and supplies manufacturing	1.3690	0.3361	6.6709	1.3909	1.4640
339115 Ophthalmic goods manufacturing	1.4133	0.3416	6.6960	1.4343	1.5884
339116 Dental laboratories	1.2997	0.4212	9.1216	1.2276	1.2449
339910 Jewelry and silverware manufacturing	1.3572	0.2794	7.0931	1.5089	1.4714

(Continued)

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RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
339920 Sporting and athletic goods manufacturing	1.7130	0.3418	7.3294	1.8935	2.1234
339930 Doll, toy, and game manufacturing	1.5827	0.3056	6.1660	1.6668	1.8871
339940 Office supplies, except paper, manufacturing	1.4383	0.2825	5.6918	1.5247	1.6675
339950 Sign manufacturing	1.5934	0.4298	8.9886	1.4314	1.5356
339991 Gasket, packing, and sealing device manufacturing	1.5275	0.3623	6.6108	1.4231	1.5999
339992 Musical instrument manufacturing	1.4504	0.3857	8.0799	1.4093	1.5153
339994 Broom, brush, and mop manufacturing	1.0000	0.0000	0.0000	0.0000	0.0000
339995 Burial casket manufacturing	1.3729	0.2463	5.1496	1.4783	1.5960
33999A Buttons, pins, and all other miscellaneous manufacturing	1.5920	0.3544	7.8774	1.5694	1.6373
420000 Wholesale trade	1.2804	0.3845	7.9518	1.2635	1.3978
4A0000 Retail trade	1.3094	0.4071	16.8086	1.2637	1.1616
481000 Air transportation	1.3072	0.3556	7.6911	1.3721	1.7963
482000 Rail transportation	1.3688	0.3525	6.0789	1.3824	1.6354
483000 Water transportation	1.4547	0.2792	6.0674	1.9435	2.2036
484000 Truck transportation	1.4991	0.3815	10.3981	1.5449	1.5127
485A00 Transit and ground passenger transportation	1.3983	0.5075	29.6267	1.2847	1.1032
486000 Pipeline transportation	1.4351	0.3705	6.9165	1.5818	2.2214
48A000 Scenic and sightseeing transportation and support activities for transportation	1.3794	0.4748	10.0399	1.3313	1.4114
492000 Couriers and messengers	1.2519	0.4164	12.9875	1.2074	1.1971
493000 Warehousing and storage	1.2513	0.5216	15.1350	1.1341	1.1343
511110 Newspaper publishers	1.3125	0.4315	12.7837	1.2186	1.1566
511120 Periodical publishers	1.3757	0.3433	7.4694	1.3941	1.4359
511130 Book publishers	1.2928	0.2786	6.1271	1.4104	1.5281
5111A0 Database, directory, and other publishers	1.2638	0.2737	6.0208	1.3405	1.3954
511200 Software publishers	1.2235	0.4178	6.2755	1.2016	1.5554
512100 Motion picture and video industries	1.2459	0.3216	9.1322	1.2579	1.2473
512200 Sound recording industries	1.2615	0.2145	5.3500	1.5111	1.6157
513100 Radio and television broadcasting	1.3108	0.3766	6.0026	1.3003	1.4479
513200 Cable networks and program distribution	1.3590	0.3035	5.6212	1.4139	1.5606
513300 Telecommunications	1.3153	0.2944	5.3756	1.4135	1.6327
514100 Information services	1.2829	0.6093	12.8875	1.1540	1.2407
514200 Data processing services	1.2418	0.5474	9.6626	1.1613	1.3233
52A000 Monetary authorities and depository credit intermediation	1.1745	0.2654	6.1287	1.2477	1.3476
522A00 Nondepository credit intermediation and related activities	1.2371	0.2874	5.7119	1.3435	1.6252
523000 Securities, commodity contracts, investments	1.2163	0.4998	9.8507	1.1647	1.2302
524100 Insurance carriers	1.4017	0.3584	7.2010	1.4712	1.5215
524200 Insurance agencies, brokerages, and related	1.1571	0.3709	7.7125	1.1503	1.1917
525000 Funds, trusts, and other financial vehicles	1.2827	0.2051	4.0317	1.9617	2.1848
531000 Real estate	1.2648	0.1731	6.3150	1.7151	1.5877
S00800 Owner-occupied dwellings	1.1883	0.0461	1.2643	0.0000	0.0000

(Continued)

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INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
532100 Automotive equipment rental and leasing	1.2541	0.2148	5.7516	1.4987	1.6221
532A00 General and consumer goods rental except video tapes and discs	1.2354	0.3432	8.8318	1.2523	1.3245
532230 Video tape and disc rental	1.2584	0.2536	13.8883	1.2796	1.1247
532400 Machinery and equipment rental and leasing	1.2056	0.2322	4.9923	1.3483	1.5934
533000 Lessors of nonfinancial intangible assets	1.0163	0.0955	1.3717	1.0514	1.1083
541100 Legal services	1.1908	0.5932	9.3388	1.1098	1.2269
541200 Accounting and bookkeeping services	1.1898	0.5933	17.2567	1.1073	1.1176
541300 Architectural and engineering services	1.2255	0.5133	11.7706	1.1811	1.2646
541400 Specialized design services	1.2654	0.4523	20.9986	1.2279	1.1393
541511 Custom computer programming services	1.1898	0.5954	10.3266	1.1164	1.2649
541512 Computer systems design services	1.2223	0.6092	10.8718	1.1422	1.3196
54151A Other computer related services, including facilities management	1.2917	0.3662	8.0458	1.3313	1.5633
541610 Management consulting services	1.2226	0.5772	15.1495	1.1355	1.1994
5416A0 Environmental and other technical consulting services	1.2118	0.4801	13.4061	1.1709	1.2104
541700 Scientific research and development services	1.3119	0.5586	10.5098	1.1861	1.3195
541800 Advertising and related services	1.2363	0.4061	9.1102	1.2104	1.3182
541920 Photographic services	1.2567	0.4436	9.6127	1.1974	1.3166
541940 Veterinary services	1.4045	0.5114	10.4726	1.2619	1.3915
5419A0 All other miscellaneous professional and technical services	1.1650	0.2254	3.9688	1.3069	1.7283
550000 Management of companies and enterprises	1.2386	0.4628	7.4424	1.1656	1.2624
561300 Employment services	1.0605	0.5329	28.3209	1.0387	1.0222
561500 Travel arrangement and reservation services	1.3579	0.4717	13.2155	1.3048	1.2942
561100 Office administrative services	1.2137	0.5091	11.4081	1.1672	1.2809
561200 Facilities support services	1.1559	0.4898	16.1360	1.1165	1.1225
561400 Business support services	1.2220	0.3983	14.3383	1.2090	1.1826
561600 Investigation and security services	1.1428	0.5581	27.5503	1.0879	1.0551
561700 Services to buildings and dwellings	1.3319	0.4465	23.0365	1.2789	1.1672
561900 Other support services	1.2591	0.3547	12.1031	1.2627	1.2282
562000 Waste management and remediation services	1.4010	0.3894	10.2763	1.3965	1.4299
611100 Elementary and secondary schools	1.3431	0.5472	24.6175	1.1783	1.1186
611A00 Colleges, universities, and junior colleges	1.3380	0.5491	19.0135	1.1689	1.1552
611B00 Other educational services	1.2968	0.3771	16.9283	1.3032	1.1995
621A00 Offices of physicians, dentists, and other health practitioners	1.2114	0.5768	10.4256	1.1248	1.2244
621600 Home health care services	1.2320	0.5853	19.9704	1.1301	1.1216
621B00 Other ambulatory health care services	1.3829	0.5162	13.2044	1.2763	1.3390
622000 Hospitals	1.3452	0.5224	13.6569	1.2182	1.2650
623000 Nursing and residential care facilities	1.3169	0.5874	25.1860	1.1723	1.1510
624400 Child day care services	1.3332	0.4316	36.4991	1.2328	1.0752
624A00 Social assistance, except child day care services	1.3768	0.5348	28.2193	1.2227	1.1109
711100 Performing arts companies	1.2240	0.4735	31.1952	1.1577	1.0763
711200 Spectator sports	1.1660	0.5834	16.6999	1.0915	1.1042

(Continued)

Region Definition: Blount, AL; Cherokee, AL; Cullman, AL; DeKalb, AL; Etowah, AL; Jackson, AL; Limestone, AL; Madison, AL; Marshall, AL; Morgan, AL; Catoosa, GA; Chattooga, GA; Dade, GA; Floyd, GA; Gordon, GA; Walker, GA; Whitfield, GA; Coffee, TN; Franklin, TN; Grundy, TN; Hamilton, TN; Lincoln, TN; Marion, TN; Moore, TN; Sequatchie, TN

*Includes Government enterprises.

1. Each entry in column 1 represents the total dollar change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.
2. Each entry in column 2 represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.
3. Each entry in column 3 represents the total change in number of jobs that occurs in all industries for each additional 1 million dollars of output delivered to final demand by the industry corresponding to the entry. Because the employment multipliers are based on 2004 data, the output delivered to final demand should be in 2004 dollars.
4. Each entry in column 4 represents the total dollar change in earnings of households employed by all industries for each additional dollar of earnings paid directly to households employed by the industry corresponding to the entry.
5. Each entry in column 5 represents the total change in number of jobs in all industries for each additional job in the industry corresponding to the entry.

NOTE.--Multipliers are based on the 1997 Benchmark Input-Output Table for the Nation and 2004 regional data. Appendix B identifies the industries corresponding to the entries.

SOURCE.--Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

RIMS II Multipliers (1997/2004)

Table 1.4 Total Multipliers for Output, Earnings, and Employment by Detailed Industry
Bellefonte (EXOGENOUS)

INDUSTRY	Multiplier				
	Final Demand			Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Earnings/4/ (dollars)	Employment/5/ (jobs)
711A00 Promoters of performing arts and sports and agents for public figures	1.1933	0.4074	25.5024	1.1687	1.0937
711500 Independent artists, writers, and performers	1.3175	0.4475	12.8746	1.2646	1.4003
712000 Museums, historical sites, zoos, and parks	1.4358	0.4799	15.9020	1.3280	1.3165
713940 Fitness and recreational sports centers	1.3533	0.4865	30.7208	1.2146	1.0859
713950 Bowling centers	1.3158	0.4561	30.3655	1.2078	1.0763
713A00 Other amusement, gambling, and recreation industries	1.2671	0.4625	23.6304	1.1771	1.0893
7211A0 Hotels and motels, including casino hotels	1.2378	0.4123	17.5930	1.1769	1.1085
721A00 Other accommodations	1.3408	0.3120	14.0977	1.3862	1.2170
722000 Food services and drinking places	1.3781	0.4610	31.5644	1.2163	1.0780
8111A0 Automotive repair and maintenance, except car washes	1.5244	0.4094	15.8437	1.4439	1.2683
811192 Car washes	1.2346	0.3709	30.4310	1.2086	1.0655
811200 Electronic equipment repair and maintenance	1.2548	0.4737	14.4829	1.1650	1.1500
811300 Commercial machinery repair and maintenance	1.2401	0.4213	13.2143	1.1736	1.1496
811400 Household goods repair and maintenance	1.2623	0.3292	14.7330	1.2654	1.1614
812100 Personal care services	1.2630	0.4343	24.6983	1.1915	1.1005
812200 Death care services	1.4144	0.4103	15.4066	1.3184	1.2077
812300 Drycleaning and laundry services	1.2955	0.4490	22.0734	1.2025	1.1128
812900 Other personal services	1.3130	0.2235	9.5004	1.5743	1.3301
813100 Religious organizations	1.1970	0.5602	26.1335	1.0839	1.0531
813A00 Grantmaking and giving and social advocacy organizations	1.4224	0.4651	16.8205	1.3978	1.3403
813B00 Civic, social, professional and similar organizations	1.4632	0.4946	20.9430	1.3344	1.2006
491000 Postal service	1.1547	0.5545	10.8607	1.0802	1.1294
S00A00 Other government enterprises	1.4640	0.3602	9.6354	1.5429	1.4978
H00000 Households	0.0000	0.0000	0.0000	0.0000	0.0000

Region Definition: Blount, AL; Cherokee, AL; Cullman, AL; DeKalb, AL; Etowah, AL; Jackson, AL; Limestone, AL; Madison, AL; Marshall, AL; Morgan, AL; Catoosa, GA; Chattooga, GA; Dade, GA; Floyd, GA; Gordon, GA; Walker, GA; Whitfield, GA; Coffee, TN; Franklin, TN; Grundy, TN; Hamilton, TN; Lincoln, TN; Marion, TN; Moore, TN; Sequatchie, TN

*Includes Government enterprises.

1. Each entry in column 1 represents the total dollar change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

2. Each entry in column 2 represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

3. Each entry in column 3 represents the total change in number of jobs that occurs in all industries for each additional 1 million dollars of output delivered to final demand by the industry corresponding to the entry. Because the employment multipliers are based on 2004 data, the output delivered to final demand should be in 2004 dollars.

4. Each entry in column 4 represents the total dollar change in earnings of households employed by all industries for each additional dollar of earnings paid directly to households employed by the industry corresponding to the entry.

5. Each entry in column 5 represents the total change in number of jobs in all industries for each additional job in the industry corresponding to the entry.

NOTE.--Multipliers are based on the 1997 Benchmark Input-Output Table for the Nation and 2004 regional data. Appendix B identifies the industries corresponding to the entries.

SOURCE.--Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis.

U.S. Census Bureau

State & County QuickFacts
Jackson County, Alabama

Website,
http://quickfacts.census.gov/qfd/states/01/01071.html
(2 pages: website data sheets)

(Accessed January 5, 2007)

ATTACHMENT 4.4.2-7A

U.S. Census Bureau

State & County QuickFacts

Jackson County, Alabama

People QuickFacts	Jackson County	Alabama
Population, 2005 estimate	53,650	4,557,808
Population, percent change, April 1, 2000 to July 1, 2005	-0.5%	2.5%
Population, 2000	53,926	4,447,100
Population, percent change, 1990 to 2000	12.8%	10.1%
Persons under 5 years old, percent, 2004	5.8%	6.5%
Persons under 18 years old, percent, 2004	22.8%	24.2%
Persons 65 years old and over, percent, 2004	14.5%	13.2%
Female persons, percent, 2004	51.1%	51.5%
White persons, percent, 2004 (a)	92.5%	71.4%
Black persons, percent, 2004 (a)	3.8%	26.4%
American Indian and Alaska Native persons, percent, 2004 (a)	1.7%	0.5%
Asian persons, percent, 2004 (a)	0.3%	0.8%
Native Hawaiian and Other Pacific Islander, percent, 2004 (a)	0.0%	0.0%
Persons reporting two or more races, percent, 2004	1.8%	0.9%
Persons of Hispanic or Latino origin, percent, 2004 (b)	1.6%	2.2%
White persons, not Hispanic, percent, 2004	91.0%	69.5%
Living in same house in 1995 and 2000, pct age 5+, 2000	61.6%	57.4%
Foreign born persons, percent, 2000	0.7%	2.0%
Language other than English spoken at home, pct age 5+, 2000	2.1%	3.9%
High school graduates, percent of persons age 25+, 2000	67.0%	75.3%
Bachelor's degree or higher, pct of persons age 25+, 2000	10.4%	19.0%
Persons with a disability, age 5+, 2000	11,842	945,705
Mean travel time to work (minutes), workers age 16+, 2000	27.0	24.8
Housing units, 2004	24,890	2,058,951
Homeownership rate, 2000	77.9%	72.5%
Housing units in multi-unit structures, percent, 2000	7.1%	15.3%
Median value of owner-occupied housing units, 2000	$72,400	$85,100
Households, 2000	21,615	1,737,080
Persons per household, 2000	2.47	2.49
Per capita money income, 1999	$16,000	$18,189
Median household income, 2003	$33,036	$36,131

ATTACHMENT 4.4.2-7A

Persons below poverty, percent, 2003	14.5%	15.2%

Business QuickFacts	Jackson County	Alabama
Private nonfarm establishments, 2003	878	99,838[1]
Private nonfarm employment, 2003	12,915	1,597,529[1]
Private nonfarm employment, percent change 2000-2003	-12.7%	-3.4%[1]
Nonemployer establishments, 2003	3,224	253,759
Manufacturers shipments, 2002 ($1000)	1,408,841	66,686,220
Retail sales, 2002 ($1000)	353,987	43,784,342
Retail sales per capita, 2002	$6,564	$9,771
Minority-owned firms, percent of total, 1997	5.1%	9.9%
Women-owned firms, percent of total, 1997	25.7%	24.4%
Housing units authorized by building permits, 2004	59	27,411
Federal spending, 2004 ($1000)	554,885	39,047,473[1]

Geography QuickFacts	Jackson County	Alabama
Land area, 2000 (square miles)	1,079	50,744
Persons per square mile, 2000	50.0	87.6
FIPS Code	071	01
Metropolitan or Micropolitan Statistical Area	Scottsboro, AL Micro Area	

1: Includes data not distributed by county.

|

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

FN: Footnote on this item for this area in place of data
NA: Not available
D: Suppressed to avoid disclosure of confidential information
X: Not applicable
S: Suppressed; does not meet publication standards
Z: Value greater than zero but less than half unit of measure shown
F: Fewer than 100 firms

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, 2000 Census of Population and Housing, 1990 Census of Population and Housing, Small Area Income and Poverty Estimates, County Business Patterns, 1997 Economic Census, Minority- and Women-Owned Business, Building Permits, Consolidated Federal Funds Report, 1997 Census of Governments

Last Revised: Thursday, 08-Jun-2006 09:29:38 EDT

ATTACHMENT 4.4.2-7B
U.S. DEPARTMENT OF EDUCATION
NATIONAL CENTER FOR EDUCATION STATISTICS
SEARCH FOR PUBLIC SCHOOL DISTRICTS – JACKSON COUNTY, ALABAMA
WEBSITE ACCESSED NOVEMBER 9, 2006

U.S. Department of Education
National Center for Education Statistics

Search for Public School Districts
District Detail for Jackson County
Website,
http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01
(3 pages: website data sheets)

(Accessed November 9, 2006)

ATTACHMENT 4.4.2-7B

ies NATIONAL CENTER FOR EDUCATION STATISTICS

Search for Public School Districts

CCD Common Core of Data

District Information | Search Results | Modify Search | Data Notes/Grant IDs | Help

District Name:
Jackson Co
schools for this district

County:
Jackson

County ID:
01071

Mailing Address:
P O Box 490
Scottsboro, AL 35768-0490

Physical Address:
16003 Al Highway 35
Scottsboro, AL 35768-0490

Phone:
(256) 259-9500

NCES District ID:
0101830

State District ID:
036

District Details

Characteristics

Show Less

Grade Span: (grades PK - 12)
PK KG 1 2 3 4 5 6 7 8 9 10 11 12

Total Schools:	19
Total Students:	5,987
Classroom Teachers (FTE):	478.0
Student/Teacher Ratio:	12.5
Summer Migrant Students:	0
ELL (formerly LEP) Students:	53
Students with IEPs:	566

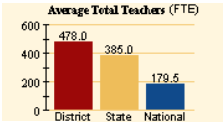
Type: Regular School District
Locale/Code: Rural, outside CBSA / 7
Status: No Boundary Change

Metro Status: Non MSA - Does not serve an MSA

CSA/CBSA:
42460

Supervisory Union #:
000

Staff



Teachers (FTE)

Total:	**478.0**
Prekindergarten:	3.5
Kindergarten:	53.5
Elementary:	282.0
Secondary:	139.0
Ungraded:	N/A

Total Staff (FTE): 864.0

Other Staff (FTE)

Total:	**386.0**
Instructional Aides:	14.0
Instruc. Coordinators & Supervisors:	6.0
Total Guidance Counselors:	12.5
Elementary Guidance Counselors:	5.5
Secondary Guidance Counselors:	7.0
Librarians/Media Specialists:	14.0
Library/Media Support:	0.0
District Administrators:	5.0
District Administrative Support:	10.0
School Administrators:	22.0
School Administrative Support:	20.0
Student Support Services:	42.1
Other Support Services:	240.4

ATTACHMENT 4.4.2-7B

Fiscal

	Amount	Amount per Student	Percent
Total Revenue:	$44,018,000	$7,285	
Revenue by Source			
Federal:	$4,924,000	$815	11%
Local:	$12,015,000	$1,989	27%
State:	$27,079,000	$4,482	62%
Total Expenditures:	$45,168,000	$7,476	
Total Current Expenditures:	$40,692,000	$6,735	
Instructional Expenditures:	$23,146,000	$3,831	57%
Student and Staff Support:	$2,969,000	$491	7%
Administration:	$4,128,000	$683	10%
Operations, Food Service, other:	$10,449,000	$1,729	26%
Total Capital Outlay:	$3,480,000	$576	
Construction:	$3,102,000	$513	
Total Non El-Sec Education & Other:	$0	$0	
Interest on Debt:	$47,000	$8	

Note: Details do not add to totals due to rounding.
Note: Fiscal data (including per pupil count used in this table) from 2003-2004.

ATTACHMENT 4.4.2-7B

Census

Total Population Under 18:	9,667
Hispanic or Latino:	136
Non Hispanic or Latino:	9,531
Population of one race:	9,358
White alone:	8,714
Black or African American alone:	363
American Indian or Alaska Native alone:	227
Asian alone:	14
Hawaiian or other Pacific Islander alone:	1
Some other race alone:	39
Population of two or more races:	309

Note: Census data from 2000.

Source: CCD public school district data for the 2004-2005 school year.
Note: "N/A" means the data are not available or not applicable.

National Center for Education Statistics
Office of Educational Research & Improvement, U.S. Dept. of Education
1990 K Street, NW, Washington, DC 20006, USA, Phone: (202) 502-7300

ATTACHMENT 4.4.2-7C
U.S. DEPARTMENT OF EDUCATION
NATIONAL CENTER FOR EDUCATION STATISTICS
SEARCH FOR PUBLIC SCHOOL DISTRICTS – SCOTTSBORO CITY, ALABAMA
WEBSITE ACCESSED NOVEMBER 9, 2006

U.S. Department of Education
National Center for Education Statistics

Search for Public School Districts
District Detail for Scottsboro City
Website,
http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=1&City=scottsboro&State=01
(3 pages: website data sheets)

(Accessed November 9, 2006.)

ATTACHMENT 4.4.2-7C

ies NATIONAL CENTER FOR EDUCATION STATISTICS

Search for Public School Districts

CCD Common Core of Data

District Information | Search Results | Modify Search | Data Notes/Grant IDs | Help

District Name:
Scottsboro City
schools for this district

County:
Jackson

County ID:
01071

Mailing Address:
906 S Scott St
Scottsboro, AL 35768-2642

Physical Address:
906 S Scott Street
Scottsboro, AL 35768-2642

Phone:
(256) 218-2100

NCES District ID:
0102940

State District ID:
190

District Details

Characteristics

Show Less

Grade Span: (grades KG - 12)
KG 1 2 3 4 5 6 7 8 9 10 11 12

Total Schools:	6
Total Students:	2,747
Classroom Teachers (FTE):	202.9
Student/Teacher Ratio:	13.5
Summer Migrant Students:	0
ELL (formerly LEP) Students:	53
Students with IEPs:	348

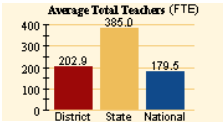
Type: Regular School District
Locale/Code: Small Town / 6
Status: No Boundary Change

Metro Status: Non MSA - Does not serve an MSA

CSA/CBSA:
42460

Supervisory Union #:
000

Staff



Teachers (FTE)

Total:	**202.9**
Prekindergarten:	2.0
Kindergarten:	29.1
Elementary:	120.3
Secondary:	51.5
Ungraded:	N/A

Total Staff (FTE): 424.2

Other Staff (FTE)

Total:	**221.3**
Instructional Aides:	26.0
Instruc. Coordinators & Supervisors:	8.5
Total Guidance Counselors:	7.4
Elementary Guidance Counselors:	4.0
Secondary Guidance Counselors:	3.4
Librarians/Media Specialists:	6.0
Library/Media Support:	5.0
District Administrators:	16.0
District Administrative Support:	14.6
School Administrators:	20.3
School Administrative Support:	17.6
Student Support Services:	4.9
Other Support Services:	95.0

ATTACHMENT 4.4.2-7C

Fiscal

	Amount	Amount per Student	Percent
Total Revenue:	$22,590,000	$8,197	
Revenue by Source			
Federal:	$2,010,000	$729	9%
Local:	$8,904,000	$3,231	39%
State:	$11,676,000	$4,237	52%
Total Expenditures:	$20,786,000	$7,542	
Total Current Expenditures:	$19,274,000	$6,993	
Instructional Expenditures:	$11,154,000	$4,047	58%
Student and Staff Support:	$1,664,000	$604	9%
Administration:	$1,910,000	$693	10%
Operations, Food Service, other:	$4,546,000	$1,649	24%
Total Capital Outlay:	$316,000	$115	
Construction:	$32,000	$12	
Total Non El-Sec Education & Other:	$0	$0	
Interest on Debt:	$830,000	$301	

Note: Details do not add to totals due to rounding.
Note: Fiscal data (including per pupil count used in this table) from 2003-2004.

ATTACHMENT 4.4.2-7C

Census

Total Population Under 18:	3,369
Hispanic or Latino:	87
Non Hispanic or Latino:	3,282
Population of one race:	3,288
White alone:	2,963
Black or African American alone:	239
American Indian or Alaska Native alone:	42
Asian alone:	17
Hawaiian or other Pacific Islander alone:	0
Some other race alone:	27
Population of two or more races:	81

Note: Census data from 2000.

Source: CCD public school district data for the 2004-2005 school year.
Note: "N/A" means the data are not available or not applicable.

National Center for Education Statistics
Office of Educational Research & Improvement, U.S. Dept. of Education
1990 K Street, NW, Washington, DC 20006, USA, Phone: (202) 502-7300

ATTACHMENT 4.4.2-7C
U.S. DEPARTMENT OF EDUCATION
NATIONAL CENTER FOR EDUCATION STATISTICS
SEARCH FOR PUBLIC SCHOOL DISTRICTS – SCOTTSBORO CITY, ALABAMA
WEBSITE ACCESSED NOVEMBER 9, 2006

ATTACHMENT 4.4.2-7C

ies NATIONAL CENTER FOR EDUCATION STATISTICS

Search for Public School Districts

CCD Common Core of Data

District Information | Search Results | Modify Search | Data Notes/Grant IDs | Help

District Name:
Scottsboro City
schools for this district

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Phone:
(256) 218-2100

NCES District ID:
0102940

State District ID:
190

District Details

Characteristics

Show Less

Grade Span: (grades KG - 12)
KG 1 2 3 4 5 6 7 8 9 10 11 12

Total Schools:	6
Total Students:	2,747
Classroom Teachers (FTE):	202.9
Student/Teacher Ratio:	13.5
Summer Migrant Students:	0
ELL (formerly LEP) Students:	53
Students with IEPs:	348

Type: Regular School District
Locale/Code: Small Town / 6
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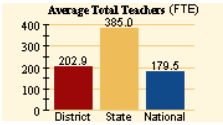
Staff



Teachers (FTE)

Total:	**202.9**
Prekindergarten:	2.0
Kindergarten:	29.1
Elementary:	120.3
Secondary:	51.5
Ungraded:	N/A

Total Staff (FTE): 424.2

Other Staff (FTE)

Total:	**221.3**
Instructional Aides:	26.0
Instruc. Coordinators & Supervisors:	8.5
Total Guidance Counselors:	7.4
Elementary Guidance Counselors:	4.0
Secondary Guidance Counselors:	3.4
Librarians/Media Specialists:	6.0
Library/Media Support:	5.0
District Administrators:	16.0
District Administrative Support:	14.6
School Administrators:	20.3
School Administrative Support:	17.6
Student Support Services:	4.9
Other Support Services:	95.0

ATTACHMENT 4.4.2-7C

Fiscal

	Amount	Amount per Student	Percent
Total Revenue:	$22,590,000	$8,197	
Revenue by Source			
Federal:	$2,010,000	$729	9%
Local:	$8,904,000	$3,231	39%
State:	$11,676,000	$4,237	52%
Total Expenditures:	$20,786,000	$7,542	
Total Current Expenditures:	$19,274,000	$6,993	
Instructional Expenditures:	$11,154,000	$4,047	58%
Student and Staff Support:	$1,664,000	$604	9%
Administration:	$1,910,000	$693	10%
Operations, Food Service, other:	$4,546,000	$1,649	24%
Total Capital Outlay:	$316,000	$115	
Construction:	$32,000	$12	
Total Non El-Sec Education & Other:	$0	$0	
Interest on Debt:	$830,000	$301	

Note: Details do not add to totals due to rounding.
Note: Fiscal data (including per pupil count used in this table) from 2003-2004.

ATTACHMENT 4.4.2-7C

Census

Total Population Under 18:	3,369
Hispanic or Latino:	87
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Population of one race:	3,288
White alone:	2,963
Black or African American alone:	239
American Indian or Alaska Native alone:	42
Asian alone:	17
Hawaiian or other Pacific Islander alone:	0
Some other race alone:	27
Population of two or more races:	81

Note: Census data from 2000.

Source: CCD public school district data for the 2004-2005 school year.
Note: "N/A" means the data are not available or not applicable.

National Center for Education Statistics
Office of Educational Research & Improvement, U.S. Dept. of Education
1990 K Street, NW, Washington, DC 20006, USA, Phone: (202) 502-7300

ATTACHMENT 4.4.2-7D
NATIONAL CENTER FOR EDUCATION STATISTICS
STATISTICAL ANALYSIS REPORT, CONDITION OF AMERICA'S PUBLIC SCHOOL FACILITIES: 1999
WEBSITE, HTTP://NCES.ED.GOV/PUBSEARCH/PUBSINFO.ASP?PUBID=2000032
ACCESSED JULY 31, 2008

National Center for Education Statistics, Statistical Analysis Report

Condition of America's Public School Facilities: 1999

Website,

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Title: **Condition of America's Public School Facilities: 1999**

Description: This report provides national data about the condition of public schools in 1999 based on a survey conducted by NCES using its Fast Response Survey System. This report provides information about the condition of school facilities and the costs to bring them into good condition; school plans for repairs, renovations, and replacements; the age of public schools; and overcrowding and practices used to address overcrowding.

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Facilities
Schools
- age of building

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Statistical Analysis Report **June 2000**

Condition of America's Public School Facilities: 1999

U.S. Department of Education
Office of Educational Research and Improvement NCES 2000-032

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Statistical Analysis Report **June 2000**

Condition of America's Public School Facilities: 1999

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table 8), this percentage also varied based upon the relationship between school enrollment and capacity (figure 9). Schools that were overcrowded were more likely than schools that were underenrolled or within 5 percent of their capacity to have at least one environmental feature in unsatisfactory condition (53 percent versus 41 percent and 39 percent, respectively). Thus, schools that were overcrowded were more likely to report facilities in less than adequate or unsatisfactory condition.

A closer examination of the adequacy of individual building features and satisfaction with individual environmental factors reveals the specifics of the poorer conditions of overcrowded schools compared with underenrolled schools and schools enrolled at their capacity, which tend to be similar to each other in condition. Among schools reporting at least one building feature to be in less than adequate condition, overcrowded schools reported significantly more features, on average, in less than adequate condition than did schools that were underenrolled (4.5 compared with 3.5; figure 10). Schools with at least one unsatisfactory environmental factor reported, on average, between 2.4 and 2.9 unsatisfactory features, which did not differ significantly from each other.

Regarding the adequacy of specific building features, for all features except roofs and plumbing, overcrowded schools were significantly more likely than underenrolled schools to report the feature as less than adequate (table 20). Overcrowded schools were also more likely than schools within 5 percent of their capacity to report framing, floors and foundations, heating, ventilation, and air conditioning, and electric power to be less than adequate. Thus, overcrowded schools are generally more likely than other schools, particularly underenrolled schools, to suffer from a number of inadequate building features.

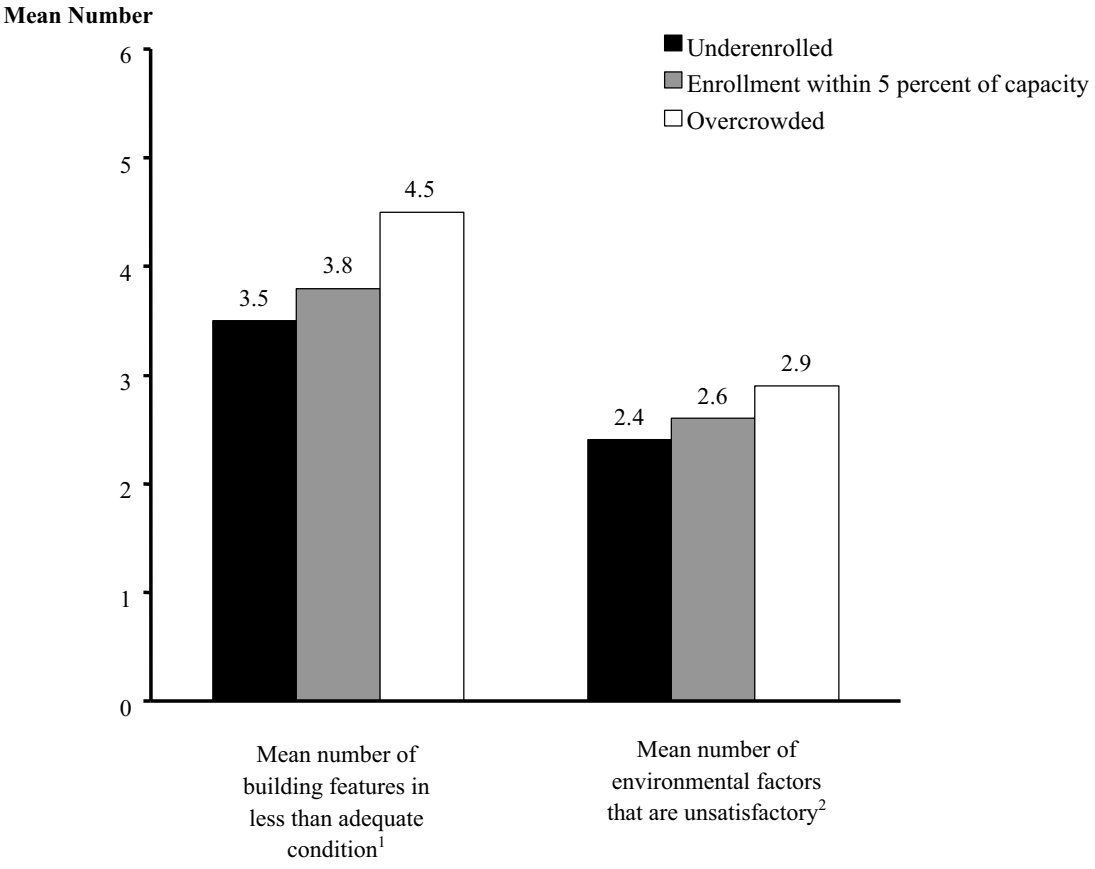
Although there were no significant differences in the mean number of unsatisfactory environmental factors based upon the enrollment to capacity ratio categories of the schools, overcrowded schools were more likely than other schools to report some environmental features as unsatisfactory (table 21). Overcrowded schools were more likely than either schools within 5 percent of their capacity and underenrolled schools to report unsatisfactory ventilation (38 percent compared with 24 and 23 percent). Overcrowded schools were also more likely than underenrolled schools to report unsatisfactory heating (25 percent versus 14 percent). Overcrowded schools were more likely than schools within 5 percent of their capacity to report unsatisfactory acoustics (25 percent versus 13 percent). The apparent differences between overcrowded and underenrolled schools in the likelihood of reporting unsatisfactory lighting, indoor air quality, or physical security based upon their enrollment to capacity ratio category were not statistically significant.

School Practices Used to Ease Overcrowding

Schools that suffer from overcrowding may utilize a number of strategies to ease the crowding. These strategies include modifying how physical structures are used, including investment in portable classrooms or using as classroom space rooms originally intended for noninstructional purposes. Other strategies utilize scheduling options, including staggered lunch schedules, year-round schedules, and split-day schedules. Because some of these practices may be used for purposes unrelated to overcrowding (e.g., providing additional instructional time or enrichment classes), respondents were asked to indicate whether the school used each practice, and if so, the extent to which the practice was used to ease overcrowding. The percentages of public schools nationwide that used each of these practices, and the extent to which the practice was used to alleviate overcrowding, are shown in table 22.

Among the most common of the practices used by schools were strategies based on how space is used. Overall, 36 percent of schools reported using portable classrooms, and 20 percent

Figure 10.—Mean number of building features in less than adequate condition and mean number of environmental factors that are unsatisfactory, by enrollment to capacity ratio category: 1999



[1]The condition of all building features is computed across nine building features (e.g., roofs, plumbing). Ratings of less than adequate encompass the ratings of fair, poor, and replace.

[2]The condition of all environmental factors is computed across six environmental factors (e.g., heating, ventilation). Ratings of unsatisfactory include the ratings of unsatisfactory and very unsatisfactory.

NOTE: "Underenrolled" indicates that the capacity of the permanent building(s) and instructional space is greater than student enrollment by more than 5 percent. "Overcrowded" indicates that the enrollment of the school is greater than the capacity of the permanent building(s) and instructional space by more than 5 percent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, Survey on the Condition of Public School Facilities, 1999.

Table 20. —Percent of public schools in each enrollment to capacity ratio category rating the condition of building features as less than adequate: 1999

Building feature	Underenrolled[1]	Enrollment within 5 percent of capacity	Overcrowded[2]
Roofs	20	22	29
Framing, floors, foundations	12	12	22
Exterior walls, finishes, windows, doors	20	23	33
Interior finishes, trim	13	18	26
Plumbing	22	25	32
Heating, ventilation, air conditioning	26	28	38
Electric power	18	19	32
Electrical lighting	14	16	28
Life safety features	18	18	28

[1] "Underenrolled" indicates that the capacity of the permanent building(s) and instructional space is greater than student enrollment by more than 5 percent.

[2] "Overcrowded" indicates that the enrollment of the school is greater than the capacity of the permanent building(s) and instructional space by more than 5 percent.

NOTE: Ratings of less than adequate encompass the ratings of fair, poor, and replace.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, Survey on the Condition of Public School Facilities, 1999.

Table 21. —Percent of public schools in each enrollment to capacity ratio category rating the condition of environmental factors as unsatisfactory: 1999

Environmental factor	Underenrolled[1]	Enrollment within 5 percent of capacity	Overcrowded[2]
Lighting	11	12	15
Heating	14	15	25
Ventilation	23	24	38
Indoor air quality	16	18	24
Acoustics or noise control	17	13	25
Physical security of buildings	17	20	25

[1] "Underenrolled" indicates that the capacity of the permanent building(s) and instructional space is greater than student enrollment by more than 5 percent.

[2] "Overcrowded" indicates that the enrollment of the school is greater than the capacity of the permanent building(s) and instructional space by more than 5 percent.

NOTE: Ratings of unsatisfactory include the ratings of unsatisfactory and very unsatisfactory.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, Survey on the Condition of Public School Facilities, 1999.

reported the creation of temporary instructional space (table 22).[45] This translates into about 28,600 schools using temporary classrooms, and 15,700 creating temporary instructional space (not shown in tables). For schools reporting the use of portable classrooms, about half (46 percent) reported doing so to a great extent in order to reduce overcrowding (table 22). Among schools reporting that they created temporary instructional space, one-quarter (26 percent) reported doing so to a great extent in order to reduce crowding, while 34 percent did so to a moderate extent to ease overcrowding, and 38 percent did so to a minor extent. Few schools used off-site instructional facilities (8 percent) or

[45] Nationally, about 6 percent of instructional rooms were in temporary structures, and about 3 percent of instructional rooms were originally designed to serve noninstructional purposes (not shown in tables).

used portable spaces other than for classroom purposes (9 percent). Among those schools that reported using the other space-related practices, about one-fifth of the schools did so to a great extent in order to reduce overcrowding.

Schools may also alter their schedules in order to reduce the number of students in a given space within the school at any given time. The most common of these scheduling practices was the use of staggered lunch schedules (74 percent). Of the schools using staggered lunch schedules, 45 percent reported doing so to a great extent in order to alleviate overcrowding, while 27 percent reported doing so to a moderate extent to ease overcrowding.[46] Very few schools utilized a year-round schedule (5 percent) or a split-day schedule (3 percent). Schools using a year-round schedule were nearly as likely to do so to ease overcrowding to a great extent (40 percent) as they were to do so for other purposes unrelated to crowding (36 percent).

Table 22.—Percent of public schools that report using various space and scheduling practices, and the extent to which the practice is used to alleviate overcrowding: 1999

Space or scheduling practice	School uses practice	Extent of use to alleviate overcrowding[1]			
		Great	Moderate	Minor	Not at all
Spaces used					
Use of portable classrooms	36	46	27	24	3
Creation of temporary instructional space (e.g., in cafeterias or gyms)	20	26	34	38	[2]2
Use of portables for other purposes, such as offices for administration and resource personnel	9	22	25	47	6
Use of off-site instructional facilities	8	20	26	33	20
Scheduling					
Staggered lunch schedules	74	45	27	15	13
Year-round schedule	5	40	12	[2]12	36
Split-day schedules	3	—	—	—	—

— Too few cases for a reliable estimate.

[1]Based on schools that use that practice. Percentages are computed across each row, but may not sum to 100 because of rounding.

[2] Coefficient of variation greater than 50 percent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, Survey on the Condition of Public School Facilities, 1999.

[46] Note also that the use of staggered lunch schedules may reflect limited capacity of the cafeteria, which may be somewhat independent of the capacity of the school as a whole.