

Affected Environment

nondetectable or their concentrations were not significantly higher than background concentration. The Baseline Risk Assessment for the Windblown Area concluded that these contaminated soils did not pose an unacceptable risk to the ecology *of the area*.

Iodine-129 was released during the fuel dissolution process at INTEC and was transported relatively long distances by atmospheric processes. Studies of vegetation and rabbit thyroids have reported levels of iodine-129 in excess of background concentrations out to 17 miles from INTEC. Iodine-129 has been detected above background concentrations in pronghorn tissues site-wide and as far offsite as Craters of the Moon National Monument and Monida Pass (Morris 1993).

4.10 Traffic and Transportation

This section discusses existing traffic volumes, transportation routes, transportation accidents, and waste and materials transportation at INEEL, including historical waste and materials transportation and baseline radiological exposures from waste and materials transportation. It also discusses noise levels at INEEL associated with the various modes of transportation. The information in this section has been summarized from Lehto (1993) and Anderson (1998) and is tiered from Volume 2 of the SNF & INEL EIS (DOE 1995).

4.10.1 ROADWAYS

4.10.1.1 Infrastructure – Regional and Site Systems

Table 4-22 shows the baseline traffic for several access routes based on the 1996 Rural Traffic Flow Map (State of Idaho 1996). The level of service of these segments is currently designated “free flow,” which is defined as “operation of vehicles is virtually unaffected by the presence of other vehicles.” The existing regional highway system is shown in Figure 4-18. Two interstate highways serve the regional area. Interstate 15, a north-south route that connects several cities along the Snake River, is approximately 25 miles east of INEEL. Interstate 86 intersects Interstate 15 approximately 40 miles south of INEEL and provides a primary linkage from Interstate 15 to points west. Interstate 15 and U.S. Highway 91 are the primary access routes to the Shoshone-Bannock reservation. U.S. Highways 20 and 26 are the main access routes to the southern portion of INEEL. Idaho State Routes 22, 28, and 33 pass through the northern portion of INEEL, with State Route 33 providing access to the northern INEEL facilities.

The INEEL contains an onsite road system of approximately 87 miles of paved surface, including about 18 miles of paved service roads that are closed to the public (DOE 1995). Most of the roads are adequate for the current level of normal transportation activity and could handle some increased traffic volume. The onsite road system at INEEL undergoes continuous maintenance.

Table 4-22. Baseline traffic for selected highway segments in the vicinity of the Idaho National Engineering and Environmental Laboratory.^a

Route	Average daily traffic	Peak hourly traffic ^b
U.S. Highway 20—Idaho Falls to INEEL	2,100	315
U.S. Highway 20/26—INEEL to Arco	1,900	285
U.S. Highway 26—Blackfoot to INEEL	1,400	210
State Route 33—west from Mud Lake	600	90
Interstate 15—Blackfoot to Idaho Falls	11,000	1,650

a. Source: State of Idaho (1996).
b. Estimated as 15 percent of average daily traffic.

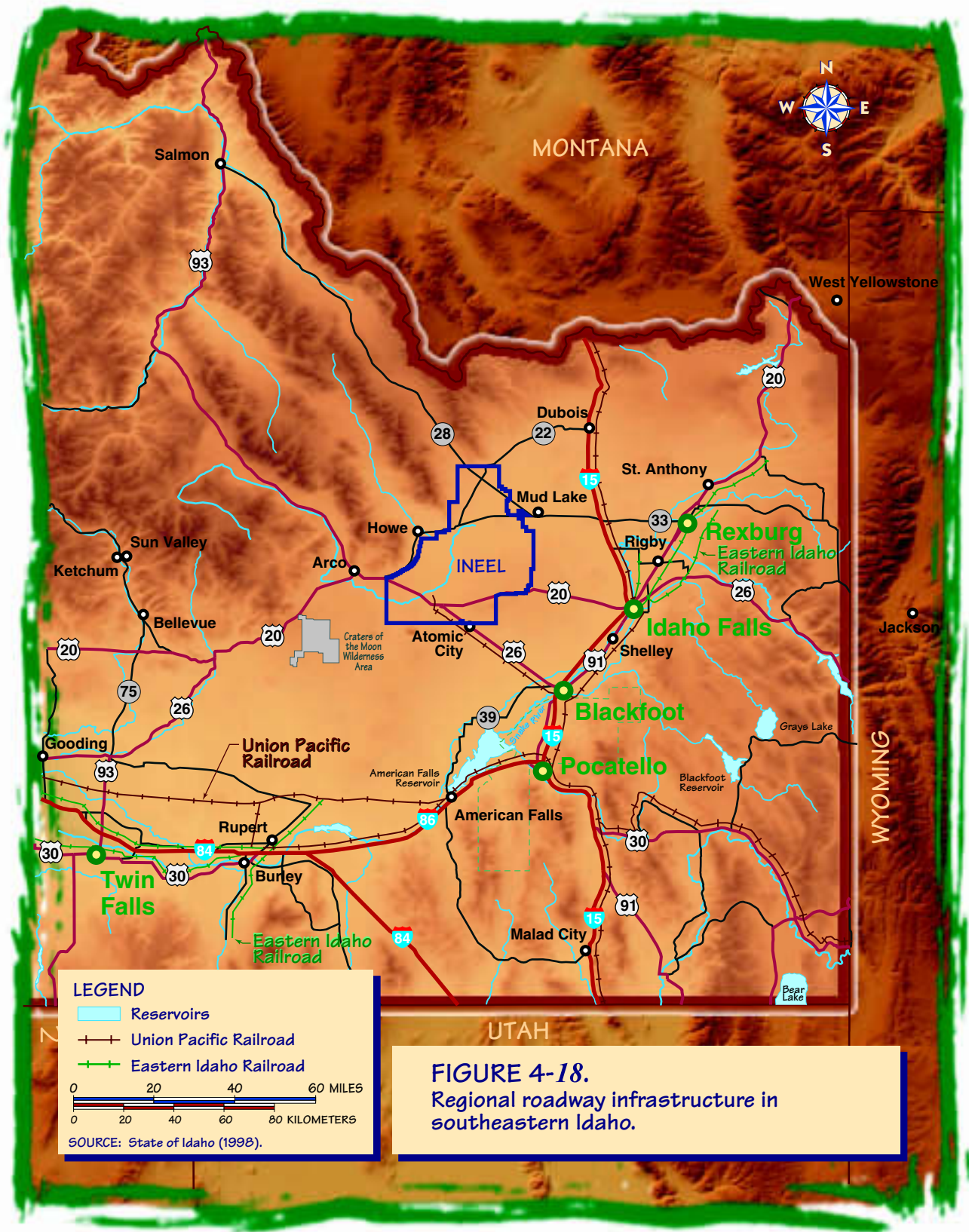


FIGURE 4-18.
Regional roadway infrastructure in southeastern Idaho.

4.10.1.2 Infrastructure – Idaho Falls

Approximately 4,000 DOE and DOE contractor personnel administer and support INEEL work through offices in Idaho Falls (DOE 1995). DOE shuttle vans provide hourly transport between in-town facilities. Currently, one of the busiest intersections is at Science Center Drive and Fremont Avenue, which serves the Willow Creek Building, Engineering Research Office Building, INEEL Electronic Technology Center, and DOE office buildings. It is congested during peak weekday hours, but the intersection is designed for the current traffic.

4.10.1.3 Transit Modes

Four major modes of transit use the regional highways, community streets, and INEEL roads to transport people and commodities: DOE buses and shuttle vans, DOE motor pool vehicles, commercial vehicles, and personal vehicles. Table 4-23 summarizes the baseline miles for INEEL-related traffic.

4.10.2 RAILROADS

Union Pacific Railroad’s main line to the Pacific Northwest follows the Snake River across southern Idaho. This line handles as many as 30 trains a day. Union Pacific Railroad has a total of 1,096 miles of track in Idaho (State of Idaho 1998). Union Pacific Railroad lines in southeastern Idaho are shown on Figure 4-18. Idaho Falls receives railroad freight service from Butte, Montana, to the north, and from Pocatello, Idaho and Salt Lake City, Utah to the south.

The Union Pacific Railroad’s Blackfoot-to-Arco Branch, which crosses the southern portion of INEEL, provides rail service to INEEL. This branch connects with a DOE-owned spur line at Scoville Siding, then links with developed areas within INEEL. Rail shipments to and from INEEL usually are limited to bulk commodities, spent nuclear fuel, and radioactive waste. From 1993 through 1997, three rail shipments of non-hazardous bulk commodities were sent to the INEEL (Morris 1998). From 1993 through 1997, 128 rail shipments of spent nuclear fuel were sent to the INEEL (Beckett 1998). The Settlement Agreement/Consent Order limits the number of shipments of naval spent nuclear fuel to INEEL to 20 shipments (each Spent Nuclear Fuel cask is considered a shipment) per year from 1997 through 2035. Nineteen shipments were made in 1997 (Anderson 1998).

4.10.3 AIR TRAFFIC

Non-DOE air traffic over INEEL is limited to altitudes greater than 1,000 feet over buildings and populated areas, and non-DOE aircraft are not permitted to use the site. The primary air traffic over INEEL is occasional high-altitude commercial jet traffic, since DOE no longer operates helicopters at INEEL.

4.10.4 ACCIDENTS

The fatal collision rate for Idaho in 1996 was 1.8 collisions per 100 million vehicle miles, and the injury collision rate was 69 collisions per 100 million vehicle miles. The total collision rate (injury, fatal, and non-injury) for Idaho in 1996

Table 4-23. Baseline annual vehicle miles traveled for traffic related to the Idaho National Engineering and Environmental Laboratory.

Mode of travel and transportation	Vehicle miles traveled ^a
DOE buses	3,200,000
Other DOE vehicles	5,800,000
Personal vehicles on highways to INEEL	40,000,000 ^b
Commercial vehicles	<u>800,000</u>
Total	49,800,000

a. Berry (1998); Beck (1998).

b. Based on 1,600 personal vehicles per day driven to the INEEL.

was 180 collisions per 100 million vehicle miles (ITD 1997). These data are for all vehicles (e.g., cars and trucks). The accident rates for highway combination trucks in Idaho are listed in Table 4-24. For railroads in Idaho, the mainline accident rate is 6.4 accidents per 100 million railcar miles (Saricks and Tompkins 1999).

For 2001, the average motor vehicle accident rate was 1.3 accidents per million vehicle miles for INEEL vehicles (Pruitt 2002a), which compares with an accident rate of 2.4 accidents per million vehicle miles for all DOE complex vehicles (Lehto 1993). No air accidents associated with INEEL have been recorded.

Collisions between wildlife and trains or motor vehicles have occurred at INEEL. Wildlife, such as pronghorn (antelope), often bed down on the train tracks and use the tracks for migration routes when snow is abundant. Train collisions with wildlife can involve large numbers of animals and have a large impact on the local popu-

lation. For example, one large documented train/antelope accident near Aberdeen, Idaho in the winter of 1976 resulted in a total population loss of 160 antelope (Compton 1994). Accidents involving motor vehicles and wildlife generally involve individual animals and can occur during any season.

4.10.5 TRANSPORTATION OF WASTE AND MATERIALS

Hazardous, radioactive, industrial, commercial, and recyclable wastes are transported on INEEL. Hazardous materials include commercial chemical products and hazardous wastes that are non-radioactive and are regulated and controlled based on their chemical toxicity. Table 4-25 summarizes shipments associated with INEEL for the period 1998 through 2001 based on data from the *Enterprise Transportation Analysis System*. These shipments range from express mail packages to radioactive waste shipments to

Table 4-24. Highway combination-truck accident, injury, and fatality rates for Idaho.^a

Accident Rate	Interstate	Primary ^b	Other ^c
Involvement (accidents/kilometer)	3.0×10^{-7}	2.8×10^{-7}	4.6×10^{-7}
Injury (injuries/kilometer)	2.3×10^{-7}	2.2×10^{-7}	3.3×10^{-7}
Fatality (fatalities/kilometer)	9.6×10^{-9}	1.8×10^{-8}	1.7×10^{-8}

a. Source: Saricks and Tompkins (1999). *Multiply by 1.6 for rates per mile.*

b. Primary: other principal highways (generally, other components of the national highway system).

c. Other: other roads (i.e., country highways, farm-to-market roads, local streets).

Table 4-25. Annual average shipments to and from the Idaho National Engineering and Environmental Laboratory (1998-2001).^a

Mode	Commodity			Total
	Hazardous	Nonhazardous	Radioactive	
Air	221	18,549	177	18,947
Motor ^b	294	4,439	109	4,842
Other ^c	273	229	5	507
Rail	0	3	1	4
Total	788	23,220	292	24,300

a. Source: *Enterprise Transportation Analysis System (Pruitt 2002a)*.

b. Commercial motor carriers.

c. Freight forwarder, private motor carrier, government vehicles, or parcel carriers.

Affected Environment

spent nuclear fuel shipments. Nonhazardous materials shipments accounted for over 95 percent of INEEL shipments. Radioactive materials and hazardous materials shipments accounted for 1.2 percent and 3.2 percent of the shipments, respectively. Nonhazardous air shipments were the largest single category of shipments, 76 percent, largely due to low-cost General Services Administration negotiated rates for letters and parcels. Commercial motor carrier shipments accounted for 20 percent of the INEEL shipments. The remaining category of shipments, denoted "Other" in Table 4-25, is composed of shipments made by freight forwarder, private motor carrier, government vehicles, or parcel carriers. This category accounted for less than 3 percent of the INEEL shipments.

DOE establishes baseline radiological doses from transportation of waste and materials for onsite and offsite transportation. The baseline for onsite, incident-free radioactive materials transportation at INEEL consists of onsite shipments of DOE spent nuclear fuel, naval spent nuclear fuel, and radioactive waste shipments evaluated in the SNF & INEL EIS. The results of the analyses in the SNF & INEL EIS are presented in Table 4-26 in terms of estimated annual collective doses and latent cancer fatalities.

To establish a baseline for offsite, incident-free radioactive materials transportation, data from Weiner et al. (1991a,b) were used. Weiner et al. (1991a) evaluated eight categories of radioactive material shipments by truck: (a) industrial, (b) radiography, (c) medical, (d) fuel cycle, (e) research and development, (f) unknown, (g) waste, and (h) other. Based on a median external exposure rate, an annual collective worker dose of 1,400 person-rem and an annual collective general population dose of 1,400 person-rem were estimated. These collective doses correspond to 0.56 and 0.70 latent cancer fatalities for workers and the general population, respectively.

Weiner et al. (1991b) also evaluated six categories of radioactive material shipments by airplane: (a) industrial, (b) radiography, (c) medical, (d) research and development, (e) unknown, and (f) waste. Based on a median external exposure rate, an annual collective worker dose of 290 person-rem and an annual collective general population dose of 450 person-rem were estimated. These collective doses correspond to 0.12 and 0.23 latent cancer fatalities for workers and the general population, respectively.

Table 4-26. Estimated annual doses and fatalities from onsite incident-free shipments at the Idaho National Engineering and Environmental Laboratory.^a

	Estimated collective dose (person-rem)	Estimated latent cancer fatalities	Estimated nonradiological fatalities ^b
Occupational			
DOE spent nuclear fuel	0.09	3.6×10^{-5}	0
Naval spent nuclear fuel	0.01	4.0×10^{-6}	0
Radioactive waste	0.76	3.0×10^{-4}	0
Total	0.86	3.4×10^{-4}	0
General Population			
DOE spent nuclear fuel	2.2×10^{-3}	1.1×10^{-6}	0
Naval spent nuclear fuel	3.8×10^{-4}	1.9×10^{-7}	0
Radioactive waste	0.02	1.0×10^{-5}	0
Total	0.02	1.1×10^{-5}	0

a. Source: DOE (1995).

b. There are no nonradiological accident-free fatalities for onsite shipments. These fatalities are only applicable to urban areas, and the INEEL is a rural area.

4.10.6 TRANSPORTATION NOISE

INEEL-related noises that affect the public are dominated primarily by transportation sources such as buses, private vehicles, delivery trucks, construction trucks, aircraft, and freight trains. During a normal workweek, a majority of the 4,000 to 5,000 employees at the INEEL site are transported daily from surrounding communities to various work areas at INEEL by a fleet of buses covering 72 routes. Approximately 1,200 private vehicles also travel to and from INEEL daily (*Pruitt 2002b*).

Noise from an occasional commercial aircraft crossing INEEL at high altitudes is indistinguishable from the natural background noise of the site. Therefore, public exposure to aircraft nuisance noise is insignificant. Rail transport noises originate from diesel engines, wheel/track contact, and whistle warnings at rail crossings. Normally no more than one train per day, and usually fewer than one train per week, service INEEL via the Scoville spur.

The noise level at INEEL ranges from 10 dBA (decibels A-weighted; i.e., referenced to the A scale, approximating human hearing response for the rustling of grass and leaves, to as much as 115 dBA, the upper limit for unprotected hearing exposure established by the Occupational Safety and Health Administration from the combined sources of industrial operations, construction activities, and vehicular traffic. The natural environment of INEEL has relatively low ambient noise levels ranging from 35 to 40 dBA (Leonard 1993). INEEL complies with Occupational Safety and Health Administration regulations (29 CFR 1910.95), which state that personnel exposed to an 8-hour time-weighted average of 85 dBA or greater must be issued hearing protection. Also, exposure to impulse or impact noise should be limited to 140 dBA peak sound pressure level.

Noise measurements taken along U.S. Highway 20 approximately 50 feet from the roadway during a peak commuting period indicate that the sound level from traffic ranges from 69 to 88 dBA (Leonard 1993). Buses are the primary source of this highway noise with a sound level of 82 dBA at 50 feet (Leonard 1993). Industrial activities (i.e., shredding) at the Central Facilities Area produce the highest noise levels mea-

Noise Measurement

What are sound and noise?

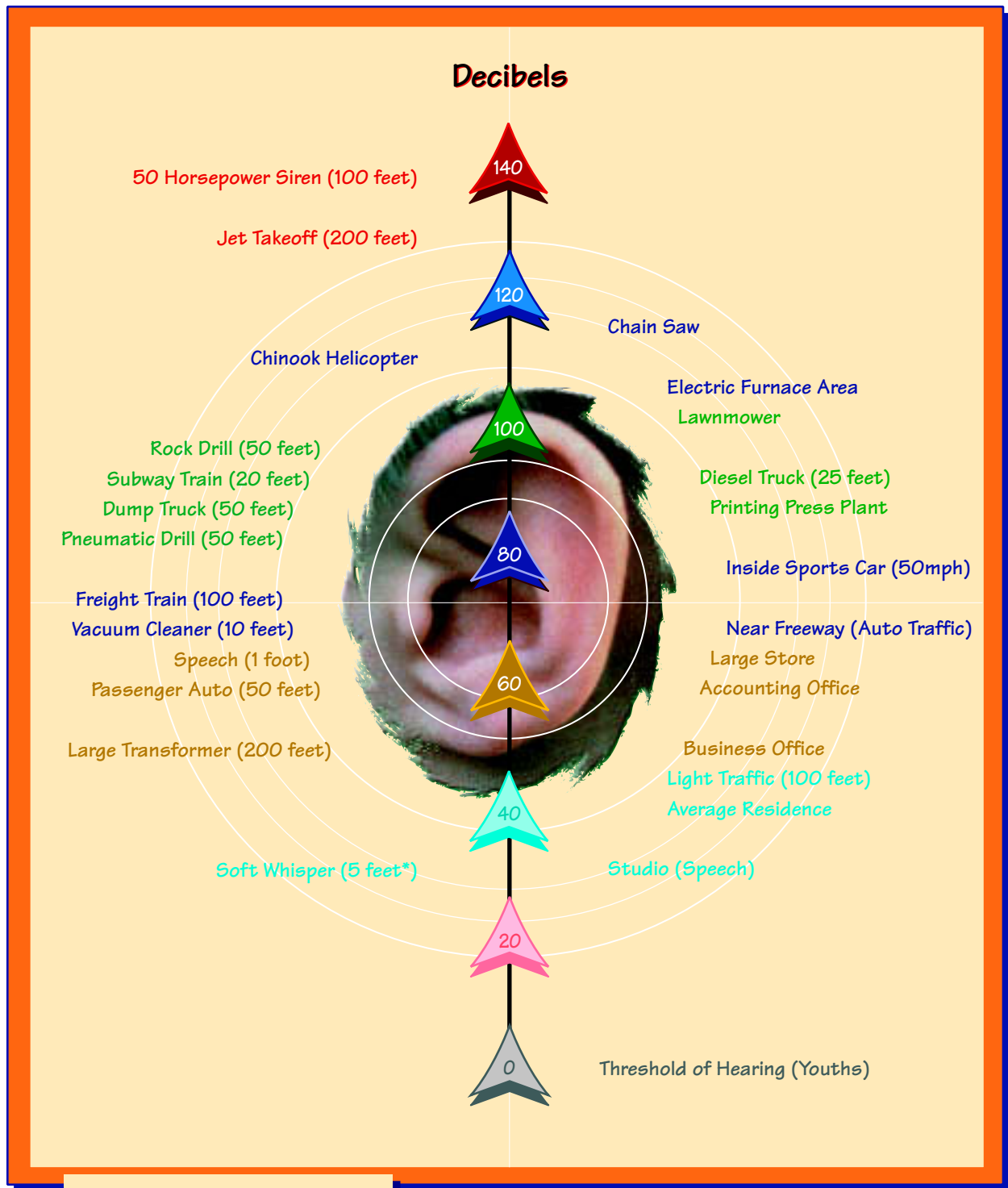
When an object vibrates it possesses energy, some of which transfers to the air, causing the air molecules to vibrate. The disturbance in the air travels to the eardrum, causing it to vibrate at the same frequency. The ear and brain translate the vibration of the eardrum to what we call sound. Noise is simply unwanted sound.

How is sound measured?

The human ear responds to sound pressures over an extremely large range of values. The range of sounds people normally experience extends from low to high pressures by a factor of 1 million. Accordingly, scientists have devised a special scale to measure sound. The term decibel (abbreviated dB), borrowed from electrical engineering, is the unit commonly used.

Another common sound measurement is the A-weighted sound level, denoted as dBA. The A-weighted scale accounts for the fact that the human ear is more sensitive to some pitches than to others. Higher pitches receive less weighting than lower ones. Most of the sound levels provided in this EIS are A-weighted; however, some are in decibels due to a lack of information on the frequency spectrum of the sound. The scale in Figure 4-19 provides common references to sound on the A-weighted sound level scale.

sured at 104 dBA. Noise generated at INEEL is not propagated at detectable levels offsite, since all primary facilities are at least 3 miles from site boundaries. However, INEEL buses operate offsite, **but are part of the** normal levels of traffic noise in the community. In addition, previous studies on effects of noise on wildlife indicate that even very high intermittent noise levels at INEEL (over 100 dBA) would not affect wildlife productivity (Leonard 1993).



LEGEND
 * Operator's Position
 SOURCE: Adapted from Glorig (1965) and Golden *et al.* (1980).

FIGURE 4-19.
 Typical A-Weighted Sound Levels.