



**PEBBLE PROJECT
ENVIRONMENTAL BASELINE DOCUMENT
2004 through 2008**

**CHAPTER 20.
POWER
Bristol Bay Drainages**

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ACRONYMS AND ABBREVIATIONS

AEA	Alaska Energy Authority
FY	fiscal year
IDC	Iliamna Development Corporation
INNEC	Iliamna-Newhalen-Nondalton Electric Cooperative
kW	kilowatt
kWh	kilowatt hour
L&P	Lake and Peninsula
N/A	not applicable
PCE	power cost equalization
RCA	Regulatory Commission of Alaska

20. POWER

20.1 Introduction

This chapter documents key features of the existing electrical power and petroleum fuels supply systems in the Bristol Bay and regional communities.

20.2 Study Objectives

The objective of the power study was to document existing arrangements for the supply of electrical power and petroleum fuels in study-area communities.

20.3 Study Area

The study area for the power study includes the eight communities nearest the Pebble Deposit area: Igiugig, Iliamna, Kokhanok, Levelock, Newhalen, Nondalton, Pedro Bay, and Port Alsworth (Figure 20-1). This group of communities is referred to herein as the Iliamna Lake/Lake Clark communities or as the study-area communities. Four of these communities—Iliamna, Newhalen, Nondalton, and Pedro Bay—are easily accessible to the transportation corridor study area, which includes possible routes for a power-transmission line, road, and fuel pipeline. The other four communities are more distant from the deposit and/or transportation corridor study area: Igiugig and Levelock are approximately 45 air miles and 78 air miles, respectively, southwest of the deposit area. Kokhanok is approximately 37 air miles southeast of the deposit area, and Port Alsworth is approximately 40 air miles northeast of the deposit area; both are approximately 25 air miles from the nearest point of the transportation-corridor study area. These latter four communities, despite their lack of direct access to the deposit and/or the transportation corridor study area, are still part of the general region. Therefore, these communities are included in this baseline description.

20.4 Scope of Work

The scope of work focused on describing existing services and facilities for supplying electrical power and petroleum fuels to the study-area communities.

20.5 Methods

The information for this chapter was partly compiled from various publications and online information resources. The report *Sustainable Utilities in Rural Alaska: Effective Management, Maintenance and Operation of Electric, Water, Sewer, Bulk Fuel, Solid Waste* (Colt et al., 2003) provided general background on the basic economics and management of rural community utilities. The Alaska Department of Commerce, Community and Economic Development's Community Database Online (ADCCED, n.d.) gave basic information about existing community energy facilities. The Alaska Energy Authority's (AEA's) annual *Statistical Report of the Power Cost Equalization Program* (AEA, 2003 through 2010) detailed community electrical utility-system operations and costs. Various online data

sources maintained by the AEA, the Denali Commission, and the Regulatory Commission of Alaska (RCA) usefully supplemented published reports. These information resources were supplemented by telephone interviews with staff of public agencies, local electrical utilities and fuel retailers, and fuel shippers.

20.6 Results and Discussion

20.6.1 Electrical Power

Six local electrical utilities generate and distribute electrical power to the eight study-area communities. Five communities (Igiugig, Kokhanok, Levelock, Pedro Bay, and Port Alsworth) each have their own local electrical power utility. The village councils of Igiugig, Kokhanok, Levelock, and Pedro Bay own and operate their community's electrical utility. The Tanalian Electric Cooperative owns and operates Port Alsworth's electrical utility. Each of these five communities has a small population and utility customer base. As of 2008, the smallest, Igiugig, had 40 residents and 20 customers; the largest, Kokhanok, had 177 residents and 53 customers (Table 20-1).

The Iliamna-Newhalen-Nondalton Electric Cooperative (INNEC) owns and operates an integrated electrical power-generation and -distribution system that serves its three namesake communities. INNEC's service-area population (463 people) and customer base (218 customers; Table 20-1) about equaled those of the other five study-area communities' electrical utilities combined (455 people and 239 customers).

20.6.1.1 Electrical Power-generation Facilities—Capacity and Power Generated

Table 20-2 documents the existing generator capacity and the kilowatt hours (kWh) generated in fiscal year (FY) 2009 for each study-area electrical utility. The utilities that serve Igiugig, Kokhanok, Levelock, Pedro Bay, and Port Alsworth rely exclusively on diesel fuel for their electrical power supply. Kokhanok, in 2003, and Pedro Bay, in 2005, obtained new power plants built through the joint Denali Commission/AEA Rural Power System Upgrade Program.

INNEC obtains its power partly from hydropower and partly from diesel generators. The Tazimina River Hydropower Project, which went on line in 1998, replaced diesel generators as INNEC's primary source of power. In FY 2009, the Tazimina hydropower plant supplied 74 percent of INNEC's power, with diesel generation providing the balance. The Tazimina hydropower plant has a capacity of 824 kilowatts (kW), with potential for upgrade to 1,500 kW. The plant is located approximately 12 miles northeast of Iliamna on the Tazimina River, which flows into Six-Mile Lake near Nondalton. The plant is accessed by a development road off the existing road between Iliamna and the east bank of the Newhalen River south of Nondalton. A buried transmission tie-line connects the hydroelectric plant to INNEC's distribution system. INNEC has approximately 50 miles of distribution lines that serve the three communities. INNEC's diesel generator plant is located in Newhalen and has a capacity of 1,560 kW. Waste heat from the diesel generators is used locally for heating.

The locations of power-generation facilities and distribution lines as of 2004 in each study-area community were depicted on the Lake and Peninsula Borough's community profile maps (L&PB, 2005).

20.6.1.2 Fuel Costs and Consumption

The cost of diesel fuel for power generation is a major operating expense for the six utilities. Their fuel costs have risen steeply in recent years (Table 20-3). Overall, the weighted average cost of fuel almost tripled from \$1.89 per gallon in 2002 to \$5.54 per gallon in 2009, a rise of 193 percent. As of FY 2009, INNEC paid the lowest price at \$4.96 per gallon; Port Alsworth's Tanalian Electric Cooperative, to which all fuel is flown by air tanker, paid \$5.26 per gallon; Levelock paid the highest cost at \$7.44 per gallon. In FY 2009, the weighted average for fuel costs for the five smaller utilities was \$5.70 per gallon, which is 15 percent higher than costs for INNEC. INNEC benefits from greater local bulk-storage capacity than the other utilities, which enables it to manage fuel inventory more cost-effectively.

The latest fuel-purchase data filed by the utilities with the RCA show that fuel costs have fallen since FY 2009. As reported by the utilities to RCA, recent fuel costs were as follows (RCA, n.d.):

- Kokhanok Village Council — \$4.86 on February 25, 2010.
- Igiugig Electric Company — \$4.17 on October 8, 2009.
- Pedro Bay Village Council — \$4.49 on March 11, 2010.
- Tanalian Electric Cooperative — \$4.73 on April 30, 2010.

INNEC and Levelock Electric Cooperative did not report any recent fuel purchases.

From FY 2002 through FY 2006, INNEC's fuel consumption fluctuated from year to year (Table 20-4) depending on its use of diesel generators. Fuel consumption has stayed more or less level for the electrical utilities in Igiugig, Pedro Bay, and Port Alsworth (Tanalian Electric Cooperative). Utility fuel consumption in Kokhanok increased by nearly 50 percent, but consumption dropped sharply in Levelock, perhaps because of that community's loss of population.

20.6.1.3 Electrical Power Rates

Electrical power rates in the study area partly reflect the cost of fuel and other operating expenses. The most important factor in rates for residential customers and local community facilities, however, is the subsidy provided by the State of Alaska's Power Cost Equalization (PCE) Program and other programs that help defray the capital cost of power facilities.

The PCE Program subsidizes electrical power costs for eligible residential consumers and community facilities. The program targets high-cost rural utilities that depend on diesel-fueled power generation. The program is jointly administered by RCA and AEA and is funded by the State of Alaska. Because legislative appropriations to support the PCE Program have fluctuated from year to year, the funds available for subsidies and the resultant subsidized electrical rates also have varied. For fiscal years 2004 through 2010, appropriations to the PCE Program were as follows (Alaska State Legislature, 2003 through 2009):

- \$15.7 million in both FY 2004 and FY 2005.
- \$22.0 million in FY 2006.
- \$25.3 million in both FY 2007 and FY 2008.

- \$28.2 million in FY 2009.
- \$32.2 million in FY 2010.

Apart from PCE payments, governmental grants and low-interest loans may help defray capital costs for small rural utilities such as those in the study-area communities. A 2003 cost study of four small, remote electrical utilities similar to those in the study area found that customer revenues covered one-third of true costs, with PCE payments (11 percent) and state and federal capital grants (54 percent) covering the balance (Colt et al., 2003). These figures suggest that consumer electrical rates, even without PCE payments, substantially understate the true cost of providing electrical power in study-area communities.

In FY 2008, the INNEC communities experienced the lowest average residential rate before the PCE subsidy was applied. INNEC's Tazimina hydroelectric plant is a less costly alternative to diesel-fueled generation. (By reducing the need to import generator fuel, the hydroelectric plant also has diminished the environmental hazards associated with shipment of fuels on the Kvichak River and Iliamna Lake, and has reduced the costs and environmental risks associated with local fuel storage.) Even so, Igiugig, Levelock, and Port Alsworth (Tanalian Electric Cooperative) enjoyed lower effective residential rates, largely because their electric utilities received substantial PCE payments (Table 20-5).

At the end of FY 2008 (June 2008), after PCE subsidies, the effective residential electrical rates for study-area communities ranged from a low of 12.83 cents per kWh for Igiugig and Levelock customers up to 48.77 cents per kWh in Pedro Bay (Table 20-5). For comparison, at the same time (June 2008), the residential rate for Anchorage Municipal Light and Power was 8.96 cents per kWh (ML&P, 2008); Chugach Electric Association's rate was 12.42 cents per kWh (CEA, 2008); and Homer Electric Association's rate for Homer was 13.55 cents per kWh (HEA, 2008). Thus, even with the PCE Program subsidy, residential electrical rates for the Iliamna Lake/Lake Clark communities are higher than the rates of most southcentral Alaska residents. The FY 2008 rates for the study-area communities, except Pedro Bay, were substantially lower than in some previous years (Table 20-6), largely because of greater PCE Program subsidies. Indeed, between FY 2002 and FY 2005, residential rates in the study-area communities were approximately triple the rates prevailing in Anchorage and Homer.

The differences in rural and urban electrical power costs, income levels, and lifestyles are reflected in household electrical power consumption. In FY 2009, the average annual consumption per household for the Iliamna Lake/Lake Clark communities was 2,629 kWh (AEA, 2009). During 2001, several years earlier, the per-household consumption for the three southcentral utilities averaged 7,658 kWh (ISER, 2003) or approximately 2.5 times the level in the study-area communities in FY 2006.

20.6.2 Petroleum Fuels

20.6.2.1 Fuel Supply

All the study-area communities import all the petroleum products used locally for power generation, space heating, and transportation, including aviation fuels. Thus, the cost and reliability of fuels delivery and storage are critical to the local economies and to the security of community life. Current arrangements for delivery of fuels to the study-area communities are described in Chapter 19. (Szymoniak et al. [2010] provide an excellent account of the general logistics and cost factors for fuel delivery in Western Alaska.)

20.6.2.2 Fuel Storage

The bulk fuel-storage facilities and capacities for each community are listed in Table 20-7. The locations of most of the listed facilities as of 2003/2004 can be viewed on the Lake and Peninsula Borough community maps (L&PB, 2005).

In recent years, the Denali Commission has put high priority on installation of modern, environmentally safe bulk fuel-storage facilities throughout rural Alaska. In collaboration, the Denali Commission recently funded and the Alaska Power Authority administered projects to upgrade bulk storage facilities in Igiugig, Kokhanok, and Pedro Bay (Denali Commission, n.d.).

20.6.2.3 Fuel Prices

Domestic space heating is generally the single most costly utility expense for households in rural Alaska (Saylor and Haley, 2007). Almost all households (89 percent) in the study area depend on heating oil for home space heating (Table 20-8). A smaller share (9 percent) depends on wood for heating, with the rest (2 percent) using other heating fuels. Thus, local heating-oil prices and price increases are of vital importance for the household economy throughout the study area. Likewise, the price of gasoline affects all consumers who purchase it to operate motor vehicles, snow machines, boats, or other gas-powered equipment.

The retail prices for the two main consumer petroleum fuels—heating oil and gasoline—for each study-area community as of January 2006, January 2008, and May 2010 are shown in Table 20-9. In January 2006, heating oil retail prices ranged from a low of \$3.50 in Levelock to a high of \$4.75 in Nondalton. Retail gasoline prices ranged from \$3.75 in Levelock to \$5.02 Pedro Bay. Overall, the average retail price in the study-area communities in January 2006 was \$4.13 per gallon for heating oil and \$4.56 per gallon for gasoline.

By January 2008, the average price was \$5.63 for heating oil and \$5.93 for gasoline. These prices represented a 36 percent increase in the average retail price of heating oil and a 30 percent increase in the average price of gasoline. Retail prices for heating oil in 2008 ranged from a low of \$4.70 per gallon in Levelock to a high of \$6.50 per gallon in Kokhanok. Retail gasoline prices ranged from a low of \$5.10 in Levelock to \$6.75 per gallon in Kokhanok.

As of May 2010, the average prices for both heating oil (\$5.85 per gallon) and gasoline (\$6.36 per gallon) had risen again, but not as steeply as between 2006 and 2008. For comparison, the retail price of heating oil in Anchorage in May 2010 hovered around \$2.90 per gallon, and gasoline was \$3.34 per gallon. As of January 2010, the statewide average price of heating oil was \$5.36 per gallon and gasoline was \$5.01 (ADCCED DCRA, 2010).

Several years prior to 2009, low water levels and river shoals made the traditional river barge route up the Kvichak River to Iliamna Lake infeasible, necessitating costly air delivery of bulk fuels. In summer 2009, a new fuel distributor, Iliamna Development Corporation (IDC), began serving Iliamna/Newhalen, Kokhanok, Nondalton, and Pedro Bay. IDC barged fuel in tanker trucks from Homer, trucked it over the Williamsport-Pile Bay road, then barged the tankers to Iliamna Lake destinations (Alaska Department of Law, 2010; IDC, n.d.). By this route, IDC's delivery of bulk fuels was more economical than air delivery.

20.7 Summary

The eight study-area communities are located in southwest Alaska, far from major transportation and distribution centers. Five of the communities are small, isolated riverfront or lakefront settlements, without road links to any other settlement. Three (Iliamna, Newhalen, Nondalton) are sufficiently close together to be linked by local roads and/or electrical power transmission lines. Until 2009, when IDC began delivery of bulk fuels and freight from Homer via the Williamsport-Pile Bay Road, all the communities depended on costly marine or air supply of petroleum fuels and bulk goods.

The communities are small, ranging in population from Igiugig's 40 persons to Nondalton's 199. Their small populations and limited local economies comprise small markets for electricity and petroleum fuels. With no opportunities for economies of scale, they face high fuel-purchase and inventory costs, high operating and administrative costs, and high capital-equipment costs. All these factors, together with increases in fuel prices and high transportation costs, result in very high real costs for petroleum fuels and electrical power. However, the PCE Program subsidies and a variety of other state and federal aid programs help to defray substantially the real costs of delivering electrical service to residential customers and community facilities, though not to commercial or other public customers. Even so, study-area households generally experience much higher electrical rates than Anchorage and Homer households, and consume much less than half the electrical power per household of Anchorage and Homer households.

Almost all study-area households rely on imported heating oil for home space heating. All rely on imported gasoline for motorized vehicles. Recent big increases in the cost of these petroleum fuels have further inflated the expense of keeping homes warm and of operating vehicles.

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TABLES

TABLE 20-1

Population and Electrical Utility Customer Base, Iliamna Lake/Lake Clark Communities, Fiscal Year 2009

Community	Electrical Utility	Community Population ^b	Number of PCE-eligible Customers ^a	
			Residential	Community Facilities
Igiugig	Igiugig Electric Company	40	17	3
Iliamna/Newhalen/ Nondalton ^c	Iliamna-Newhalen-Nondalton Electric Cooperative (INNEC)	463	203	15
Kokhanok	Kokhanok Village Council	177	45	8
Levelock	Levelock Electric Cooperative	70	71	9
Pedro Bay	Pedro Bay Village Council	44	25	4
Port Alsworth	Tanalian Electric Cooperative	124	57	0

Notes:

- a. Numbers obtained from Alaska Energy Authority's statistics for the Power Cost Equalization (PCE) Program. Only residential customers and community facilities are eligible for PCE payments; state and federal offices and facilities, commercial customers, and public schools are not eligible (AEA, 2007).
- b. Population figures are for 2008.
- c. Iliamna – population 93; Newhalen – population 171; Nondalton – population 199.

Sources: Population from ADOLWD, 2009; PCE-eligible customers from AEA, 2010.

TABLE 20-2
Select Electrical Power Statistics, Iliamna Lake/Lake Clark Communities, Fiscal Year 2009

Community	Generator Capacity (kilowatts)	Annual Power Generated (kilowatt hours)	
		Hydropower	Diesel
Igiugig	160	0	255,038
Iliamna/Newhalen/ Nondalton	824 1,560	2,578,537 0	0 919,226
Kokhanok	490	0	455,717
Levelock	360	0	390,600 ^a
Pedro Bay	345	0	258,419
Port Alsworth	270	0	584,014-+.3

Notes:

a. Fiscal year (FY) 2009 figure not available; figure shown is for FY 2008.

Sources: AEA, 2009, 2010; SWAMC, 2006a; Denali Commission, n.d.

TABLE 20-3

Average Annual Diesel-fuel Costs, Iliamna Lake/Lake Clark Communities, Electrical Utilities, Fiscal Years 2002 through 2009

Utility	Cost per Gallon (\$)								Change 2002-2009 (%)
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Igiugig	N/A	1.53	1.99	2.61	3.42	4.10	3.95	5.23	242 ^a
INNEC	1.48	1.59	1.61	2.15	2.15	2.35	4.65	4.96	235
Kokhanok	2.14	1.94	2.36	2.51	3.31	4.22	5.31	5.12	139
Levelock	1.66	1.50	1.54	1.60	2.74	3.46	5.76	7.44	348
Pedro Bay	2.15	2.02	2.32	2.72	2.74	4.05	5.72	5.45	153
Tanalian	2.25	2.24	2.18	2.68	3.77	4.05	4.72	5.26	134
Average^b	1.89	1.93	2.03	2.54	3.08	3.65	5.07	5.54	193

Notes:

a. Percent change for 2003 through 2009.

b. Weighted average.

FY = fiscal year.

N/A = not applicable.

Sources: AEA, 2003, 2004, 2005, 2006, 2007, 2008, 2009, and 2010.

TABLE 20-4

Annual Diesel-fuel Consumption, Iliamna Lake/Lake Clark Communities, Electrical Utilities, Fiscal Years 2002 through 2009

Utility	Fuel Consumed (gallons)							
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Igiugig	N/A	20,199	21,314	21,000	20,898	20,524	20,640	22,437
INNEC	50,959	27,259	53,816	29,543	47,848	42,686	17,816	43,230
Kokhanok	24,995	24,368	26,403	34,612	36,026	41,129	38,375	38,044
Levelock	46,677	36,444	36,834	34,800	33,115	37,351	36,076	33,863
Pedro Bay	26,010	21,220	20,413	25,327	20,058	19,238	23,099	21,753
Tanalian	50,076	50,909	54,606	49,556	53,068	56,082	53,448	49,225

Sources: AEA, 2003, 2004, 2005, 2006, 2007, 2008, 2009, and 2010.

TABLE 20-5
Residential Electrical Rates, Iliamna Lake/Lake Clark Communities,
Electrical Utilities, Fiscal Year 2008

Utility	Average Residential Rate^a	PCE Rate^b	Effective Residential Rate^c
Igiugig	80.30	67.47	12.83
INNEC	51.34	31.57	19.77
Kokhanok	90.00	63.19	26.81
Levelock	70.00	57.17	12.83
Pedro Bay	91.00	42.23	48.77
Tanalian	63.79	45.62	18.17

Notes:

- Cents per kilowatt hour, based on monthly usage of 500 kilowatt hours, without power cost equalization (PCE).
- PCE rate at end of FY 2008. The PCE rate is the subsidy in cents per kilowatt hour provided by the PCE program.
- Rate in cents per kilowatt hour at the end of FY 2008 after the PCE subsidy.

Source: AEA, 2010.

TABLE 20-6
Effective Residential Electrical Rates, Iliamna Lake/Lake Clark Communities, Electrical Utilities,
Fiscal Years 2002 through 2008

Utility	Rate^a						
	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Igiugig	N/A	30.46	34.97	34.06	21.82	22.65	12.83
INNEC	28.04	24.09	28.52	28.15	12.75	28.71	19.77
Kokhanok	36.84	24.60	35.76	35.76	21.52	31.35	26.81
Levelock	26.88	15.16	24.21	32.49	19.10	15.84	12.83
Pedro Bay	39.22	38.13	36.25	35.76	21.52	22.31	48.77
Tanalian	27.79	21.35	28.73	29.12	20.23	32.57	18.17

Notes:

- Effective rate in cents per kilowatt hour at the end of the fiscal year, after PCE subsidy.

Sources: AEA, 2003, 2004, 2005, 2006, 2007, 2008, and 2009.

TABLE 20-7
Bulk Fuel-storage Facilities, Iliamna Lake/Lake Clark Communities

Community	Owner	Capacity (gallons)
Igiugig	Village Council	111,050
	L&P School District	<u>5,000</u>
	Total	116,050
Iliamna	Crowley	258,000
	Rainbow King Lodge	19,000
	Iliamna Trading General Store	11,855
	Iliaska Lodge	10,900
	Iliamna Air	10,000
	John Swenko	7,000
	ADOT&PF/Airport	5,000
	Talarik Creek Lodge	5,000
	Others (12)	<u>30,500</u>
	Total	379,755
Kokhanok	Kokhanok Village Council	133,000
	Roehl's Enterprises	3,800
	L&P School District	<u>3,600</u>
	Total	140,400
Levelock	Village Council	156,800
	L&P School District	<u>31,500</u>
	Total	188,300
Newhalen	City of Newhalen	191,700
	Nondalton Village Corp.	165,000
	L&P School District	5,000
	City clinic	<u>3,500</u>
	Total	270,200
Nondalton	City of Nondalton	26,000
	L&P School District	17,900
	Newhalen Lodge	10,000
	Others (3)	<u>6,000</u>
	Total	59,900
Pedro Bay	Pedro Bay Village Council	64,000
	L&P School District	<u>20,000</u>
	Total	84,000

Community	Owner	Capacity (gallons)
Port Alsworth	Lake Clark National Park and Preserve	20,955
	L&P School District	15,000
	Lake Clark Air	8,000
	Alaska Wilderness Lodge	6,000
	Alaska Lake Clark Air/Lodge	6,000
	L&P Air	5,500
	Fishing Unlimited	<u>4,300</u>
Total		65,755

Notes:

ADOT&PF = Alaska Department of Transportation and Public Facilities.

L&P = Lake and Peninsula.

Sources: ADCCED, n.d.; Denali Commission, n.d.; Crowley Maritime Corporation, 2010.

TABLE 20-8

Usage of Fuels for Home Heating, Iliamna Lake/Lake Clark Communities, 2000

Community	Usage of Fuel Types (Number of Households)			Total
	Heating Oil	Wood	Other Fuel	
Igiugig	12	0	0	12
Iliamna	41	0	0	41
Kokhanok	46	2	3	51
Levelock	42	0	2	44
Newhalen	32	0	0	32
Nondalton	53	14	2	69
Pedro Bay	14	4	0	18
Port Alsworth	39	8	0	47
Total	279	28	7	314
Percent of Total	89%	9%	2%	100%

Source: ADOLWD, 2002.

TABLE 20-9

Retail Prices of Heating Oil and Gasoline, Iliamna Lake/Lake Clark Communities, January 2006, January 2008, and May 2010

Community	Retailer	Heating Oil (price per gallon)				Gasoline (price per gallon)			
		January 2006	January 2008	May 2010	Percent Change 1/2006- 5/2010	January 2006	January 2008	May 2010	Percent Change 1/2006- 5/2010
Igiugig	Igiugig Village Council	\$3.84	\$5.00	\$7.07	+84	\$4.15	\$6.10	\$7.50	+81
Iliamna/	Crowley	\$3.92	\$6.13	\$6.56	+67	\$4.56	\$5.90	\$6.76	+48
Newhalen	Iliamna Development Corp.	N/A	N/A	\$5.02	N/A	N/A	N/A	\$5.12	N/A
	Iliamna Trading	N/A	N/A	N/A	N/A	\$4.89	\$5.99	\$6.39	+31
Kokhanok	Kokhanok Village Council	\$4.00	\$6.50	\$6.75	+69	\$5.00	\$6.75	\$7.25	+45
Levelock	Levelock Village Council	\$3.50	\$4.70	\$4.25	+21	\$3.75	\$5.10	\$4.50	+20
Nondalton	City of Nondalton	\$4.75	\$6.13	\$5.70	+20	N/A	\$6.19	\$6.95	N/A
Pedro Bay	Pedro Bay Village Council	\$4.69	\$5.66	\$5.76	+23	\$5.02	\$5.75	\$6.03	+20
Port Alsworth	L&P Air	\$4.23	\$5.30	\$5.65	+34	N/A	\$6.50	\$6.75	N/A
Unweighted Average		\$4.13	\$5.63	\$5.85	+42	\$4.56	\$5.93	\$6.36	+39

Source: January 2006 prices from SWAMC, 2006b; January 2008 and May 2010 prices from telephone calls to retailers.

FIGURE

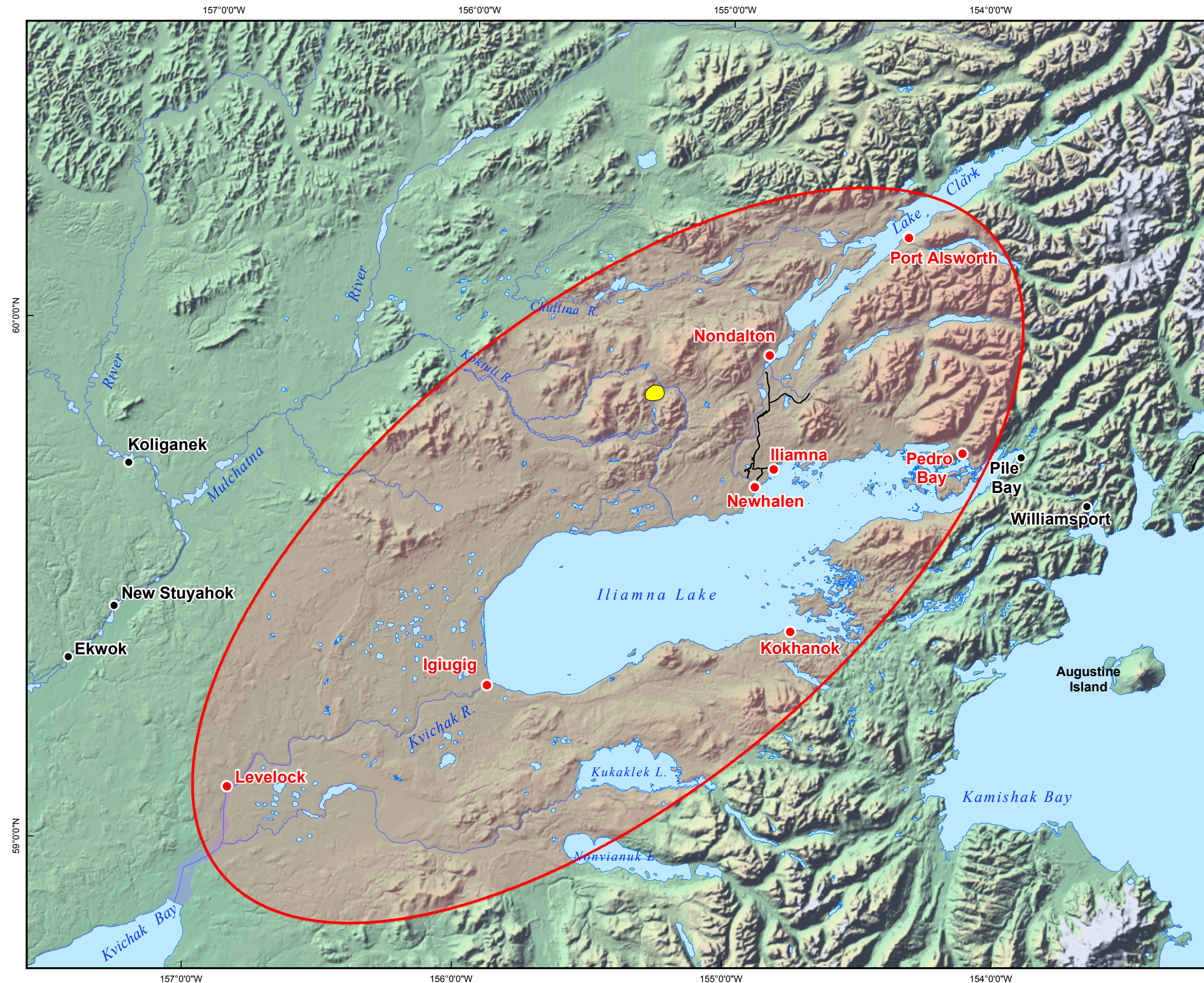
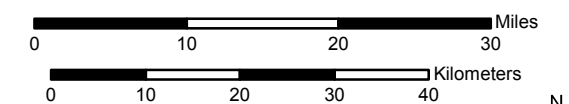
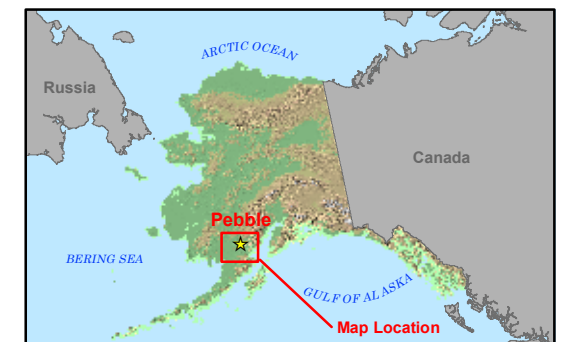


Figure 20-1
Power Study Area
Bristol Bay Drainages

Legend

- Iliamna Lake/Lake Clark Communities
- Study Area
- X General Deposit Location
- Existing Roads



Scale 1:800,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

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