

# Assessment of Feasibility of the Beneficial Use of Waste Heat from the Advanced Test Reactor

July 2012



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# **Assessment of Feasibility of the Beneficial Use of Waste Heat from the Advanced Test Reactor**

July 2012

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**<http://www.inl.gov>**

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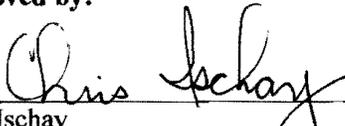


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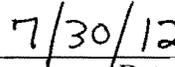


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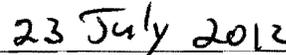
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## **ABSTRACT**

This report investigates the feasibility of using waste heat from the Advanced Test Reactor secondary coolant system to preheat air for space heating of TRA-670. The existing, but currently nonfunctioning waste heat recovery system was assessed for technical and economic feasibility. Hot water would be extracted from the secondary coolant system loop and pumped to a new plate and frame heat exchanger from which heat would be transferred to the tertiary glycol loop for preheating of outdoor air in the heating and ventilation system. Data from Advanced Test Reactor operations over the past 10 years indicates that heat from the reactor coolant was available (when needed for heating) for 43.5% of the year on average. The potential energy cost savings from using waste heat to preheat intake air would be \$285K/yr. The total project cost is estimated to be \$9.68M, which includes operating and maintenance costs for the first 5 years. Technical, safety, and logistics considerations of the glycol waste heat recovery system are outlined. Other opportunities for using waste heat and reducing water usage at the Advanced Test Reactor are also discussed.



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## ACRONYMS

ATR	Advanced Test Reactor
DG	Diesel Engine Generator
DOE	Department of Energy
ECM	Energy Conservation Measure
GHG	Greenhouse Gas
g-WHRS	Glycol Waste Heat Recovery System
HVS	Heating and Ventilation System
INL	Idaho National Laboratory
PCS	Primary Coolant System
PFD	Process Flow Diagram
PRA	Probabilistic Risk Assessment
SCS	Secondary Coolant System
UFSAR	Upgraded Final Safety Analysis
USQ	Unreviewed Safety Questions
WHRS	Waste Heat Recovery System



# Assessment of Feasibility of the Beneficial Use of Waste Heat from the Advanced Test Reactor

## 1. INTRODUCTION

This report assesses the feasibility of using waste heat from the Advanced Test Reactor (ATR) at Idaho National Laboratory (INL) to preheat air for space heating of TRA-670. It evaluates a concept proposed by Ameresco, and discusses other potential energy and water efficiency opportunities at ATR.

The installation of a glycol waste heat recovery system (g-WHRS) to preheat outside air for building TRA-670, located at the ATR Complex, was proposed. The Ameresco provided process flow diagram (PFD), shown in Figure 1, was accompanied by the following paragraph:

“This ECM involves recovery of heat from the ATR cooling tower cooling water loop for use in preheating outdoor ventilation air for TRA-670. The combined outdoor intake air for four HVUs, including HVS-1, -2, -3, and -4, totals 114,300 cfm according to design airflow schematics. The outdoor intake air in each of these HVUs is currently preheated by electric resistance coils. Implementation of this ECM would include installation of a heat exchanger to transfer heat from the 120°F cooling water to a new glycol loop. The heated glycol would then preheat outdoor air through a heating coil on the intake of each of the four HVUs. This ECM would result in substantial electric savings by reducing the heating load on the existing electric resistance preheat coils. The attached schematic shows a basic arrangement of the proposed heat recovery system.”

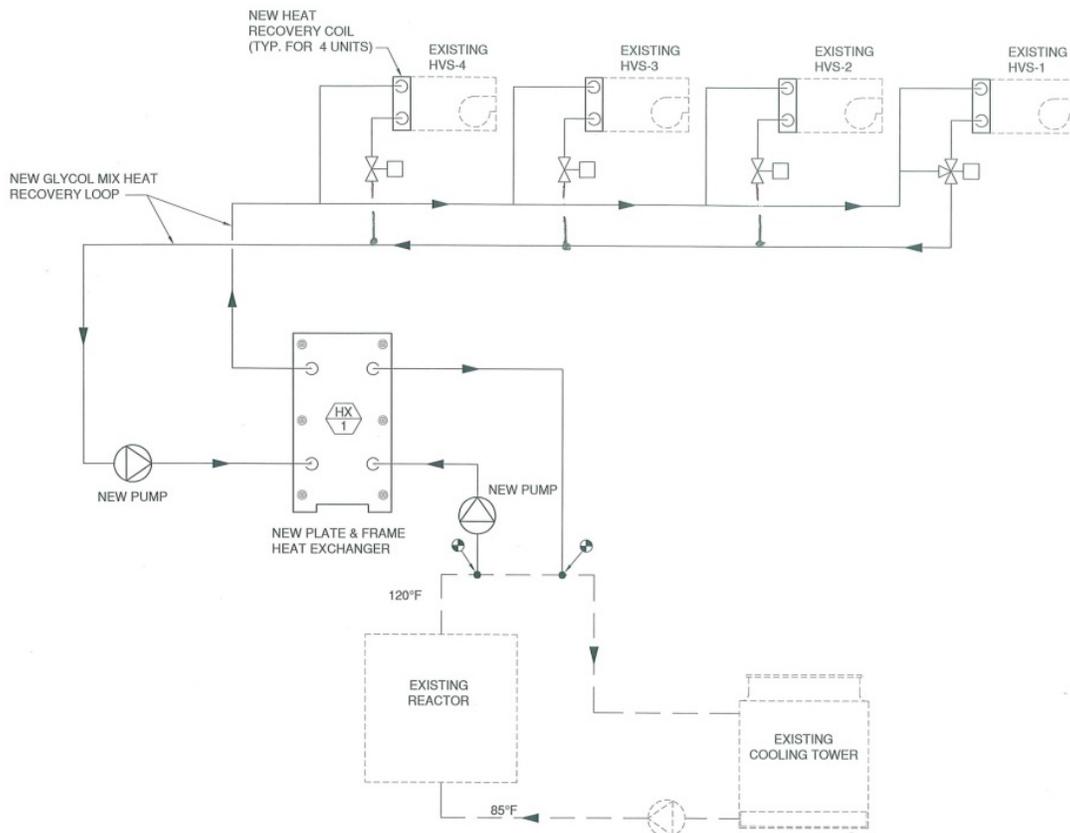


Figure 1. Ameresco process flow diagram.

## 2. HISTORY

Constructed in 1967, the ATR is the second-oldest of three reactors still in operation at INL. A waste heat recovery system (WHRS) constructed at ATR during the late 1980s operated only briefly. The original motivation for the WHRS was the replacement of the deteriorating central steam plant with electrical heating. The existing WHRS was constructed in two phases. The first phase of the project involved design and installation of electrical resistance heating for all of the heated buildings at the ATR Complex. The second phase included design and construction of the WHRS loop.

The ATR WHRS was a piping/mechanical system that circulated warm water (at approximately 130°F) from the ATR secondary coolant system (SCS) through heating coils that were part of the heating and ventilation systems (HVS) for 14 buildings at the ATR Complex in a district heating type arrangement. The WHRS underwent shakedown testing during FY 1990 and began operation during the FY 1991 heating season. Freeze up of the finned tube hot water coils during a commercial power outage resulted in flooding of the basement in TRA-604 (Kinnaman 1993). The system was placed in a dry layup configuration, which was later changed to “abandoned in place” (SES-2002-457, Rev. 1; Drawing 171227, 171211, 171200, etc.).

Figure 2 shows the old WHRS piping located in the canal area. The piping is situated along the walls high above the floor level. The white insulation covering the piping is marked with yellow and black labels to indicate that it is part of the WHRS. Figure 3 shows a placard with “Waste Heat Recovery System Abandoned in Place” near the old WHRS piping to HVS-4. Similar placards have been placed on the abandoned WHRS piping throughout the facility. WHRS piping to the HVS is shown in Figures 4 and 5. Figure 6 shows the old WHRS piping in the TRA-670 layup area. The building (TRA-676) on the north side of TRA-670 that formerly housed the pumps for the old WHRS has been reconfigured into a fitness facility (Figure 7).



Figure 2. Old WHRS abandoned piping and pipe supports in canal area.

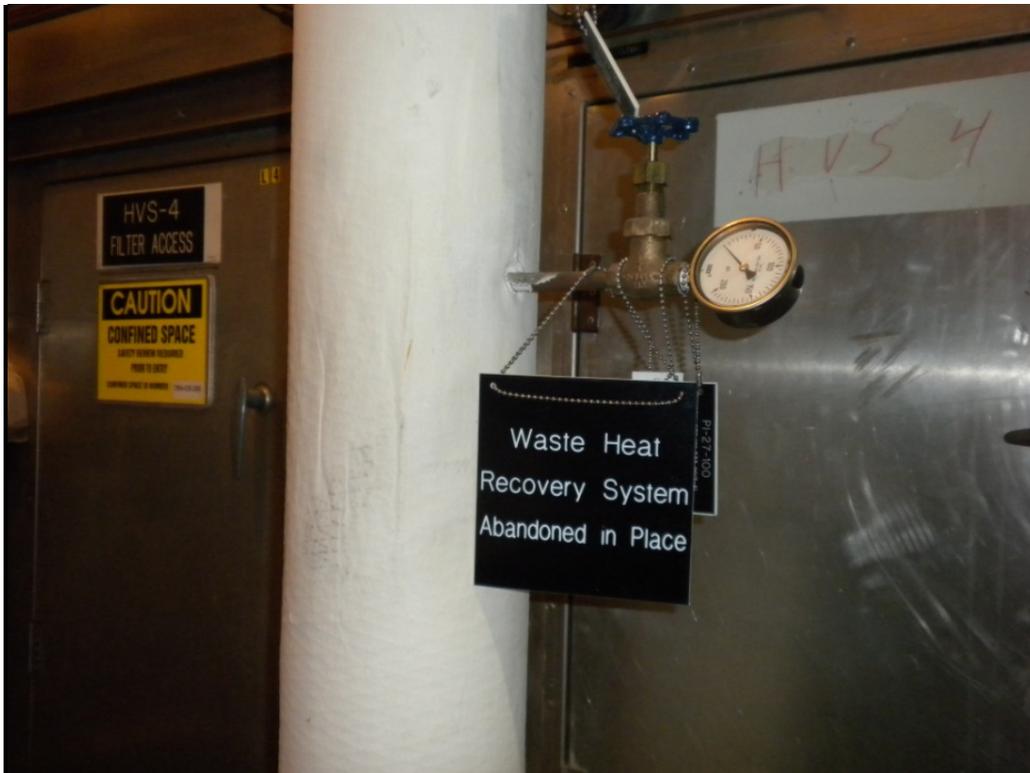


Figure 3. Old WHRS abandoned piping outside of HVS-4 filter access compartment.



Figure 4. Old WHRS piping to the downstream side of the face and bypass damper in HVS-1.



Figure 5. Old WHRS piping to HVS-5.

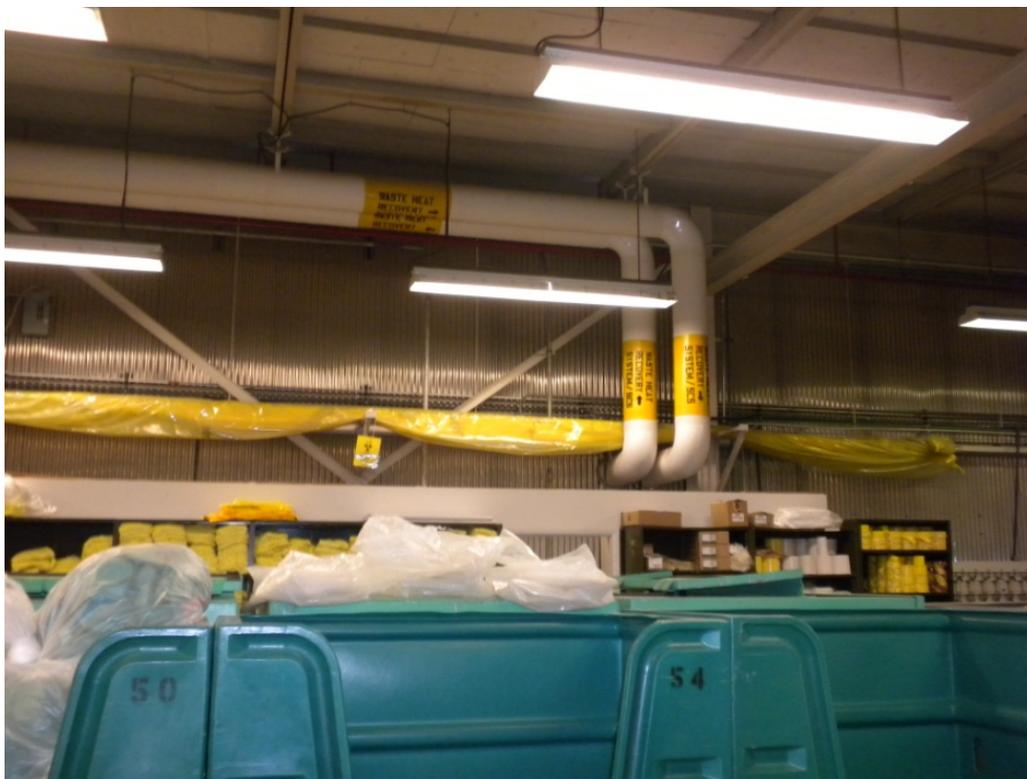


Figure 6. Old WHRS piping in TRA-670 layup area.



Figure 7. Old WHRS pump house (TRA-676, presently the fitness facility) on north side of TRA-670.

### 3. COMMENTS ON PROCESS FLOW DIAGRAM

The Ameresco PFD, shown in Figure 1 above, indicates four HVS units, whereas there are actually five HVS units shown on Drawing 120281 for the ATR reactor building (TRA-670). Design air flows indicated on the drawing are compared with actual measured values in Table 1. The air flow rates listed on the drawing are design values, whereas the actual values are much lower. Figure 8 shows the air intakes for HVS-1 (upper grill) and HVS-2 (lower grill). The intake grills for HVS-3, -4 and -5 units, shown in Figure 9, are located on the east side of TRA-670. Air intakes for HVS-3 and HVS-4, which are combined, are located near the top of the photo. HVS-5 is located at the right side of Figure 9.

Table 1. HVS air flow rates for TRA-670.

HVS Unit	cubic feet per minute (cfm)	
	Design	Actual
1	64,800	55,000*
2	12,500	10,000
3	23,500	21,000
4	13,500	
5	79,450	62,000
Total	193,750	148,000

\*Fan in AUTO @approx. 70% speed

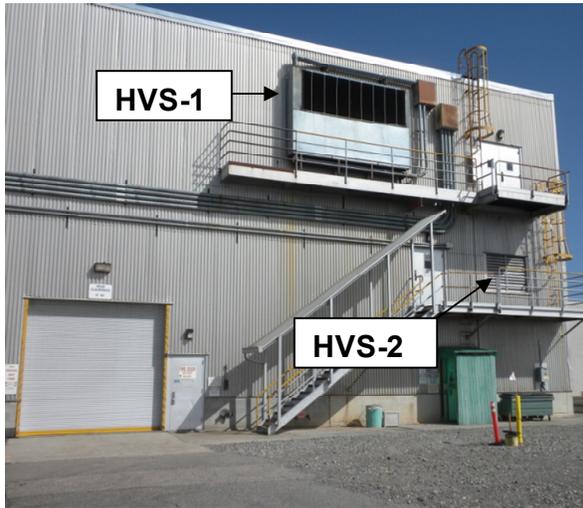


Figure 8. HVS-1 and -2 air intakes on the west side of TRA-670.

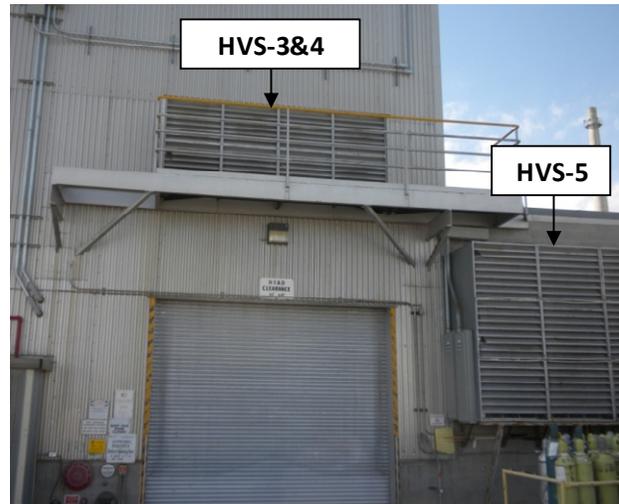


Figure 9. HVS-3, -4, and -5 air intakes on the east side of TRA-670.

The drawings show that the heat exchanger coils from the old WHRS were abandoned in place and remain in the ducts of HVS-1, -3, -4, and -5 units. It is possible that flow blockage from the old coils is reducing the air flow. The actual flow rates should be measured to provide accurate data for the design of the g-WHRS and to ensure that industrial hygiene standards are being met. Regardless of whether the decision is made to proceed with the g-WHRS, removal of the old WHRS coils may save energy costs and make it easier to perform maintenance on the existing HVS units. If the g-WHRS coils are installed without removing the old coils, a larger fan capacity could be required because of the added pressure drop

from the g-WHRS coils placed in the flow path. It is likely that the old coils are resulting in higher energy costs to operate the fans. Removal of the old WHRS piping associated with these coils that is abandoned in place is recommended before installing piping associated with a new system. Adding piping without removal of the old piping would increase the loading on the building structure, requiring a structural evaluation to be performed.

If new coils are installed, the heat exchange area should be sized such that the air flows to the building do not drop below industrial hygiene standards. If higher capacity fans are needed, the additional power costs relative to energy savings should be assessed, along with the ability of the existing transformers, etc., to handle the increase in power needed for the new higher capacity fans.

It is assumed that 100% outside air is supplied to HVS-1, -2, -3, -4, and -5. If installed, the g-WHRS heating coils should be placed downstream of the existing electrical resistance preheating coil to prevent buildup of ice/hoarfrost on coils. The INL Site is notorious for hoarfrost and it has been known to build up on equipment exposed to the elements. The existing electrical preheaters would be used to preheat the air to 20°F before flowing past the g-WHRS coils. The g-WHRS would be used to heat the air from 20°F to 65°F. Existing electrical duct burners would still be needed to supply heat during ATR outages.

### 3.1 New g-WHRS System

The proposed g-WHRS system consists of a new tertiary coolant loop that takes a side stream off of the main SCS loop. The SCS header pit, located on the north side of TRA-670, is shown in Figure 10. Heat from the SCS coolant water is transferred to a glycol loop by means of a plate and frame heat exchanger. The glycol loop would be used to preheat outside air in HVS units at TRA-670.

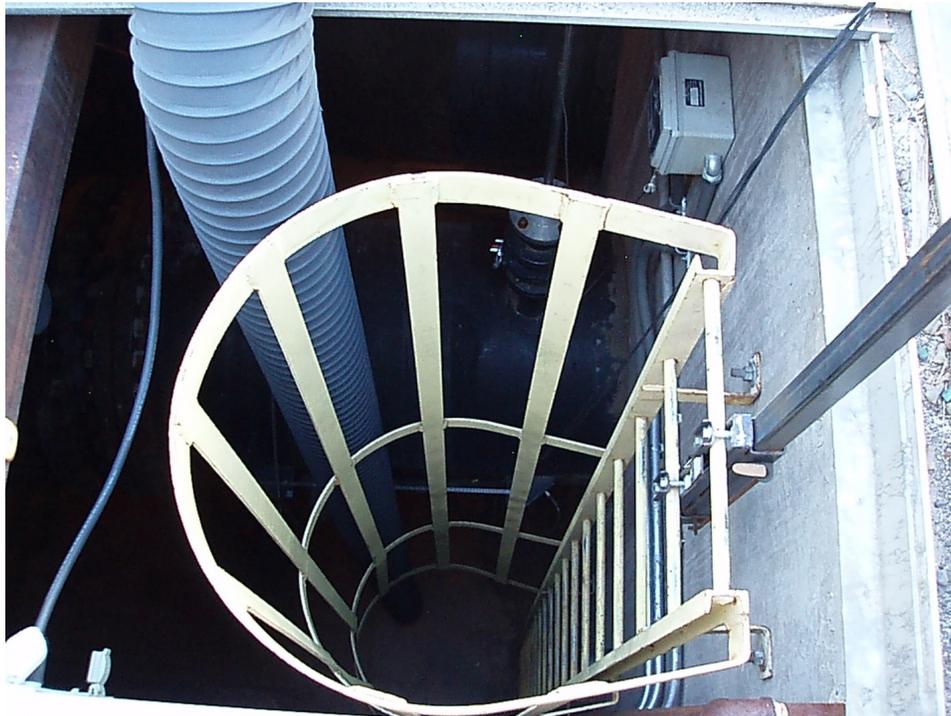


Figure 10. ATR SCS header pit located on north side of TRA-670.

### 3.2 Proposed Tertiary Coolant Loop

Figure 11 shows the heat and coolant flows in the proposed g-WHRS. The proposed new plate and frame heat exchanger between the secondary coolant loop and the tertiary glycol loop must be located within an enclosure where it is protected from humidity, frost, snow, etc. Plate and frame heat exchangers typically have heat transfer coefficients 3 to 4 times that of shell and tube heat exchangers, but would require periodic maintenance to remove fouling and scale buildup on the heat exchanger surfaces, especially those in contact with the SCS water.

The proposed tertiary loop off of the main SCS loop requires freeze protection and heat trace lines to prevent freezing. Costs for this pumping power must be factored into the cost-benefit assessment. Because air ingress can cause corrosion in heat exchangers and piping systems, draining the tertiary flow system during outages is not recommended. A method of isolating the heat exchanger from the flow loop is necessary.

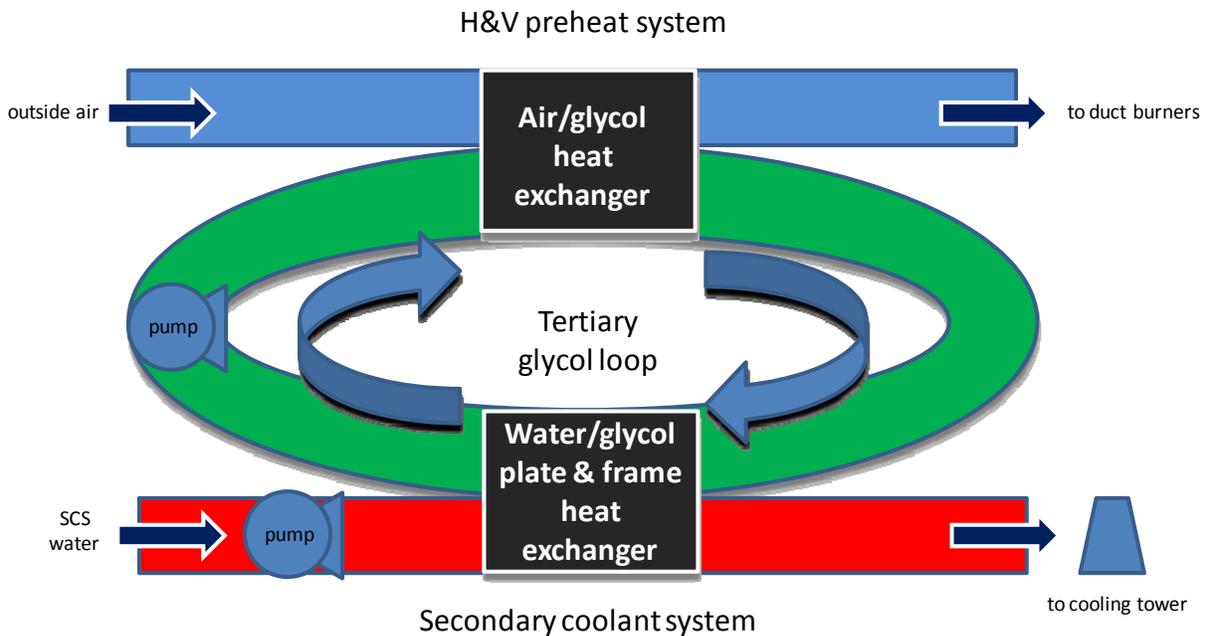


Figure 11. Heat and coolant flows in proposed g-WHRS.

The effects of the new system on cooling tower performance should be assessed. The four-cell, induced-draft cooling tower at ATR is shown in Figure 12. Changes to operating procedures, especially during the winter, may be required. Also, additional demands on personnel to operate and maintain this system must be considered and factored into the budget.



Figure 12. ATR four-cell cooling tower.

### 3.3 Glycol Loop Operation and Logistics

The type of glycol used would have to be propylene glycol ( $C_3H_8O_2$ ), or possibly a renewable corn glycol. In any case, because of toxicity and environmental concerns, ethylene glycol (even though it exhibits better heat transfer performance) should not be used at INL. A 40% water–60% propylene glycol solution would provide freeze protection to  $-55^{\circ}F$ . There is no flash point specified for the glycol solution, so flammability is not a concern. High quality glycol should be procured, since the use of cheaper fluids may ultimately end up costing more because of quicker fluid degradation, fouling of pipes and heat exchanger surfaces, etc. Use of a corrosion inhibitor is necessary for the propylene glycol-water solution. The water used in the glycol systems must be of the highest possible quality (softened, demineralized, deionized), otherwise the hardness and corrosive salts in most domestic water supplies will deplete the inhibitor concentration in the glycol. The water-glycol solution quality should be checked at least annually.

Since propylene glycol increases major head loss in the heat recovery system, pumping power would be greater than that needed for a water system. The glycol loop must accommodate thermal expansion (pressure relief valves, surge tank, etc.) per piping code, and this equipment must be factored into the cost estimate. Water/glycol lines must be located a sufficient distance away from potable water lines. It must be verified that existing transformers could handle the additional pumping power needed for the glycol system.

An acceptable location for the g-WHRS equipment (pipes, pumps, etc.) would have to be found. There is potentially space available on the northwest side of the reactor building, but this may create difficulties for other ATR activities, such as primary heat exchanger replacement. Construction in certain areas (e.g., within 2 ft of a pressurized line) can only take place during a reactor outage. Building penetrations that breach the confinement can only be performed during an outage.

During ATR outages, the glycol loop must be isolated so that it does not serve to cool the SCS. Consequences of periodically shutting down the glycol loop and having the fluid sit in it without flowing should be addressed. Frequent startup and shutdown tends to be hard on mechanical equipment, and this should be factored into maintenance requirements. An operator would be needed to shut down the glycol loop during reactor outages; otherwise, the glycol will serve to cool the secondary coolant. Continuing resources must be allocated to support this activity.

## 4. SAFETY CONSIDERATIONS

The ATR is a Department of Energy (DOE)-owned Hazard Category 1 nuclear facility whose principal function is to provide a high neutron flux for irradiation testing of reactor fuels and other materials. Any modifications to the SCS must undergo review to ensure they do not present (a) an unreviewed safety question, (b) a threat to the health and safety of workers or the public, (c) adverse environmental effects, or (d) a hazard to the reactor facility or other equipment. Postulated accident scenarios must be formally analyzed using INL's formal procedures, and a determination made whether they are bounded by the events already addressed by the current safety analyses. The old WHRS was not an authorization safety basis system, nor was it mentioned in the ATR Upgraded Final Safety Analysis Report (UFSAR) [Grover and Brower 2003].

Accident events must be bounded by the sequences discussed in SAR-153 (2011), Chapter 15, Section 15.1.1. Applicable sections of the UFSAR include SAR-153, Chapter 15, Section 15.1, "Increase in Heat Removal by the Secondary (Cold Water Addition)" and Section 15.2, "Decrease in Heat Removal by the Secondary." A complete and abrupt loss of secondary coolant stemming from a piping failure upstream of the heat exchangers is the enveloping event for degradation of the heat sink. The supporting analyses for the complete loss of heat sink events are documented in EDF-5522 (Bayless and Polkinghorne 2005). Loss of SCS inventory because of a piping failure in the WHRS is enveloped by the primary coolant system loss of heat sink analysis. Reviewers must ensure that any modifications made to the SCS are bounded by the events addressed by the SAR. A determination would have to be made whether the existing analysis bounds events that could occur because of installation of the new system. Other sections of the UFSAR that may be affected by the g-WHRS include Chapter 9, Section 9.2, "Auxiliary Water Systems," and Section 9.4, "Heating and Ventilation." Examples of new events to consider are:

1. Water/glycol leak from/into SCS. What does it do to heat transfer characteristics, pumping power, and interaction with biofouling chemicals?
2. Flooding from a leak caused by a break in the tertiary glycol piping or heat exchange system.

## 5. USE OF WASTE HEAT FOR SPACE HEATING

### 5.1 Typical Energy Usage

The most efficient use of waste heat is to use it directly as heat. This avoids efficiency losses that occur when heat is transformed to another kind of energy. Heat recovery is most effective when the heat source and heat sink are coincident, meaning they are physically close together and occur at the same time. The recovered heat can be used for space heating.

Commercial buildings and homes account for 40% of all energy use in the U.S. The U.S. is responsible for 20% of the world's carbon dioxide emissions, with energy usage by U.S. buildings responsible for 8%. As shown in Figure 13, space heating accounts for approximately 13.7% of the energy usage in a typical commercial building (U.S. DOE, 2010). Climatology data for Idaho (U.S. DOC, 2011) indicates there were 6,867 degree days during 2010 (base temperature of 65°F).

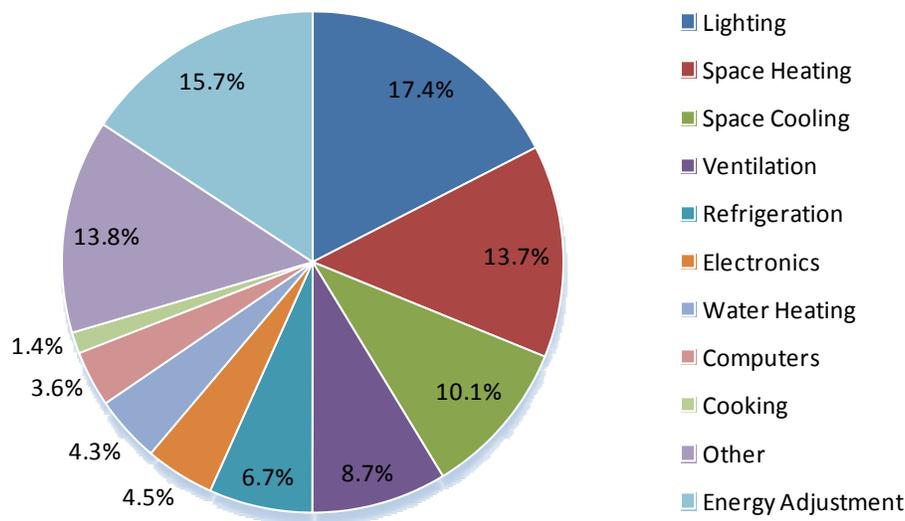


Figure 13. Commercial building energy usage splits (U.S. DOE, 2010).

### 5.2 Availability of SCS Waste Heat

Since the ATR is a materials and test reactor rather than a commercial power reactor, it is frequently shut down for outages. A hybrid system wherein the electrical heating takes over when the reactor is shut down would therefore be required to preclude freezing. The existing electrical preheaters and duct burners in the HVS units would still be required. Energy savings from using SCS waste heat would only be realized during reactor operation in nonsummer months. Outages lasting approximately 2 weeks occur every 6 weeks, with a longer 6-week outage taking place every 18 months. A 6-month shut down for core internals change-out is scheduled once every 10 years. The historical data of actual (rather than planned) ATR operating cycles over the past 10 years is shown in Table 2. The ATR has been operating 55.7% of the year on average, and only 43.5% of the year when heating is needed (October through June).

Table 2. ATR full-power hours over the past 10 years (source: Marjorie Owens, ATR).

	ATR Full-Power Hours									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Jan</b>	583.6	514.9	485.3	0.3	546.3	744.0	474.2	700.0	531.3	178.0
<b>Feb</b>	668.0	564.4	94.8	55.7	511.9	294.1	593.8	466.0	399.3	0.0
<b>Mar</b>	443.2	349.0	744.0	0.0	197.1	673.3	178.0	456.5	743.0	0.0
<b>Apr</b>	719.0	710.3	411.0	387.6	324.0	489.0	0.0	585.9	289.9	389.7
<b>May</b>	264.0	346.4	403.4	617.6	739.5	0.0	709.7	498.5	704.6	490.0
<b>Jun</b>	429.9	542.3	720.0	198.7	295.7	137.0	436.2	653.4	188.8	573.3
<b>July</b>	742.1	611.5	494.9	369.8	215.0	609.0	556.5	82.0	687.2	706.0
<b>Aug</b>	408.7	261.9	155.0	588.9	0.0	0.0	666.2	0.0	322.0	286.1
<b>Sept</b>	519.1	0.0	0.0	504.8	0.0	470.4	157.0	571.1	716.9	3.7
<b>Oct</b>	745.0	0.0	0.0	745.0	464.1	381.5	372.1	600.0	416.6	390.2
<b>Nov</b>	246.6	60.1	0.0	261.5	720.0	721.0	494.0	292.1	301.3	611.0
<b>Dec</b>	744.0	557.9	0.0	744.0	345.0	379.8	329.7	669.7	744.0	342.9
<b>Total Hours</b>	6513.2	4518.5	3508.4	4473.8	4358.6	4899.1	4967.3	5575.2	6044.9	3970.8
<b>Total Days</b>	271.4	188.3	146.2	186.4	181.6	204.1	207.0	232.3	251.9	165.5
<b>% of Year</b>	74.4	51.6	40.1	51.1	49.8	55.9	56.7	63.6	69.0	45.3
<b>% Yr Htg</b>	55.3	41.6	32.6	34.4	47.3	43.6	41.0	56.2	49.3	34.0

## 6. ENERGY AND COST/BENEFIT ANALYSIS

The g-WHRS could recover some heat energy from the ATR SCS that would otherwise be lost as waste heat discharged at the cooling tower. The motivation for this study is to reduce energy consumption, carbon footprint, and costs. This section includes the possible yearly energy savings from installing a g-WHRS and estimated costs to install the system.

### 6.1 Energy Savings

The following calculation indicates that the proposed g-WHRS could save approximately \$285K per year in electricity costs. This calculation assumes a flat rate electricity price of \$0.035/kWh.

Properties of air

$$\rho_{\text{air}} := 0.076 \frac{\text{lb}}{\text{ft}^3}$$

$$\Delta T_{\text{air}} := 45 \text{ } ^\circ\text{R}$$

Preheat air by 45 F. These parameters are based upon original WHRS specifications, which result in reasonable size H&V coils. If preheating was increased, so would heat exchange area (i.e., size) of coils.

$$c_{p_{\text{air}}} := 0.24 \frac{\text{BTU}}{\text{lbm} \cdot ^\circ\text{R}}$$

$$\dot{m}_{\text{air}} := \rho_{\text{air}} \cdot 148000 \cdot \text{cfm}$$

Heat supplied by preheat system 43.5% of year

$$Q_{\text{preheat}} := 0.435 \dot{m}_{\text{air}} \cdot c_{p_{\text{air}}} \cdot \Delta T_{\text{air}}$$

$$Q_{\text{preheat}} = 2.779 \times 10^{10} \frac{\text{BTU}}{\text{yr}}$$

Apply blended rate for INL electricity costs

$$\text{Energycost} := 0.035 \cdot \frac{\$}{\text{kWh}}$$

$$\text{Savings}_{\text{preheat}} := Q_{\text{preheat}} \cdot \text{Energycost}$$

$$\text{Savings}_{\text{preheat}} = 285084 \frac{\$}{\text{yr}}$$

The proposed WHRS could possibly qualify for energy conservation credits or incentives that would offset capital or operating and maintenance costs. The use of a renewable propylene glycol (such as corn glycol) could potentially qualify for renewable energy credits. Electricity for the INL Site is derived from a mix of hydropower and fossil energy, which varies, depending upon the availability of hydropower in any given year.

## 6.2 Installation, Operating, and Maintenance Costs

A Level 5 cost estimate was prepared for the proposed g-WHRS. The complete cost estimate with details is provided in Appendix A. Total project costs are estimated at \$9.68M. A management reserve of 35% has been applied. It is assumed that the funding would be supplied as indirect funding. The cost estimate includes the capital costs for equipment, installation, construction, demolition, and removal of abandoned lines that are in the way, as well as operating and maintenance costs for the first 5 years of operation. Table 3 outlines the total project costs. The execution phase has the highest costs, which are further delineated in Table 4. Figure 14 shows the relative percentage of the various costs. The most costly items are:

- Installation of the new piping, pumps, heat exchangers and ancillary equipment
- Construction of the new pump and heat exchanger building
- Pumps, heat exchangers and associated equipment (including spares) for the water and glycol loops
- Operations, including development of procedures and plans.

Table 3. Overall Level 5 estimated project costs.

Item	Cost
Project Management	\$584,488
Construction Management	\$462,971
Engineering Design	\$705,514
Design Plans, Reports & Documents	\$281,733
Execution	\$5,314,843
Environmental Assessment	\$171,007
Operations	\$968,018
SAR Update	\$676,639
Readiness	\$163,116
New System SO Testing	\$52,580
Project Closeout	\$299,638
Total	\$9,680,547

Table 4. Cost details for execution phase.

Item	Cost
Removal of Abandoned Equipment	\$373,021
Heat Exchangers, Pumps, Piping, Electrical & Controls	\$994,798
Pump & Heat Exchanger Building	\$975,086
Construction Support & Oversight	\$790,989
General, Piping & Electrical Contractor	\$470,608
Installation of Piping & Equipment	\$1,490,501
Tie-in to SCS	\$219,840
Total for Execution Phase	\$5,314,843

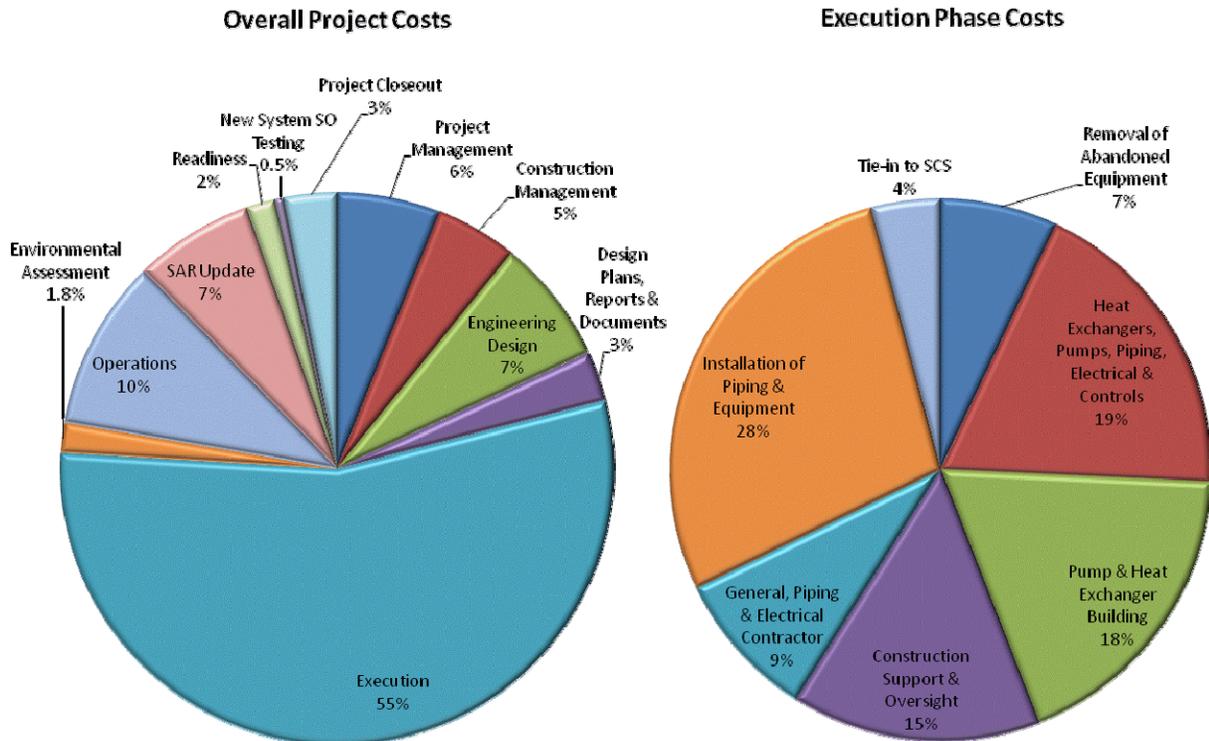


Figure 14. Proposed g-WHRS cost breakdown.

The cost estimate was based upon an ideal schedule for a consecutive 9-month duration for demolition, construction, and installation activities at the reactor building. Unforeseen delays would increase costs. Vacuum excavation is necessary to minimize the risk of damage to underground utilities. Demolition of the old WHRS entails removal of the old piping, insulation, coils, and associated equipment, with the exception of the existing pipe supports that would be reused. Existing penetrations would be used for the new g-WHRS piping. As can be seen in the photos of the canal area, the pipe supports are approximately 40 ft above ground level, which requires the use of a snorkel lift for removal of the old piping and installation of the new piping. No construction debris will be allowed to fall into the canal, so appropriate measures must be put in place.

## 6.3 Technical, Safety, and Logistics Considerations

The following concerns must be addressed before proceeding with the g-WHRS concept. Issues in three areas have been identified: g-WHRS operational concerns, installation issues, and safety reviews and operating procedures.

### 6.3.1 G-WHRS Operational Concerns

Operation of the proposed g-WHRS imposes additional burdens on ATR Operations personnel, which will not improve the safety of the ATR but will increase ATR operating risks. The risks may outweigh any potential cost or energy-savings benefits. The following issues related to the operation and maintenance of the g-WHRS must be addressed:

1. Startup/shutdown of the proposed g-WHRS will coincide with the reactor startup/shutdown. The ATR's most significant event of 2011 occurred during preparation for reactor startup. How will operation of the g-WHRS impact ATR Operations? How much of the operators' time and attention will be required?

2. Shutdown of the proposed g-WHRS will occur during reactor shutdown when ATR Operations personnel may be busier than during reactor startup. During planned shutdowns, most activities are planned and scheduled based upon the available personnel, resources, and time. During an unplanned reactor outage (a reactor scram due to events beyond the control of ATR Operation personnel, such as during a loss of commercial power), there is often no advance warning. The reactor immediately shuts down and the heat generation provided to the SCS drops to zero in seconds. During this time, personnel are extremely busy working to keep the reactor safe. Adding additional burdens to take actions to shutdown the g-WHRS would be an extremely inappropriate use of available personnel. Following a reactor scram, forcing ATR Operations personnel to make a decision between keeping the ATR reactor core safe or shutting down the g-WHRS is not a wise choice. If the operators do not take action to ensure the g-WHRS is shutdown, then it will affect SCS, primary coolant system (PCS), and core temperatures. Operator action to shutdown the g-WHRS would be critical during cold weather, when the g-WHRS is in service.
3. Does the g-WHRS need to be placed into a “wet lay-up” condition for those months when the system is not used? If so, what will be required to transition from wet lay-up to operating status? Will debris settle in the system?
4. What equipment or personnel actions are required to control ATR building ventilation temperatures when starting up or shutting down the g-WHRS? One of the complaints from the previous WHRS installed at the ATR Complex was that when the WHRS was operating, building temperatures were too hot. When the WHRS shut down, the temperatures were too cold. How much operator effort will be required to monitor building temperatures during startup and shutdown of the g-WHRS?
5. How much operator attention will be required to monitor the g-WHRS during steady state operations? Will operator rounds be required to check building temperatures and the g-WHRS equipment? Will operators need to take logs on the g-WHRS equipment?
6. How will the operators know if conditions are correct to startup the g-WHRS? Are there temperature limits for when the system should or should not be operated? What if the nighttime low temperature is 40°F and the daytime high temperature is 80°F? Does the g-WHRS need to be shutdown every morning and restarted every evening? This could be a significant burden on ATR Operations personnel.
7. Does the glycol chemistry remain the same after periods of inactivity? Who will be responsible for sampling the glycol coolant? Who will perform the analysis of the glycol coolant? Who will evaluate the results of the analysis? Who will be responsible for taking action to make the necessary corrective actions to maintain the glycol coolant?
8. Who will be responsible for establishing the preventative maintenance procedures for the g-WHRS? Who will be responsible for performing the maintenance? Who will pay for the replacement parts and materials?
9. Used glycol cannot be discharged to the evaporation pond. What is the proposed disposition pathway for low-level radioactively contaminated glycol?

### **6.3.2 Installation Considerations**

Retrofitting an existing coolant loop is much more difficult than designing a WHRS that is an integral part of a new system. Installation of the proposed g-WHRS represents a significant investment in a new structure and equipment; it includes:

1. Providing necessary instrumentation and controls for the hybrid electrical/g-WHRS. Upgrades to other equipment (electrical, instrumentation, control systems, etc.) may be required to bring these

systems into compliance with current codes when installing the new system. This decision is made by the authority having jurisdiction.

2. Routing piping for the proposed g-WHRS in the same locations as the old WHRS piping, which has been abandoned in place and its condition unknown. It is recommended that the piping from the previous WHRS that was abandoned in place be removed before installing the new piping associated with the g-WHRS. If additional new piping is routed without removing the previous WHRS piping, the loading affect on the ATR building structure will need to be evaluated. Removal of old steam and condensate lines may be complicated by the presence of asbestos insulation.
3. Maintaining the drawings of the g-WHRS system and keeping them current.
4. Performing the installation of the new coils when space heating is not required, so as not to adversely impact building occupants and operations.

### **6.3.3 Safety Reviews and Operating Procedures**

Existing safety documentation must be reviewed and any unreviewed safety questions (USQs) addressed. Procedures must be established for normal and off-normal operations as follows:

1. The proposed glycol coolant creates a new flooding event that is different from any previously evaluated flooding event for ATR. Although the g-WHRS would not be installed within the confinement, there is the potential for flooding to impact vital systems, such as electrical equipment switchgear. This may have an effect on the ATR SAR-153, TSR-186, and Probabilistic Risk Assessment (PRA), which will need to be evaluated.
2. Operating documents will need to be created, maintained, and updated for startup, shutdown, monitoring, logkeeping, and maintenance of the g-WHRS. A procedure will need to be created to address personnel actions and cleanup requirements in the event of a glycol spill.

## 7. OTHER ENERGY AND WATER EFFICIENCY OPPORTUNITIES AT ATR

It is paramount that any energy conservation measures (ECMs) considered for implementation must not adversely impact the mission of the ATR. The objectives of the ECMs should be to reduce energy or water *waste*, not *use*.

### 7.1 Alternate Waste Heat Recovery Concepts

Some alternatives to the g-WHRS for waste heat recovery at ATR are to recover heat from:

- The ATR diesel engine generators (DG). One of the two Enterprise DSQ-38 DGs operates continuously during reactor operation and for a minimum of 30 minutes after reactor shutdown to provide electric power for mission-critical vital loads. Each engine is an in-line, eight-cylinder, four-cycle diesel engine with a displacement of 32,170 in<sup>3</sup>, rated for 2,170 horsepower at 360 revolutions per minute, and drives a 4,160 V<sub>ac</sub>, 1,500 kW generator (Ceci 2008).
  - Heat generated during DG operations could be used for hot water needs or for space heating; freeze protection of water pipes would be required.
  - Or, if the loads were instead configured to operate on commercial power, rather than diesel, there could be a cost-savings from reduced operating and maintenance costs and a reduction in greenhouse gas (GHG) emissions. The DGs would be kept as a backup and operated in the event of a loss of commercial power.
- Exhaust air flows using heat pipe heat exchangers, heat recovery ventilators, or energy recovery ventilators.
- Air conditioning system to provide preheated water to the water heater.
- Water-cooled air compressors for hot water preheating.

### 7.2 INL Water Usage

An assessment of water usage at INL (Cabe et al. 2012) provided four recommendations to improve water efficiency at the ATR:

1. Incorporate a cooling tower blowdown controller for total dissolved solids and pH control.
2. In conjunction with Recommendation 1, replace the current scale and corrosion control chemicals with materials that are less likely to precipitate as scale-forming constituents in the recirculating cooling tower water.
3. Eliminate once-through cooling water for the air-compressor heat exchangers and replace with air-cooled heat exchangers. Drawbacks to this proposed concept are reduced reliability during hot weather operations and the need for water to be supplied to the ATR sewage lagoon to keep the bentonite liner wet.
4. Eliminate once-through cooling water for ATR heating, ventilation, and air conditioning (HVAC) equipment when the reactor is off-line.

For additional details, see Cabe et al.'s 2012 report. If all of the above recommendations were implemented, the estimated yearly savings would be 145.6M gal for water and \$17.7K for energy. These recommendations should be evaluated by ATR Operations personnel to determine impacts to the reactor and ancillary systems.

## **8. RECOMMENDATIONS**

The simple payback for the proposed g-WHRS is 35 years. This does not include operating and maintenance costs beyond the first 5 years of operations. Industry typically does not consider WHRSs as a capital improvement project, with a target payback within 3 years; rather, industry considers a WHR project with a payback period within 6 years to be acceptable (Tillman, 2012). The long payback period for the proposed g-WHRS is due to a combination of factors that tend to reduce energy savings and increase costs. These factors include the low cost of electricity, partial year operation and high cost of performing work in a Hazard Category 1 nuclear facility. The low temperature of the SCS makes it extremely unattractive for other waste heat applications, such as the generation of electricity via the Organic Rankine Cycle. The poor economics are compounded by operational concerns and previous bad experience with the old WHRS. Based upon these factors, the g-WHRS is not an attractive option for WHR at the ATR.

## 9. REFERENCES

- Bayless, P. D., and S. T. Polkinghorne, 2005, "Updated Complete Loss of Flow and Complete Loss of Heat Sink Analyses for the Advanced Test Reactor," Idaho National Laboratory Engineering Design File, EDF-5522, January 18, 2005.
- Brown, R. D. and Donovan, L. E., 1979, "Conceptual Design Report for TRA Heating System Upgrade with Waste Heat Recovery," EG&G Idaho, Inc., Internal Technical Report No. RE-D-77-212, Rev. 2, March 5, 1979.
- Cabe, J. E., De La Rosa, M. I., Boyd, B. K., Russell, B. W., McMordie Stoughton, K. L., 2012, "Idaho National Laboratory Water Assessment," Pacific Northwest National Laboratory Report PNNL-XXXXX, February 2012.
- Ceci, D. M., 2008, "Project Management and Technical Support Service for the ATR Enterprise Diesel Engine Overhauls," SOW-6743, September 25, 2008.
- Grover, G., and J. Brower, 2003, "USQ Screen for Modifications to Nuclear Reactor Facilities," SES-2002-457, Modification/FCF Number 8.1.2-6/6795 Rev. 1, March 14, 2003.
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- SAR-153, 2011, "Upgraded Final Safety Analysis Report for the Advanced Test Reactor," Idaho National Laboratory Safety Analysis Report SAR-153, Chapter 5 – Primary Coolant System, Rev. 14, February 15, 2011.
- Tillman, T., TAS Energy presentation to the Technology Forum on Low-Temperature Waste Energy Recovery in Chemical Plants and Refineries, Houston, Texas, May 16, 2012.
- U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Buildings Energy Data Book: *3.1 Commercial Sector Energy Consumption*, March 2011.
- U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 2010, "Energy Efficiency Trends in Residential and Commercial Buildings," August 2010.
- U.S. Department of Commerce National Oceanic and Atmospheric Administration National Environmental Satellite, Data, and Information Service, 2011, *Historical Climatology Series 5-1, July 2009 through Dec 2010*, Published March 2011.

**Appendix A**  
**g-WHRS Cost Estimate**



# Appendix A

## g-WHRS Cost Estimate

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### INTEROFFICE MEMORANDUM

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**Date:** May 9, 2012  
**To:** C. P. Ischay, Engineer  
**From:** A. W. Miller, S. N. Wasley Cost Estimators  
**Subject:** RTC Waste Heat Recovery

Per your request, Cost Estimating prepared a cost estimate (Class 5) for the above-mentioned subject. The estimated cost, including escalation and management reserve, is \$9,600,000.

Please note the following:

- A. Per the requester, this work will be indirect funded. General and Administrative (G&A) costs are not included in this estimate.
- B. This cost estimate has been evaluated in the Association for the Advancement of Cost Engineering International (AACEI) classification matrix as a Class 5 estimate (*ref. Department of Energy (DOE) G. 430.1-1X, Appendix J*). The primary characteristic used in this guideline to define the classification category is the degree of project definition at this time. The intent of this classification is to assist in the interpretation of the quality and value of the information available to prepare this cost estimate and the expected accuracy levels that can be produced. Per AACEI, a Class 5 indicates the lowest amount of project information quality and value with a graded approach to a Class 1, which indicates the highest amount of project information quality and value.
- C. A review of this cost estimate was held on May 8, 2012, with you, the project team, and the cost estimators. This review allowed the estimators to discuss, in detail, the perceived scope, basis of estimates, assumptions, project risks, and the resources that make up this cost estimate. Comments from this review have been incorporated into this estimate to reflect a project team consensus of this document.
- D. This project has been identified by Idaho National Laboratory (INL) Construction Management, R. E. Strong, as a "Block 2" in the INL Construction Commercial Practices Evaluation for the purpose of construction scope, management, and field oversight.

Refer to the cost estimating summary, detail, markup, and labor sheets with the cost breakdowns. Also included for your use are the cost estimate recapitulation sheets describing the basis and assumptions used in development of this estimate.

This estimate, the work, and the work breakdown structure are based on the information perceived by this estimator as to the scope of work to be completed. Any changes to the methodology used to prepare this estimate could have a significant effect on the cost estimate and/or schedule and should be reviewed by me. If you have any questions or comments, do not hesitate to contact me at 526-1827 or e-mail [Andrew.Miller@inl.gov](mailto:Andrew.Miller@inl.gov) or Scott Wasley at 526-6835 or [Scott.Wasley@inl.gov](mailto:Scott.Wasley@inl.gov).

C. P. Ischay  
May 9, 2012  
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Attachments

cc: Estimate File 7B50

Uniform File Code: 8309

Disposition Authority: A16-1.5-b

Retention Schedule: Cut off at the end of each fiscal year. Destroy 10 years after cutoff.

NOTE: Original disposition authority, retention schedule, and Uniform Filing Code applied by the sender may not be appropriate for all recipients. Make adjustments as needed.

**Summary Report**

Project Name: *RTC Waste Heat Recovery*

Project Location: *ATR*  
 Project Number: *7B50*

<u>ESTIMATE ELEMENT</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve</u>	<u>TOTAL</u>
<b>Total Estimated Cost (TEC)</b>	\$3,823,811	8.82% \$337,396	35.00% \$1,456,422	\$5,617,630
<b>Other Project Cost (OPC)</b>	\$2,723,509	10.50% \$286,060	35.00% \$1,053,349	\$4,062,918
<b>Total Cost</b>	\$6,547,320	9.52% \$623,456	35.00% \$2,509,772	\$9,680,547
<b>Rounded Total Cost</b> (Rounded to the nearest \$ 100000)				<b>\$9,700,000</b>

25

	Remarks
Type of Estimate: <u>Class-5</u> Estimator: <u>A. W. Miller / S. N. Wasley</u> Checked By: _____ Approved By: _____	

**FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

Project Title: RTC Waste Heat Recovery  
Estimator: A. W. Miller/S. W. Wasley  
Date: May 7, 2012  
Estimate Type: Class 5  
File: 7B50  
Approved By:

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- I. **PURPOSE:** *Brief description from the requester of the intent of how the estimate is to be used, i.e., for engineering study, comparative analysis, request for funding, proposal, etc.*

The purpose of this estimate is to identify the resources required to complete the scope of work as stated below. It is expected that this estimate will be considered and used by Battelle Energy Alliance, LLC (BEA) in the path forward decision making process for this project.

- II. **SCOPE OF WORK:** *Brief statement of the project's objective. Thorough overview and description of the proposed project. Identify work to be accomplished, as well as any specific work to be excluded.*

A. **Objective:**

The objective of this work is to remove and replace the existing heat recovery piping and insulation system in Building TRA-670. The piping will be removed from the canal storage area, general storage lay-down area, and the Advanced Test Reactor Critical (ATRC) area on the west end of Building TRA-670. This system will be replaced utilizing existing piping racks and penetrations for the new piping system. A new structure will be built to house a heat exchanger and pumps that will tie into the existing secondary cooling water system that will supply water to the heat exchanger system. It is expected that by using the secondary cooling water system from the reactor, the high temperature water will provide energy saving heat through this new piping system, via the existing ventilation system. This work will be performed at the Advanced Test Reactor (ATR) Complex located at Idaho National Laboratory (INL).

B. **Included:**

The scope of work required to achieve this objective includes the following:

1. Providing project management support and oversight during the project initiation, design effort, execution phase, and close out.
2. Full time radiological technicians during the subcontracted activities, per construction management.
3. Full time security escorts/guard services for the subcontractors during all activities within TRA-670, per construction management.
4. Quality assurance support.
5. Operations support during outages.
6. Engineering oversight during the execution phase and project support closeout.

## **FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title: ATR Waste Heat Recovery

File: 7B50

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7. Support to implement new safety analysis reviews (SAR) and unreviewed safety questions (USQ).
8. Environmental assessments will be performed by BEA personnel.
9. A probable risk assessment (PRA) will be performed by BEA personnel to address hazards to the reactor, accident scenarios, etc.
10. Development and/or modifications to existing test procedures, operating procedures, and preventative maintenance procedures to meet the operating requirements of the new heat recovery piping system.
11. Developing and maintaining existing ATR drawings by BEA personnel.
12. Developing operating documents to develop start up/shutdown procedures, monitoring procedures, and system cleanup procedures in case of a glycol spill.
13. Maintenance/operating costs to startup/shutdown, system layup, solution replacement, and system cleaning from corrosion. This estimate includes a 5 year maintenance duration allowance.
14. Training for the BEA crafts to understand and operate the new heat recovery system being installed.
15. General closeout activities including as-built drawings, lessons learned, and training of systems.
16. Subcontracting the execution activities involved with the demolition and installation of the new heat recovery system and the construction of the new heat exchanger building located north of Building TRA-670, includes the following:
  - a. A general subcontractor to manage and direct lower tier subcontractors performing work in Building TRA-670 and in the new heat exchanger structure.
  - b. Draining the existing heat recovery system of any existing fluids that may remain in the original system.
  - c. Removal and disposal of all the existing piping insulation.
  - d. Demolition and disposal of the existing heat recovery system throughout Building TRA-670.
  - e. Installation of a new heat recovery piping system and piping insulation on the existing heat recovery piping racks throughout Building TRA-670.
  - f. Installation of new pressure relief valves, and surge tanks.
  - g. New coils will be installed in the existing heat recovery systems.
  - h. Installation of a 50/50 glycol solution in the heat recovery system piping
  - i. System operation devices for a complete heat recovery operating system.
  - j. Allowances to tie into the existing secondary piping reactor cooling system located north of Building TRA-670.
  - k. A new building 60' X 30' X 20' structure to house the new heat exchanger.
  - l. Allowances to provide for footings and foundations for the new structure plus a concrete slab floor.
  - m. New building structure with a roof and lightning protection system.
  - n. A new heating, ventilating and air conditioning system will be installed in the new structure.

## **FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title: ATR Waste Heat Recovery

File: 7B50

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- o. Epoxy paint throughout the new building structure.
- p. Allowance for general lighting systems and outlets have been included in the estimate.
- q. Alarm and communication system allowance in the new structure.
- r. Fire suppression system allowance in the new structure.
- s. One new heat exchanger unit will be installed in the new structure.
- t. New electrical pumps with motors and piping system will be installed in the new heat exchanger building.
- u. Labels will be installed to identify systems and flow characteristics.
- v. Startup and testing of the new system by the subcontractors.

C. **Excluded:**

This scope of work specifically excludes the following:

- 1. Any upgrades or rebuilding of the existing heat recovery piping supports in Building TRA-670.
- 2. Upgrades to the existing mechanical and electrical systems beyond the identified scope of work.
- 3. The new heat recovery system will not support any other buildings within the ATR Complex.
- 4. Project impacts due to encountering asbestos or other hazardous materials that are not explicitly noted in the Building TRA-670 asbestos inspection reports.
- 5. BEA General and Administrative costs; this project would be funded as indirect.

III. **ESTIMATE METHODOLOGY:** *Overall methodology and rationale of how the estimate was developed, i.e., parametric, forced detail, bottom up, etc. Total dollars/hours and rough order of magnitude (ROM) allocations of the methodologies used to develop the cost estimate.*

Because this document will be used to establish the project path forward, a “forced detail” method was used to develop this estimate. This method provides for a greater degree of detail than would be provided utilizing parametric modeling. The activities and resources were developed by the cost estimator and the project team from engineering and project information that provided the level of detail documented in the estimate.

Estimate Methodology	ROM Percentage (%)
Project Team	65
Recorded Actuals	0
Parametric	0
Vendor Quotes	0
Other (e.g., RS Means)	35
<b>TOTAL</b>	<b>100</b>

## **FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title: ATR Waste Heat Recovery

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IV. **BASIS OF THE ESTIMATE:** *Overall explanation of sources for resource quantities, pricing, and schedules.*

- A. **Quantification Basis:** *The source for the measureable quantities in the estimate that can be used in support of earned value management. Source documents may include drawings, design reports, engineers' notes, and other documentation upon which the estimate is originated.*

The requester provided a draft assessment of feasibility, dated March 2012, INL/EXT-12-25004. This preliminary concept provided a write up of the work scope to be executed in Building TRA-670. In addition, a site tour of Building TRA-670 reactor building and other affected areas of the project was used to develop the quantifications. This preliminary work scope information was developed by BEA engineering and was used to establish the activities and quantities for this estimate.

- B. **Planning Basis:** *The source for the execution and strategies of the work that can be used to support the project execution plan, identification of long-lead items, acquisition strategy, schedules, market conditions, and other documentation upon which the estimate is originated.*

1. Per the requester:
  - a. This project will be indirect funded.
  - b. BEA will provide resources for all engineering, project management, and construction management resources.
  - c. This project will be competitively bid within the local subcontracting community. Local subcontractors familiar with performing work for INL will construct the project.
  - d. This work will be performed during standard working hours and no premium time will be required for off-shift or weekend work.
  - e. Work will be able to progress consecutively and will not require delays between work segments.
  - f. The cost estimate does not consider or address funding or labor resource restrictions. Sufficient funding and labor resources will be available in a manner allowing optimum usage of that funding and resources as estimated.
2. The engineering activities will begin in early FY 2013, with the construction to begin in FY 2014. It is anticipated that the construction will be completed in 9 months.
3. Subcontractor markup rates are based on this estimator's judgment. These rates have been adjusted to reflect the estimated anticipated market conditions.
4. Existing preventative maintenance procedures, operating procedures, and testing procedures will be utilized with minimal modifications to the documents.

## **FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title: ATR Waste Heat Recovery

File: 7B50

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5. This project will be performed during the normal reactor operation at the TRA-670 facility.
- C. **Cost Basis:** *The source for the costing on the estimate that can be used in support of earned value management, funding profiles, and schedule of values. Sources may include published costing references, judgment, actual costs, preliminary quotes and/or other documentation upon which the estimate is originated.*
1. INL labor rates, fees, and burdens are based on the current published rates as provided by BEA Planning and Financial Controls.
  2. Craft labor rates are based on information provided by the “INL Site Stabilization Agreement.” Adders (such as FICA, SUTA, and federal insurances) are based on an interpretation by Cost Estimating.
  3. Estimated escalation rates are based on historical indexes from 1962 to today, as published by RS Means. Five-year, ten-year, and lifecycle trends were developed to estimate the most likely rates that have been used in this estimate. Inflationary and deflationary impacts will be addressed in management reserve.
  4. Sales tax on materials is based on the current 6% rate charged by the State of Idaho.
  5. Labor factors affecting work being performed within Building TRA-670 have been adjusted. These factors were applied as appropriate in accordance with the project team and estimator’s judgment.
  6. Estimate includes a full time non-working supervisor/safety representative for the subcontracted work being performed at the ATR complex.
  7. Standard published industry references RSMeans and Richardson’s Cost Data Online were used to help develop the estimated resources and their productivities and some material costs.
- V. **ESTIMATE QUALITY ASSURANCE:** *A listing of all estimate reviews that have taken place and the actions taken from those reviews.*
- A. A formal review of the cost estimate was held on May 8, 2012, with the requester, project team and the cost estimators. This review allowed for the project team to review and comment, in detail, on the perceived scope, basis of estimate, assumptions, project risks, and the resources that make up this cost estimate. Comments from this review have been incorporated into this estimate to reflect a project team consensus of this document.
  - B. An internal organizational check has been performed on this estimate with the purpose of checking the methodology approach used, discussing the document with the estimator, and ensuring the document has been reviewed and discussed with the requester, reflects a team consensus, has adequately documented the basis, assumptions, and risks to the project, and has mitigated those risks.

## **FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title: ATR Waste Heat Recovery

File: 7B50

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- VI. **ASSUMPTIONS:** *Condition statements accepted or supposed true without proof of demonstration; statements adding clarification to scope. An assumption has a direct impact on total estimated cost.*
- A. No modification to existing utility systems including code updates, other than the systems where work is being performed to complete the heat recovery project.
  - B. The pipe removal and installation in Building TRA-670 will be performed during normal reactor operations and also when work is being performed in the canal area.
  - C. During the existing system removal no asbestos materials will be encountered during the execution of the subcontracted work being performed.
  - D. Demolition of the existing heat recovery systems is limited to the confines of Building TRA-670.
  - E. Re-use of existing piping supports without any engineering reanalysis or any physical modifications to the existing heat recovery piping supports in Building TRA-670.
  - F. This system will not be designed as a safety class system that supports the reactor.
  - G. No additional confinement penetrations will be required for the heat recovery system installation.
  - H. The estimate is based on the header supply and return piping to be 8" in diameter and all the coil branch supply lines and return lines will be 4" in diameter.
  - I. The new piping system will require insulation and a polyvinyl chloride jacket on the outside of the insulation.
  - J. There will be sufficient electrical power available to support the new system without any major modifications to electrical equipment existing in Building TRA-670.
  - K. The existing electrical equipment used in the original heat recovery system will be in good working condition and not require extensive testing and verification to ensure the system is working properly.
  - L. System tie-ins to the secondary cooling system will be performed during a reactor outage.
  - M. The new heat exchanger building will be constructed west of TRA-676 (fitness center) located on the north end of Building TRA-670.
  - N. This estimate includes a redundant pumping system for the secondary cooling side and the glycol loop side of the heat recovery system.
  - O. No delays will occur while the construction is being performed in the reactor canal area and the ATRC reactor area.
  - P. Two snorkel lifts will be used to remove the existing piping in the canal area and to reinstall the piping in the canal area. It is assumed the lifts will be able to enter the building through the west end overhead door.
  - Q. Equipment will be able to access all areas that will require piping removal and installation in the ATRC reactor area.
  - R. Radiological oversight will be required for all subcontracted activities.
  - S. No outside work will be performed during adverse weather conditions.

## **FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title: ATR Waste Heat Recovery

File: 7B50

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### VII. **MANAGEMENT RESERVE (MR) GUIDELINE IMPLEMENTATION:**

**Management Reserve Methodologies:** *Explanation of methodology used in determining overall management reserve. Identify any specific drivers or items of concern and any inherent risks typical with this type of environment. Inflationary and deflationary impacts are addressed in this section.*

No formal risk review was performed for this project. A blanket management reserve allowance of 35% was applied to this cost estimate. This allowance was concurred with by the cost estimators and the project team as generally reflective of the risks and assumptions stated in this document, and as appropriate for the purpose of this cost estimate.

A. **Threats:** *Uncertain events that are potentially negative or reduce the probability that the desired outcome will happen.*

1. No detailed design exists for this project. The estimated costs were based on the cost estimator's perceived idea as to the design requirements and project scope that will be required. Completion of the design may increase the costs due to requirements or needs not identified in the scope of this estimate.
2. Preciseness in the forced detail take-offs leaves little room if crews are unable to meet the estimated production rates. Factors could include, but are not limited to, changes to Integrated Safety Management requirements, equipment breakdowns, resource impacts, and/or availability.
3. Possible glycol solution leaking into the secondary reactor cooling system through a breach in the heat exchanger, this could cause cross contamination in the systems.
4. Flooding in the TRA-670 reactor building due to a break in the system or a manufacturer's defect in the materials that will be installed.
5. More than normal adverse weather (cold, snow, rain, and wind) would cause losses in productivity or even stop the work. This loss in productivity or stoppage would still require for the operating contractor's forces to be compensated.
6. Impacts due to ongoing ATR operation activities could delay the project.
7. If the existing pipe hangers do not meet the current seismic requirements an evaluation and installation of new pipe hangers could be required.

B. **Opportunities:** *Uncertain events that could improve the results or improve the probability that the desired outcome will happen.*

1. Well-planned-out work activities and scheduling by the subcontractors could result in increased production, thus producing lower bids and operating contractor oversight costs than what have been estimated.
2. Optimization of the design could reduce the utility runs, thus reducing the costs associated with those activities.

**FORMAL COST ESTIMATE SUPPORT DATA RECAPITULATION**

-Continued-

Project Title:     ATR Waste Heat Recovery

File:               7B50

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3. In the event standard excavation activities could be performed in lieu of vacuum excavation.

C. **Accepted Risks:** *Activities with a greater than 50% and less than 100% probability of occurrence has been accepted as part of this scope of work.*

NA

D. **Excluded Risks:** *Risks that have been identified and have a probability of occurrence but are specifically excluded from this estimate.*

NA

Note: Management reserve does not increase the overall accuracy of the estimate; it does, however, reduce the level of risk associated with the estimate. Management reserve is intended to cover the inadequacies in the complete project scope definition, estimating methods, and estimating data. Management reserve specifically excludes changes in project scope, unexpected work stoppages, (e.g., strikes, disasters, and earthquakes) and excessive and/or unexpected inflation or currency fluctuations. This estimate does not contain any contingencies and has not been evaluated to include any contingencies and has not been evaluated to include any of the risks that pertain to Department of Energy.

VIII. **OTHER COMMENTS/CONCERNS SPECIFIC TO THE ESTIMATE:**

None.

### Project Summary Report

Project Name: *RTC Waste Heat Recovery*

Client: *C. P. Ischay*  
 Prepared By: *A. W. Miller / S. N. Wasley*  
 Estimate Type: *Class-5*

Project Location: *ATR*  
 Estimate Number: *7B50*

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
<b>1.0</b>		<b><u>Project Management (PM)</u></b>	<b>\$402,470</b>	<b>\$30,484</b>	<b>\$151,534</b>	<b>35.00%</b>	<b>\$584,488</b>
1.1	OPC	.... Project Management Initiation	\$53,867	\$2,995	\$19,902	35.00%	\$76,764
1.2		.... Project Management (PM) Support during Design Phase	\$130,099	\$7,233	\$48,066	35.00%	\$185,398
1.2.1		..... Provide PM Oversight - Level of Effort (LOE) during Design Phase	\$69,087	\$3,841	\$25,525	35.00%	\$98,453
1.2.2		..... Maintain Project Files - LOE during Design Phase	\$10,327	\$574	\$3,815	35.00%	\$14,717
1.2.3		..... Provide Cost and Schedule Support during Design Phase	\$50,684	\$2,818	\$18,726	35.00%	\$72,228
1.3		.... Project Management (PM) Support during Execution	\$158,961	\$14,736	\$60,794	35.00%	\$234,491
1.3.1		..... Provide PM Oversight - Level of Effort (LOE) during Execution	\$91,700	\$8,501	\$35,070	35.00%	\$135,270
1.3.2		..... Maintain Project Files - LOE during Execution	\$13,770	\$1,276	\$5,266	35.00%	\$20,312
1.3.3		..... Provide Cost and Schedule Support during Execution	\$53,492	\$4,959	\$20,458	35.00%	\$78,908
1.4		.... Quality Assurance and Quality Control Support	\$59,543	\$5,520	\$22,772	35.00%	\$87,835
1.4.1	OPC	..... Provide Quality Inspections During Construction - First Line	\$50,650	\$4,695	\$19,371	35.00%	\$74,716
1.4.2	OPC	..... Quality Assurance Oversight	\$8,894	\$824	\$3,401	35.00%	\$13,119
<b>2.0</b>		<b><u>Construction Management (CM)</u></b>	<b>\$313,848</b>	<b>\$29,094</b>	<b>\$120,029</b>	<b>35.00%</b>	<b>\$462,971</b>
2.1		.... Provide CM Oversight/Support during Execution - Level of Effort (LOE)	\$122,397	\$11,346	\$46,810	35.00%	\$180,554
2.2	OPC	.... BEA - Provide CM Supervision - OPC	\$14,611	\$1,354	\$5,588	35.00%	\$21,554
2.3	OPC	.... Provide Safety Oversight/Support during Execution - LOE	\$110,390	\$10,233	\$42,218	35.00%	\$162,842
2.4	OPC	.... Provide Industrial Hygiene Oversight/Support during Execution - LOE	\$50,864	\$4,715	\$19,453	35.00%	\$75,032
2.5		.... Perform Subsurface Investigations Prior to Excav'ns, Floor and Wall Penetrations	\$11,475	\$1,064	\$4,389	35.00%	\$16,928

**BEA**

### Project Summary Report

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
2.6		.... CM Support During Design and Closeout	\$4,109	\$381	\$1,572	35.00%	\$6,062
<b>3.0</b>		<b><u>Engineering/Design</u></b>	<b>\$495,077</b>	<b>\$27,526</b>	<b>\$182,911</b>	<b>35.00%</b>	<b>\$705,514</b>
3.1		.... BEA Engineering & Design Phase	\$495,077	\$27,526	\$182,911	35.00%	\$705,514
3.1.1	OPC	..... BEA Engineering & Design Conceptual Phase	\$165,026	\$9,175	\$60,970	35.00%	\$235,171
3.1.2		..... BEA Engineering & Design Preliminary Phase	\$126,829	\$7,052	\$46,858	35.00%	\$180,739
3.1.3		..... BEA Engineering & Design Final Phase	\$203,222	\$11,299	\$75,082	35.00%	\$289,604
<b>4.0</b>	<b>OPC</b>	<b><u>Design Plans, Reports &amp; Documents</u></b>	<b>\$197,699</b>	<b>\$10,992</b>	<b>\$73,042</b>	<b>35.00%</b>	<b>\$281,733</b>
4.1	OPC	.... Environmental Documents (NEPA Checklist)	\$4,898	\$272	\$1,809	35.00%	\$6,979
4.2	OPC	.... Hazards Documents	\$22,568	\$1,255	\$8,338	35.00%	\$32,161
4.2.1	OPC	..... Prepare Fire Hazards Analysis Report	\$22,568	\$1,255	\$8,338	35.00%	\$32,161
4.3	OPC	.... Other Documents	\$11,431	\$636	\$4,223	35.00%	\$16,290
4.3.1	OPC	..... Prepare Davis Bacon Determination Documents	\$11,431	\$636	\$4,223	35.00%	\$16,290
4.4	OPC	.... Prepare Unreviewed Safety Questions (USQs)	\$85,889	\$4,775	\$31,732	35.00%	\$122,397
4.5	OPC	.... Probabilistic Risk Assessment (PRA)	\$72,913	\$4,054	\$26,939	35.00%	\$103,906
4.5.1	OPC	..... Probabilistic Risk Assessment (PRA) Preliminary	\$29,941	\$1,665	\$11,062	35.00%	\$42,667
4.5.2	OPC	..... Probabilistic Risk Assessment (PRA) Final	\$42,973	\$2,389	\$15,877	35.00%	\$61,239
<b>5.0</b>		<b><u>Execution Phase</u></b>	<b>\$3,602,929</b>	<b>\$333,992</b>	<b>\$1,377,922</b>	<b>35.00%</b>	<b>\$5,314,843</b>
5.1		.... Subcontract Construction	\$3,066,718	\$284,285	\$1,172,851	35.00%	\$4,523,854
5.1.1		..... General Conditions	\$319,025	\$29,574	\$122,009	35.00%	\$470,608
5.1.1.1		..... General Contractor	\$144,214	\$13,369	\$55,154	35.00%	\$212,737
5.1.1.2		..... Piping Contractor	\$99,904	\$9,261	\$38,208	35.00%	\$147,373
5.1.1.3		..... Electrical Contractor	\$74,906	\$6,944	\$28,648	35.00%	\$110,498
5.1.2		..... Building TRA-670 Heat Recovery Demolition/Installation	\$1,263,281	\$117,106	\$483,135	35.00%	\$1,863,522
5.1.2.1		..... Waste Heat Recovery Piping Demolition	\$252,871	\$23,441	\$96,709	35.00%	\$373,021

**BEA**

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**Project Summary Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
5.1.2.1.1		..... North Wall Canal Area Piping and Insulation Demolition	\$62,569	\$5,800	\$23,929	35.00%	\$92,299
		..... Main Supply Demolition (Canal Area 40' Elevation)	\$7,312	\$678	\$2,796	35.00%	\$10,786
		..... Main Supply Insulation Demolition (Canal Area 40' Elevation)	\$15,648	\$1,451	\$5,985	35.00%	\$23,084
		..... Main Return Demolition (Canal Area 40' Elevation)	\$7,312	\$678	\$2,796	35.00%	\$10,786
		..... Main Return Insulation Demolition (Canal Area 40' Elevation)	\$15,648	\$1,451	\$5,985	35.00%	\$23,084
		..... Overhead Working Equipment	\$16,648	\$1,543	\$6,367	35.00%	\$24,558
5.1.2.1.2		..... Canal Area Mezzanine Piping and Insulation Demolition	\$24,075	\$2,232	\$9,207	35.00%	\$35,515
		..... Main Supply Demolition (Canal Mezzanine Area 40' Elevation)	\$2,559	\$237	\$979	35.00%	\$3,775
		..... Main Supply Insulation Demolition (Canal Mezzanine Area 40' Elevation)	\$5,477	\$508	\$2,095	35.00%	\$8,079
		..... Main Return Demolition (Canal Mezzanine Area 40' Elevation)	\$2,559	\$237	\$979	35.00%	\$3,775
		..... Main Return Insulation Demolition (Canal Mezzanine Area 40' Elevation)	\$5,477	\$508	\$2,095	35.00%	\$8,079
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805
5.1.2.1.3		..... Canal Area West End Piping and Insulation Demolition	\$24,075	\$2,232	\$9,207	35.00%	\$35,515
		..... Main Supply Demolition (West Canal Area 30' Elevation)	\$2,559	\$237	\$979	35.00%	\$3,775
		..... Main Supply Insulation Demolition (West Canal Area 30' Elevation)	\$5,477	\$508	\$2,095	35.00%	\$8,079
		..... Main Return Demolition (West Canal Area 30' Elevation)	\$2,559	\$237	\$979	35.00%	\$3,775
		..... Main Return Insulation Demolition (West Canal Area 30' Elevation)	\$5,477	\$508	\$2,095	35.00%	\$8,079
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805

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**Cost Estimating**

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### Project Summary Report

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
5.1.2.1.4		..... Canal Area West End Vertical Piping and Insulation Demolition	\$14,891	\$1,380	\$5,695	35.00%	\$21,966
		..... Main Supply Demolition (West Canal Area 40' Elevation)	\$1,097	\$102	\$419	35.00%	\$1,618
		..... Main Supply Insulation Demolition (West Canal Area 40' Elevation)	\$2,347	\$218	\$898	35.00%	\$3,463
		..... Main Return Demolition (West Canal Area 40' Elevation)	\$1,097	\$102	\$419	35.00%	\$1,618
		..... Main Return Insulation Demolition (West Canal Area 40' Elevation)	\$2,347	\$218	\$898	35.00%	\$3,463
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805
5.1.2.1.5		..... West End Laydown Area Metal Piping and Insulation Demolition	\$24,478	\$2,269	\$9,361	35.00%	\$36,108
		..... Main Supply Demolition (Laydown Area West Wall 20' Elevation)	\$2,760	\$256	\$1,056	35.00%	\$4,072
		..... Main Supply Insulation Demolition (Laydown Area West Wall 20' Elevation)	\$5,477	\$508	\$2,095	35.00%	\$8,079
		..... Main Return Demolition (Laydown Area West Wall 20' Elevation)	\$2,760	\$256	\$1,056	35.00%	\$4,072
		..... Main Return Insulation Demolition (Laydown Area West Wall 20' Elevation)	\$5,477	\$508	\$2,095	35.00%	\$8,079
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805
5.1.2.1.6		..... North End Laydown Area Metal Piping and Insulation Demolition	\$26,831	\$2,487	\$10,261	35.00%	\$39,580
		..... Main Supply Demolition (Laydown Area North Wall 20' Elevation)	\$3,155	\$292	\$1,207	35.00%	\$4,654
		..... Main Supply Insulation Demolition (Laydown Area North Wall 20' Elevation)	\$6,259	\$580	\$2,394	35.00%	\$9,233
		..... Main Return Demolition (Laydown Area North Wall 20' Elevation)	\$3,155	\$292	\$1,207	35.00%	\$4,654
		..... Main Return Insulation Demolition (Laydown Area North Wall 20' Elevation)	\$6,259	\$580	\$2,394	35.00%	\$9,233
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805

**BEA**

### Project Summary Report

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
5.1.2.1.7		..... Westside South From The Canal Area Metal Piping and Insulation Demolition	\$48,955	\$4,538	\$18,723	35.00%	\$72,216
		..... Main Supply Demolition (Southwest Area 40' Elevation)	\$5,521	\$512	\$2,111	35.00%	\$8,144
		..... Main Supply Insulation Demolition (Southwest Area 40' Elevation)	\$10,954	\$1,015	\$4,189	35.00%	\$16,159
		..... Main Return Demolition (Southwest Area 40' Elevation)	\$5,521	\$512	\$2,111	35.00%	\$8,144
		..... Main Return Insulation Demolition (Southwest Area 40' Elevation)	\$10,954	\$1,015	\$4,189	35.00%	\$16,159
		..... Overhead Working Equipment	\$16,006	\$1,484	\$6,121	35.00%	\$23,611
5.1.2.1.8		..... Northeast side Diesel Generator Room Area Metal Piping and Insulation Demolition	\$19,771	\$1,833	\$7,561	35.00%	\$29,164
		..... Main Supply Demolition (Diesel Generator Room Area North Wall 20' Elevation)	\$1,972	\$183	\$754	35.00%	\$2,909
		..... Main Supply Insulation Demolition (Diesel Generator Room Area North Wall 20' Elevation)	\$3,912	\$363	\$1,496	35.00%	\$5,771
		..... Main Return Demolition (Diesel Generator Room Area North Wall 20' Elevation)	\$1,972	\$183	\$754	35.00%	\$2,909
		..... Main Return Insulation Demolition (Diesel Generator Room Area West Wall 20' Elevation)	\$3,912	\$363	\$1,496	35.00%	\$5,771
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805
5.1.2.1.9		..... Demo Existing Coils	\$7,225	\$670	\$2,763	35.00%	\$10,659
5.1.2.2		..... Waste Heat Recovery Piping Installation	\$1,010,410	\$93,665	\$386,426	35.00%	\$1,490,501
5.1.2.2.1		..... North Wall Canal Metal Piping and Insulation Installation	\$155,560	\$14,420	\$59,493	35.00%	\$229,474
		..... Main Supply Installation (Canal Area 40' Elevation)	\$55,214	\$5,118	\$21,116	35.00%	\$81,448
		..... Main Return Installation (Canal Area 40' Elevation)	\$55,214	\$5,118	\$21,116	35.00%	\$81,448
		..... Main Supply Insulation Installation (Canal Area 40' Elevation)	\$10,080	\$934	\$3,855	35.00%	\$14,870
		..... Main Return Insulation Installation (Canal Area 40' Elevation)	\$10,080	\$934	\$3,855	35.00%	\$14,870

**BEA**

**Project Summary Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
		..... Overhead Working Equipment	\$24,972	\$2,315	\$9,550	35.00%	\$36,837
5.1.2.2.2		..... Canal Mezzanine Metal Piping and Insulation Installation	\$59,847	\$5,548	\$22,888	35.00%	\$88,284
		..... Main Supply Installation (Canal Area 40' Elevation)	\$17,465	\$1,619	\$6,680	35.00%	\$25,764
		..... Main Return Installation (Canal Area 40' Elevation)	\$17,465	\$1,619	\$6,680	35.00%	\$25,764
		..... Main Supply Insulation Installation (Canal Area 40' Elevation)	\$4,134	\$383	\$1,581	35.00%	\$6,099
		..... Main Return Insulation Installation (Canal Area 40' Elevation)	\$4,134	\$383	\$1,581	35.00%	\$6,099
		..... Overhead Working Equipment	\$16,648	\$1,543	\$6,367	35.00%	\$24,558
5.1.2.2.3		..... Canal Area West End Piping and Insulation Installation	\$53,442	\$4,954	\$20,439	35.00%	\$78,835
		..... Main Supply Installation (West Canal Area 30' Elevation)	\$19,303	\$1,789	\$7,382	35.00%	\$28,474
		..... Main Return Installation (West Canal Area 30' Elevation)	\$19,303	\$1,789	\$7,382	35.00%	\$28,474
		..... Main Supply Insulation Installation (West Canal Area 30' Elevation)	\$3,417	\$317	\$1,307	35.00%	\$5,040
		..... Main Return Insulation Installation (West Canal Area 30' Elevation)	\$3,417	\$317	\$1,307	35.00%	\$5,040
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805
5.1.2.2.4		..... Canal Area West End Vertical Piping and Insulation Installation	\$26,502	\$2,457	\$10,135	35.00%	\$39,094
		..... Main Supply Installation (West Canal Area 40' Elevation)	\$7,734	\$717	\$2,958	35.00%	\$11,408
		..... Main Return Installation (West Canal Area 40' Elevation)	\$7,734	\$717	\$2,958	35.00%	\$11,408
		..... Main Supply Insulation Installation (West Canal Area 40' Elevation)	\$1,516	\$140	\$580	35.00%	\$2,236
		..... Main Return Insulation Installation (West Canal Area 40' Elevation)	\$1,516	\$140	\$580	35.00%	\$2,236
		..... Overhead Working Equipment	\$8,003	\$742	\$3,061	35.00%	\$11,805

**BEA**

### Project Summary Report

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
5.1.2.2.5		..... West End Laydown Area Metal Piping and Insulation Installation	\$83,027	\$7,697	\$31,753	35.00%	\$122,477
		..... Main Supply Installation (Canal Area 30' Elevation)	\$33,074	\$3,066	\$12,649	35.00%	\$48,789
		..... Main Return Installation (Canal Area 30' Elevation)	\$33,074	\$3,066	\$12,649	35.00%	\$48,789
		..... Main Supply Insulation Installation (Canal Area 30' Elevation)	\$4,278	\$397	\$1,636	35.00%	\$6,310
		..... Main Return Insulation Installation (Canal Area 30' Elevation)	\$4,278	\$397	\$1,636	35.00%	\$6,310
		..... Overhead Working Equipment	\$8,324	\$772	\$3,183	35.00%	\$12,279
5.1.2.2.6		..... North End Laydown Area Metal Piping and Insulation Installation	\$76,796	\$7,119	\$29,370	35.00%	\$113,285
		..... Main Supply Installation (Canal Area 20' Elevation)	\$29,788	\$2,761	\$11,392	35.00%	\$43,941
		..... Main Return Installation (Canal Area 20' Elevation)	\$29,788	\$2,761	\$11,392	35.00%	\$43,941
		..... Main Supply Insulation Installation (Canal Area 20' Elevation)	\$4,448	\$412	\$1,701	35.00%	\$6,562
		..... Main Return Insulation Installation (Canal Area 20' Elevation)	\$4,448	\$412	\$1,701	35.00%	\$6,562
		..... Overhead Working Equipment	\$8,324	\$772	\$3,183	35.00%	\$12,279
5.1.2.2.7		..... Westside South From The Canal Area Metal Piping and Insulation Installation	\$68,624	\$6,361	\$26,245	35.00%	\$101,230
		..... Main Supply Installation (Canal Area 40' Elevation)	\$22,957	\$2,128	\$8,780	35.00%	\$33,865
		..... Main Return Installation (Canal Area 40' Elevation)	\$22,957	\$2,128	\$8,780	35.00%	\$33,865
		..... Main Supply Insulation Installation (Canal Area 40' Elevation)	\$7,192	\$667	\$2,751	35.00%	\$10,610
		..... Main Return Insulation Installation (Canal Area 40' Elevation)	\$7,192	\$667	\$2,751	35.00%	\$10,610
		..... Overhead Working Equipment	\$8,324	\$772	\$3,183	35.00%	\$12,279

**BEA**

### Project Summary Report

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
5.1.2.2.8		..... Northeast Side Diesel Generator Room Metal Piping and Insulation Installation	\$56,303	\$5,219	\$21,533	35.00%	\$83,054
		..... Main Supply Installation (Canal Area 20' Elevation)	\$18,626	\$1,727	\$7,124	35.00%	\$27,477
		..... Main Return Installation (Canal Area 20' Elevation)	\$18,626	\$1,727	\$7,124	35.00%	\$27,477
		..... Main Supply Insulation Installation (Canal Area 20' Elevation)	\$5,363	\$497	\$2,051	35.00%	\$7,911
		..... Main Return Insulation Installation (Canal Area 20' Elevation)	\$5,363	\$497	\$2,051	35.00%	\$7,911
		..... Overhead Working Equipment	\$8,324	\$772	\$3,183	35.00%	\$12,279
5.1.2.2.9		..... Piping, Valve, Coils, & Control System	\$430,309	\$39,890	\$164,570	35.00%	\$634,769
5.1.3		..... <b>Pump and Heat Exchanger Building</b>	<b>\$661,010</b>	<b>\$61,276</b>	<b>\$252,800</b>	<b>35.00%</b>	<b>\$975,086</b>
5.1.3.1		..... Heat Exchanger and Pump House Excavation	\$123,780	\$11,474	\$47,339	35.00%	\$182,594
		..... Building Piping Vacuum Excavations	\$79,805	\$7,398	\$30,521	35.00%	\$117,725
		..... Pump House Building Foundation Excavation	\$37,243	\$3,452	\$14,243	35.00%	\$54,938
		..... Backfill Excavations	\$6,733	\$624	\$2,575	35.00%	\$9,932
5.1.3.2		..... Heat Exchanger Concrete Footings/Foundation and Slab	\$26,781	\$2,483	\$10,242	35.00%	\$39,506
		..... Building Concrete Footings	\$7,426	\$688	\$2,640	35.00%	\$10,955
		..... Building Concrete Foundation	\$7,746	\$718	\$2,962	35.00%	\$11,426
		..... Building Concrete Slab	\$11,609	\$1,076	\$4,440	35.00%	\$17,126
5.1.3.3		..... Heat Exchanger Building Exterior	\$75,057	\$6,958	\$28,705	35.00%	\$110,720
5.1.3.4		..... Heat Exchanger Building Interior	\$32,262	\$2,991	\$12,339	35.00%	\$47,592
5.1.3.5		..... Heat Exchanger Building HVAC	\$65,293	\$6,053	\$24,971	35.00%	\$96,316
5.1.3.6		..... Heat Exchanger Pump Building Electrical and Pump Connections	\$279,074	\$25,870	\$106,730	35.00%	\$411,674
		..... Electrical Building Service Connection	\$28,688	\$2,659	\$10,972	35.00%	\$42,319
		..... General Electrical Lighting and Outlets	\$76,112	\$7,056	\$29,109	35.00%	\$112,277

**BEA**

**Project Summary Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
		..... Pump House Communication and Fire Alarm System	\$20,790	\$1,927	\$7,951	35.00%	\$30,668
		..... Pump & Control Connections	\$138,580	\$12,846	\$52,999	35.00%	\$204,426
		..... Lightning Protection	\$14,903	\$1,382	\$5,700	35.00%	\$21,984
5.1.3.7		..... Building Fire Suppression System	\$58,762	\$5,447	\$22,473	35.00%	\$86,683
5.1.4		..... Waste Heat Recovery Tie-in	\$149,030	\$13,815	\$56,996	35.00%	\$219,840
5.1.5		..... Exchanger & Pump Building Piping/Equipment	\$674,373	\$62,514	\$257,911	35.00%	\$994,798
5.1.5.1		..... Heat Exchanger	\$190,785	\$17,684	\$72,957	35.00%	\$281,406
5.1.5.2		..... Heat Exchanger Piping	\$287,719	\$26,672	\$110,037	35.00%	\$424,427
5.1.5.3		..... Heat Exchanger Pumps & Misc	\$195,889	\$18,159	\$74,917	35.00%	\$288,965
5.2	OPC	.... Provide Construction Support	\$350,862	\$32,525	\$134,186	35.00%	\$517,573
5.2.1	OPC	..... Provide Safeguard and Security Support (Plan Development)	\$2,035	\$189	\$778	35.00%	\$3,002
5.2.2	OPC	..... Provide Operations Support for Outages	\$9,551	\$885	\$3,653	35.00%	\$14,089
5.2.3	OPC	..... Provide Radcon Support During Sub-k Activities	\$202,266	\$18,750	\$77,355	35.00%	\$298,371
5.2.4	OPC	..... Provide for Security/Escorts/Guard Service	\$137,011	\$12,701	\$52,399	35.00%	\$202,111
5.3	OPC	.... Provide For Project Specific Training - Subcontractor	\$12,799	\$1,186	\$4,895	35.00%	\$18,880
5.4	OPC	.... Provide for 10 CFR 851 Requirements	\$17,940	\$1,663	\$6,861	35.00%	\$26,465
5.5	OPC	.... Misc Support During Execution	\$154,609	\$14,332	\$59,130	35.00%	\$228,071
5.5.1	OPC	..... Provide AE Field Support/Oversight during Execution - Level of Effort (LOE)	\$133,289	\$12,356	\$50,976	35.00%	\$196,621
5.5.2	OPC	..... Provide AE Support Oversight during Execution - Level of Effort (LOE)	\$21,320	\$1,976	\$8,154	35.00%	\$31,450
6.0	OPC	<u>Environmental Assessment</u>	\$120,000	\$6,672	\$44,335	35.00%	\$171,007
7.0	OPC	<u>Operations</u>	\$184,408	\$24,065	\$72,966	35.00%	\$281,439
7.1	OPC	.... Preventative Maintenance (PM) Plan Development	\$68,066	\$8,883	\$26,932	35.00%	\$103,881
7.2	OPC	.... Develop Operating Procedures, Manuals & Documents	\$87,452	\$11,413	\$34,603	35.00%	\$133,468

**BEA**

**Project Summary Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
7.3	OPC	.... Prepare Commissioning/SO Test Plan	\$28,890	\$3,770	\$11,431	35.00%	\$44,091
8.0	OPC	<u>SAR Update</u>	\$443,356	\$57,858	\$175,425	35.00%	\$676,639
9.0	OPC	<u>New System SO Testing</u>	\$34,452	\$4,496	\$13,632	35.00%	\$52,580
10.0	OPC	<u>Readiness</u>	\$106,879	\$13,948	\$42,289	35.00%	\$163,116
10.1	OPC	.... MSA	\$106,879	\$13,948	\$42,289	35.00%	\$163,116
11.0	OPC	<u>PROJECT CLOSEOUT</u>	\$196,332	\$25,621	\$77,684	35.00%	\$299,638
11.1	OPC	.... Project Management (PM) Support during Transition/Closeout Phase	\$16,275	\$2,124	\$6,440	35.00%	\$24,839
11.1.1	OPC	..... Provide PM Oversight - Level of Effort (LOE) during Transition/Closeout Phase	\$14,554	\$1,899	\$5,759	35.00%	\$22,212
11.1.2	OPC	..... Closeout Project Files	\$1,721	\$225	\$681	35.00%	\$2,627
11.2	OPC	.... Closure Engineering and Design Documents	\$34,010	\$4,438	\$13,457	35.00%	\$51,905
11.2.1	OPC	..... Prepare Master Facility As-Built Drawings and Incorporate into EDMS	\$20,406	\$2,663	\$8,074	35.00%	\$31,143
11.2.2	OPC	..... Prepare Project As-Built Drawings and Incorporate into EDMS	\$13,604	\$1,775	\$5,383	35.00%	\$20,762
11.3	OPC	.... Closure Plans, Reports, and Documents	\$62,693	\$8,181	\$24,806	35.00%	\$95,681
11.3.1	OPC	..... Other Documents	\$62,693	\$8,181	\$24,806	35.00%	\$95,681
11.3.1.1	OPC	..... Complete Closeout PM Checklist	\$45,725	\$5,967	\$18,092	35.00%	\$69,784
11.3.1.2	OPC	..... Develop Lessons Learned	\$11,253	\$1,469	\$4,452	35.00%	\$17,174
11.3.1.3	OPC	..... Prepare Final Project Closeout Report	\$5,716	\$746	\$2,262	35.00%	\$8,723
11.4	OPC	.... Project Acceptance and Closeout	\$83,354	\$10,878	\$32,981	35.00%	\$127,213
11.4.1	OPC	..... Provide Operational Training	\$30,323	\$3,957	\$11,998	35.00%	\$46,278
11.4.2	OPC	..... Provide Start-Up Coordination, Materials, & Supplies	\$1,000	\$131	\$396	35.00%	\$1,526
11.4.3	OPC	..... Provide Spares	\$52,031	\$6,790	\$20,588	35.00%	\$79,409
12.0	OPC	<u>Heat Recovery System O&amp;M (5 Year)</u>	\$449,869	\$58,708	\$178,002	35.00%	\$686,579

**BEA**

**Project Summary Report**

Project Name: *RTC Waste Heat Recovery*

Client: *C. P. Ischay*  
 Prepared By: *A. W. Miller / S. N. Wasley*  
 Estimate Type: *Class-5*

Project Location: *ATR*  
 Estimate Number: *7B50*

<u>Level</u>	<u>Group</u>	<u>Description</u>	<u>Estimate Subtotal</u>	<u>Escalation</u>	<u>Management Reserve MR</u>	<u>MR %</u>	<u>TOTAL</u>
12.1	OPC	. . . System Maintenance (5 Years)	\$367,705	\$47,986	\$145,492	35.00%	\$561,182
12.2	OPC	. . . System Operating Costs (5 Years)	\$82,164	\$10,722	\$32,510	35.00%	\$125,397
<b>Total RTC Waste Heat Recovery - INDIRECT</b>			<b>\$6,547,320</b>	<b>\$623,456</b>	<b>\$2,509,772</b>	<b>35.00%</b>	<b>\$9,680,547</b>

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**Estimate Markup Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

CONTRACTOR	MARK-UP PERCENT	LABOR & EQUIP HOURS	LABOR	MATERIAL	EQUIPMENT	OTHERS	SUBTOTAL	% MARKUP	% DIRECT COST	% TOTAL COST
<b><u>Battelle Energy Alliance - BEA</u></b>										
DIRECT COST			\$3,138,774	\$321,240	\$0	\$0	\$3,460,014			
	0.00%		\$0	\$0	\$0	\$0	\$0	0.00%		
<b>TOTAL FOR Battelle Energy Alliance - BEA</b>		28,498	<b>\$3,138,774</b>	<b>\$321,240</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,460,014</b>		62.37%	35.74%
<b><u>Concrete Contractor - CONC</u></b>										
DIRECT COST			\$1,721	\$0	\$0	\$17,971	\$19,691			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$172	\$0	\$0	\$1,797	\$1,969	10.00%		
Subcontractor Overhead	15.00%		\$284	\$0	\$0	\$2,965	\$3,249	16.50%		
Subcontractor Profit	10.00%		\$218	\$0	\$0	\$2,273	\$2,491	12.65%		
Subtier Handling Fee	5.00%		\$120	\$0	\$0	\$1,250	\$1,370	6.96%		
Project Bond and Insurances	2.00%		\$50	\$0	\$0	\$525	\$575	2.92%		
<b>TOTAL FOR Concrete Contractor - CONC</b>		38	<b>\$2,564</b>	<b>\$0</b>	<b>\$0</b>	<b>\$26,781</b>	<b>\$29,346</b>	49.03%	0.35%	0.20%
<b><u>Earthwork Contractor - EARTHW</u></b>										
DIRECT COST			\$0	\$4,518	\$0	\$78,540	\$83,058			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$0	\$452	\$0	\$7,854	\$8,306	10.00%		
Subcontractor Overhead	15.00%		\$0	\$745	\$0	\$12,959	\$13,705	16.50%		
Subcontractor Profit	10.00%		\$0	\$571	\$0	\$9,935	\$10,507	12.65%		
Subtier Handling Fee	5.00%		\$0	\$314	\$0	\$5,464	\$5,779	6.96%		
Project Bond and Insurances	2.00%		\$0	\$132	\$0	\$2,295	\$2,427	2.92%		
<b>TOTAL FOR Earthwork Contractor - EARTHW</b>		0	<b>\$0</b>	<b>\$6,733</b>	<b>\$0</b>	<b>\$117,048</b>	<b>\$123,780</b>	49.03%	1.50%	0.86%
<b><u>Electrical Contractor - ELECT</u></b>										
DIRECT COST			\$79,152	\$78,069	\$12,600	\$94,272	\$264,093			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$7,915	\$7,807	\$1,260	\$9,427	\$26,409	10.00%		
Subcontractor Overhead	15.00%		\$13,060	\$12,881	\$2,079	\$15,555	\$43,575	16.50%		
Subcontractor Profit	10.00%		\$10,013	\$9,876	\$1,594	\$11,925	\$33,408	12.65%		
Subtier Handling Fee	5.00%		\$5,507	\$5,432	\$877	\$6,559	\$18,374	6.96%		
Project Bond and Insurances	2.00%		\$2,313	\$2,281	\$368	\$2,755	\$7,717	2.92%		
<b>TOTAL FOR Electrical Contractor - ELECT</b>		1,444	<b>\$117,960</b>	<b>\$116,346</b>	<b>\$18,778</b>	<b>\$140,493</b>	<b>\$393,577</b>	49.03%	4.76%	2.73%

**BEA**

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**Estimate Markup Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

CONTRACTOR	MARK-UP PERCENT	LABOR & EQUIP HOURS	LABOR	MATERIAL	EQUIPMENT	OTHERS	SUBTOTAL	% MARKUP	% DIRECT COST	% TOTAL COST
<b>Fire Protection Contractor - FIRE</b>										
<b>DIRECT COST</b>			\$0	\$0	\$0	\$39,430	\$39,430			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$0	\$0	\$0	\$3,943	\$3,943	10.00%		
Subcontractor Overhead	15.00%		\$0	\$0	\$0	\$6,506	\$6,506	16.50%		
Subcontractor Profit	10.00%		\$0	\$0	\$0	\$4,988	\$4,988	12.65%		
Subtier Handling Fee	5.00%		\$0	\$0	\$0	\$2,743	\$2,743	6.96%		
Project Bond and Insurances	2.00%		\$0	\$0	\$0	\$1,152	\$1,152	2.92%		
<b>TOTAL FOR Fire Protection Contractor - FIRE</b>		<b>0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$58,762</b>	<b>\$58,762</b>	<b>49.03%</b>	<b>0.71%</b>	<b>0.41%</b>
<b>General Contractor - GEN</b>										
<b>DIRECT COST</b>			\$79,609	\$265	\$34,800	\$68,864	\$183,538			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$7,961	\$27	\$3,480	\$6,886	\$18,354	10.00%		
Contractor Overhead	10.00%		\$8,757	\$29	\$3,828	\$7,575	\$20,189	11.00%		
Contractor Profit	10.00%		\$9,633	\$32	\$4,211	\$8,333	\$22,208	12.10%		
Project Bond and Insurances	2.00%		\$2,119	\$7	\$926	\$1,833	\$4,886	2.66%		
<b>TOTAL FOR General Contractor - GEN</b>		<b>1.632</b>	<b>\$108,079</b>	<b>\$360</b>	<b>\$47,245</b>	<b>\$93,491</b>	<b>\$249,175</b>	<b>35.76%</b>	<b>3.31%</b>	<b>1.90%</b>
<b>Mechanical Contractor - MECH</b>										
<b>DIRECT COST</b>			\$524,443	\$690,904	\$127,271	\$143,812	\$1,486,430			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$52,444	\$69,090	\$12,727	\$14,381	\$148,643	10.00%		
Subcontractor Overhead	15.00%		\$86,533	\$113,999	\$21,000	\$23,729	\$245,261	16.50%		
Subcontractor Profit	10.00%		\$66,342	\$87,399	\$16,100	\$18,192	\$188,033	12.65%		
Subtier Handling Fee	5.00%		\$36,488	\$48,070	\$8,855	\$10,006	\$103,418	6.96%		
Project Bond and Insurances	2.00%		\$15,325	\$20,189	\$3,719	\$4,202	\$43,436	2.92%		
<b>TOTAL FOR Mechanical Contractor - MECH</b>		<b>9.743</b>	<b>\$781,576</b>	<b>\$1,029,652</b>	<b>\$189,672</b>	<b>\$214,323</b>	<b>\$2,215,222</b>	<b>49.03%</b>	<b>26.79%</b>	<b>15.35%</b>
<b>Painting Contractor - PAINT</b>										
<b>DIRECT COST</b>			\$2,615	\$814	\$0	\$0	\$3,429			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$261	\$81	\$0	\$0	\$343	10.00%		
Subcontractor Overhead	15.00%		\$431	\$134	\$0	\$0	\$566	16.50%		
Subcontractor Profit	10.00%		\$331	\$103	\$0	\$0	\$434	12.65%		
Subtier Handling Fee	5.00%		\$182	\$57	\$0	\$0	\$239	6.96%		

**BEA**

**Estimate Markup Report**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

CONTRACTOR	MARK-UP PERCENT	LABOR & EQUIP HOURS	LABOR	MATERIAL	EQUIPMENT	OTHERS	SUBTOTAL	% MARKUP	% DIRECT COST	% TOTAL COST
<b><u>Painting Contractor - PAINT</u></b>										
<b>DIRECT COST</b>			\$2,615	\$814	\$0	\$0	\$3,429			
Project Bond and Insurances	2.00%		\$76	\$24	\$0	\$0	\$100	2.92%		
<b>TOTAL FOR Painting Contractor - PAINT</b>		60	<b>\$3,897</b>	<b>\$1,213</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,110</b>	49.03%	0.06%	0.04%
<b><u>Roofing Contractor - ROOF</u></b>										
<b>DIRECT COST</b>			\$0	\$0	\$0	\$5,850	\$5,850			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$0	\$0	\$0	\$585	\$585	10.00%		
Subcontractor Overhead	15.00%		\$0	\$0	\$0	\$965	\$965	16.50%		
Subcontractor Profit	10.00%		\$0	\$0	\$0	\$740	\$740	12.65%		
Subtier Handling Fee	5.00%		\$0	\$0	\$0	\$407	\$407	6.96%		
Project Bond and Insurances	2.00%		\$0	\$0	\$0	\$171	\$171	2.92%		
<b>TOTAL FOR Roofing Contractor - ROOF</b>		0	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,718</b>	<b>\$8,718</b>	49.03%	0.11%	0.06%
<b><u>Structural Steel Contractor - STEEL</u></b>										
<b>DIRECT COST</b>			\$2,426	\$0	\$0	\$0	\$2,426			
POD/Breaks/Mat'l Waste/Misc Supplies	10.00%		\$243	\$0	\$0	\$0	\$243	10.00%		
Subcontractor Overhead	15.00%		\$400	\$0	\$0	\$0	\$400	16.50%		
Subcontractor Profit	10.00%		\$307	\$0	\$0	\$0	\$307	12.65%		
Subtier Handling Fee	5.00%		\$169	\$0	\$0	\$0	\$169	6.96%		
Project Bond and Insurances	2.00%		\$71	\$0	\$0	\$0	\$71	2.92%		
<b>TOTAL FOR Structural Steel Contractor - STEEL</b>		42	<b>\$3,615</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,615</b>	49.03%	0.04%	0.03%

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**BEA**

**Estimate Markup Report**

Project Name: *RTC Waste Heat Recovery*

Client: *C. P. Ischay*  
 Prepared By: *A. W. Miller / S. N. Wasley*  
 Estimate Type: *Class-5*

Project Location: *ATR*  
 Estimate Number: *7B50*

CONTRACTOR	MARK-UP PERCENT	LABOR & EQUIP HOURS	LABOR	MATERIAL	EQUIPMENT	OTHERS	SUBTOTAL	% MARKUP	% DIRECT COST	% TOTAL COST
Direct Cost Subtotal		41,457	\$3,828,740	\$1,095,810	\$174,671	\$448,739	\$5,547,959		100.00%	
Mark-Up Totals			\$327,725	\$379,734	\$81,023	\$210,878	\$999,361			10.32%
Subtotal			\$4,156,465	\$1,475,544	\$255,694	\$659,617	\$6,547,320			
Escalation	9.52%		\$389,813	\$148,794	\$23,703	\$61,146	\$623,456			6.44%
<b>Project Cost Subtotals</b>			<b>\$4,546,278</b>	<b>\$1,865,356</b>	<b>\$316,841</b>	<b>\$720,763</b>	<b>\$7,170,776</b>			
Management Reserve	35.00%		\$1,591,197	\$568,518	\$97,789	\$252,267	\$2,509,772			25.93%
<b>Total Cost w/ Markups</b>			<b>\$6,137,475</b>	<b>\$2,433,874</b>	<b>\$414,630</b>	<b>\$973,030</b>	<b>\$9,680,547</b>			
<b>RTC Waste Heat Recovery - INDIRECT</b>										

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**BEA**

**Labor Resource Report**

Activity: **RTC Waste Heat Recovery - INDIRECT**

Group:

Level:

Project Name: RTC Waste Heat Recovery

Project Location: ATR

Estimate Number: 7B50

<b>Code</b>	<b>Description</b>	<b>WDC Year</b>	<b>Rate \$/Hr</b>	<b>Hours</b>	<b>Direct Labor Cost</b>
A13K7	RECORD MGMT/DOCUMENT CONTROL	FY-12	\$43.03	728	\$31,326
CNCARP	CARPENTERS	FY-12	\$46.92	42	\$1,971
CNCARPCF	CARPENTERS - CONCRETE - FOREMAN	FY-12	\$49.35	184	\$9,080
CNCARPF	CARPENTERS - FOREMAN	FY-12	\$49.04	1,294	\$63,458
CNCEM	CEMENT MASONS	FY-12	\$45.28	38	\$1,721
CNELEC	ELECTRICIANS	FY-12	\$50.06	844	\$42,251
CNELECGF	ELECTRICIANS - GF	FY-12	\$57.25	408	\$23,358
CNIRON	IRONWORKERS	FY-12	\$57.47	28	\$1,609
CNIRONF	IRONWORKERS - FOREMAN	FY-12	\$58.32	14	\$816
CNLAB	LABORERS	FY-12	\$44.01	56	\$2,465
CNLABGF	LABORERS - GF	FY-12	\$47.55	14	\$666
CNLINEF	LINE CONSTRUCTION - FOREMAN	FY-12	\$70.54	192	\$13,544
CNOPRCR	OPERATORS - CRANES	FY-12	\$48.36	14	\$677
CNOPRL1	OPERATORS - LOADER <4 CUYD	FY-12	\$46.82	14	\$655
CNPAIN	PAINTERS	FY-12	\$43.58	60	\$2,615
CNPIPE	PIPEFITTERS	FY-12	\$53.87	9,731	\$524,207
CNPIPEF	PIPEFITTERS - FOREMAN	FY-12	\$59.07	4	\$236
CNTEAM	TEAMSTERS	FY-12	\$45.53	14	\$637
E04W1	CIVIL/STRUCTURAL ENGR	FY-12	\$148.58	976	\$145,014
E05W1	DESIGNER	FY-12	\$90.26	270	\$24,370
E06W1	ELECTRICAL ENGINEERING	FY-12	\$118.73	950	\$112,793
E08W2	ENVIRONMENTAL ENGINEERING	FY-12	\$131.59	18	\$2,369
E11W1	MECHANICAL ENGINEERING	FY-12	\$119.29	1,990	\$237,387

**BEA**

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*Cost Estimating*

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**Labor Resource Report**

Activity: **RTC Waste Heat Recovery - INDIRECT**  
 Group:  
 Level:  
 Project Name: RTC Waste Heat Recovery

Project Location: ATR  
 Estimate Number: 7B50

Code	Description	WDC Year	Rate \$/Hr	Hours	Direct Labor Cost
E17W5	QUALITY ENGINEERING	FY-12	\$111.17	140	\$15,564
E18H6	RADIOLOGICAL ENGINEERING	FY-12	\$107.66	60	\$6,460
E19H1	SAFETY ENGINEERING	FY-12	\$114.99	1,270	\$146,037
E27W4	OTHER ENGINEERING	FY-12	\$120.18	30	\$3,605
E32W1	SYSTEM/SSC ENGINEER	FY-12	\$121.94	800	\$97,552
E34W2	PROJECT ENGINEER	FY-12	\$133.25	640	\$85,280
E35W1	INSTRUMENTATION AND CONTROLS	FY-12	\$131.69	300	\$39,507
E41W1	FIRE PROTECTION	FY-12	\$126.49	270	\$34,152
E48W1	OPERATIONS ENGINEER, GENERAL	FY-12	\$101.57	420	\$42,659
E54W4	OPS SYSTEM ENGR, VITAL SAFETY SYSTEMS	FY-12	\$119.49	40	\$4,780
E63W3	NUCLEAR SAFETY ANALYSIS	FY-12	\$107.42	2,080	\$223,434
F05GB	FAC OPERATIONS	FY-12	\$109.78	360	\$39,521
F10GB	WORK PLANNING AND/OR SCHEDULING	FY-12	\$79.42	370	\$29,385
F12M3	SECURITY	FY-12	\$81.39	25	\$2,035
F22P2	COST ESTIMATING	FY-12	\$88.12	240	\$21,149
F31J1	CONSTRUCTION - OTHER TECHNICAL	FY-12	\$91.32	1,485	\$135,610
F33P2	PM SCHEDULING	FY-12	\$92.73	583	\$54,015
F35P1	PROJECT MANAGER	FY-12	\$142.89	2,070	\$295,782
P37Y5	TRAINING TECHNOLOGIST (CBT)	FY-12	\$82.61	85	\$7,022
P44F2	PLANNING AND CONTROLS	FY-12	\$73.25	566	\$41,441
S06B3	HEALTH PHYSICS	FY-12	\$158.95	320	\$50,864
S21GC	REGULATORY COMPLIANCE - ENVIRONMENTAL	FY-12	\$122.44	40	\$4,898
T02J1	CONST INSPECT TECH	FY-12	\$79.14	785	\$62,125

**BEA**

**Labor Resource Report**

Activity: **RTC Waste Heat Recovery - INDIRECT**  
 Group:  
 Level:  
 Project Name: RTC Waste Heat Recovery

Project Location: ATR  
 Estimate Number: 7B50

Code	Description	WDC Year	Rate \$/Hr	Hours	Direct Labor Cost
T03W1	DRAFTER	FY-12	\$68.02	1,460	\$99,309
T04W2	ELECTRO/MECH TECHNICIAN	FY-12	\$76.38	70	\$5,347
T12W5	QUALITY INSPECT TECH	FY-12	\$68.04	40	\$2,722
T44GC	NUCLEAR FACILITY OPERATOR	FY-12	\$84.60	40	\$3,384
U11GB	ELECTRICIAN	FY-12	\$67.97	140	\$9,516
U16J1	FITTER	FY-12	\$67.21	170	\$11,426
U29GB	SYS MECHANIC	FY-12	\$68.47	2,740	\$187,608
U52J1	OPERATOR,UTILITY	FY-12	\$75.72	120	\$9,086
U60H6	RADIOLOGICAL CONTROL TECH	FY-12	\$79.01	2,560	\$202,266
U96M4	SECURITY POLICE OFFICER II (SPO II)	FY-12	\$53.52	2,560	\$137,011
X18H2	OCCUPATIONAL PHYSICIAN	FY-12	\$210.72	38	\$7,902
Z02GB	MANAGER, FAC SUPPORT SERVICES	FY-12	\$124.05	40	\$4,962
Z03GB	MANAGER, OPERATIONS	FY-12	\$141.05	360	\$50,778
Z04GD	MANAGER, SCI/ENG FUNCTION	FY-12	\$161.74	40	\$6,470
Z04Q5	MANAGER, SCI/ENG FUNCTION	FY-12	\$160.27	40	\$6,411
Z04W4	MANAGER, SCI/ENG FUNCTION	FY-12	\$173.21	160	\$27,714
Z07M2	SUPERVISOR, FAC SUPPORT SERVICES	FY-12	\$72.81	10	\$728
<b>Total Labor Cost</b>				<b>41,449</b>	<b>\$3,458,740</b>

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Cost Estimating

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**  
 Project Location: **ATR**  
 Estimate Number: **7B50**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
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**1.2.1 Provide PM Oversight - Level of Effort (LOE) during Design Phase**

*Memo: Based on estimator judgment including consideration for the duration of the heat recovery system design phase.*

Provide PM Oversight & Cost & Schedule Monitoring during the Design	BEA	U.C. per Weeks	24.00	Weeks	20	\$142.89	2857.8	0	0	0	0	2857.8
					480	F35P1	\$68,587	\$0	\$0	\$0	\$0	\$68,587
Procure Misc. Project Supplies, paper, signage, office supplies, etc. for Design	BEA	U.C. per lot	1.00	NM60 lot	0		0	\$0	\$500	\$0	\$0	\$500

Subtotal							\$68,587	\$0	\$500	\$0	\$0	\$69,087
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups		0.00%					\$0	\$0	\$0	\$0	\$0	\$0

<b>Subtotal Estimate</b>												\$69,087
Escalation							\$3,813	\$0	\$28	\$0	\$0	\$3,841
Management Reserve							\$25,340	\$0	\$185	\$0	\$0	\$25,525

---Total 1.2.1 Provide PM Oversight - Level of Effort (LOE) during Design Phase 480 \$97,741 \$0 \$713 \$0 \$0 \$98,453

**1.2.2 Maintain Project Files - LOE during Design Phase**

*Memo: Based on estimator judgment including consideration for the duration of the heat recovery system design phase.*

Prepare Project Documents and Filing during Design Phase	BEA	U.C. per weeks	24.00	weeks	10	\$43.03	430.3	0	0	0	0	430.3
					240	A13K7	\$10,327	\$0	\$0	\$0	\$0	\$10,327

Subtotal							\$10,327	\$0	\$0	\$0	\$0	\$10,327
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups		0.00%					\$0	\$0	\$0	\$0	\$0	\$0

<b>Subtotal Estimate</b>												\$10,327
Escalation							\$574	\$0	\$0	\$0	\$0	\$574
Management Reserve							\$3,815	\$0	\$0	\$0	\$0	\$3,815

---Total 1.2.2 Maintain Project Files - LOE during Design Phase 240 \$14,717 \$0 \$0 \$0 \$0 \$14,717

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b>1.2.3 Provide Cost and Schedule Support during Design Phase</b>													
<i>Memo: Based on estimator judgment including consideration for the duration of the heat recovery system design phase.</i>													
	BEA	<i>U.C. per activiti</i>			0.25	\$73.25	18.313	0	0	0	0	18.313	
	Prepare Level 2 Design Schedule		10.00	activiti	3	P44F2	\$183	\$0	\$0	\$0	\$0	\$183	
	BEA	<i>U.C. per weeks</i>			10	\$73.25	732.5	0	0	0	0	732.5	
	Prepare Weekly Cost Status during Design		24.00	weeks	240	P44F2	\$17,580	\$0	\$0	\$0	\$0	\$17,580	
	BEA	<i>U.C. per weeks</i>			10	\$92.73	927.3	0	0	0	0	927.3	
	Prepare Weekly Schedule Status during Design		24.00	weeks	240	F33P2	\$22,255	\$0	\$0	\$0	\$0	\$22,255	
	BEA	<i>U.C. per number</i>			0.25	\$73.25	18.312	0	0	0	0	18.312	
	Set Up Activity Charge Numbers for Design		5.00	number	1	P44F2	\$92	\$0	\$0	\$0	\$0	\$92	
	BEA	<i>U.C. per Allow</i>			120	\$88.12	10574.4	0	0	0	0	10574.4	
	Develop Class-2 Cost Estimate to Support Construction & Procurement Awards		1.00	Allow	120	F22P2	\$10,574	\$0	\$0	\$0	\$0	\$10,574	
<b>Subtotal</b>							\$50,684	\$0	\$0	\$0	\$0	\$50,684	
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$50,684	
<b>Escalation</b>							\$2,818	\$0	\$0	\$0	\$0	\$2,818	
<b>Management Reserve</b>							\$18,726	\$0	\$0	\$0	\$0	\$18,726	
<b>---Total 1.2.3 Provide Cost and Schedule Support during Design Phase</b>					<b>604</b>		<b>\$72,228</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$72,228</b>	

**1.3.1 Provide PM Oversight - Level of Effort (LOE) during Execution**

*Memo: Based on estimator judgment including consideration for the duration of the heat recovery system installation execution phase.*

	BEA	<i>U.C. per weeks</i>			20	\$142.89	2857.8	0	0	0	0	2857.8
	Provide PM Oversight, Cost & Schedule Monitoring during the Execution		32.00	weeks	640	F35P1	\$91,450	\$0	\$0	\$0	\$0	\$91,450

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>1.3.1 Provide PM Oversight - Level of Effort (LOE) during Execution</b>												
<i>Memo: Based on estimator judgment including consideration for the duration of the heat recovery system installation execution phase.</i>												
	BEA	U.C. per lot	NM60				0	0	250	0	0	250
	Procure Misc. Project Supplies, paper, signage, office supplies, etc.		1.00	lot			\$0	\$0	\$250	\$0	\$0	\$250
<b>Subtotal</b>							\$91,450	\$0	\$250	\$0	\$0	\$91,700
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$91,700
Escalation							\$8,477	\$0	\$23	\$0	\$0	\$8,501
Management Reserve							\$34,974	\$0	\$96	\$0	\$0	\$35,070
<b>---Total 1.3.1 Provide PM Oversight - Level of Effort (LOE) during Execution</b>					<b>640</b>		<b>\$134,901</b>	<b>\$0</b>	<b>\$369</b>	<b>\$0</b>	<b>\$0</b>	<b>\$135,270</b>
<b>1.3.2 Maintain Project Files - LOE during Execution</b>												
<i>Memo: Based on estimator judgment including consideration for the duration of the heat recovery system installation execution phase.</i>												
	BEA	U.C. per weeks			10	\$43.03	430.3	0	0	0	0	430.3
	Prepare Project Documents and Filing during Execution		32.00	weeks	320	A13K7	\$13,770	\$0	\$0	\$0	\$0	\$13,770
<b>Subtotal</b>							\$13,770	\$0	\$0	\$0	\$0	\$13,770
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$13,770
Escalation							\$1,276	\$0	\$0	\$0	\$0	\$1,276
Management Reserve							\$5,266	\$0	\$0	\$0	\$0	\$5,266
<b>---Total 1.3.2 Maintain Project Files - LOE during Execution</b>					<b>320</b>		<b>\$20,312</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$20,312</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>1.3.3 Provide Cost and Schedule Support during Execution</b>												
<i>Memo: Based on estimator judgment including consideration for the duration of the heat recovery system installation execution phase.</i>												
	BEA	<i>U.C. per activity</i>			0.25	\$92.73	23.183	0	0	0	0	23.183
	Prepare Level 4 Execution and Monitoring Schedule		10.00	activity	3	F33P2	\$232	\$0	\$0	\$0	\$0	\$232
	BEA	<i>U.C. per weeks</i>			10	\$73.25	732.5	0	0	0	0	732.5
	Prepare Weekly Cost Status during Execution		32.00	weeks	320	P44F2	\$23,440	\$0	\$0	\$0	\$0	\$23,440
	BEA	<i>U.C. per weeks</i>			10	\$92.73	927.3	0	0	0	0	927.3
	Prepare Weekly Schedule Status during Design		32.00	weeks	320	F33P2	\$29,674	\$0	\$0	\$0	\$0	\$29,674
	BEA	<i>U.C. per number</i>			0.25	\$73.25	18.313	0	0	0	0	18.313
	Set Up Activity Charge Numbers for Execution		8.00	number	2	P44F2	\$147	\$0	\$0	\$0	\$0	\$147
<b>Subtotal</b>							\$53,492	\$0	\$0	\$0	\$0	\$53,492
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$53,492
<b>Escalation</b>							\$4,959	\$0	\$0	\$0	\$0	\$4,959
<b>Management Reserve</b>							\$20,458	\$0	\$0	\$0	\$0	\$20,458
<b>---Total 1.3.3 Provide Cost and Schedule Support during Execution</b>					<b>645</b>		<b>\$78,908</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$78,908</b>

**1.4.1 Provide Quality Inspections During Construction - First Line**

*Memo: Based on estimator judgment including consideration for the duration of the heat recovery system, installation execution phase for quality assurance duties.*

	BEA	<i>U.C. per weeks</i>			20	\$70.14	1582.8	0	0	0	0	1582.8
	Provide On-Site Inspection during Construction		32.00	weeks	640	T02J1	\$50,650	\$0	\$0	\$0	\$0	\$50,650

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>1.4.1 Provide Quality Inspections During Construction - First Line</b>												
<i>Memo: Based on estimator judgment including consideration for the duration of the heat recovery system, installation execution phase for quality assurance duties.</i>												
	Subtotal						\$50,650	\$0	\$0	\$0	\$0	\$50,650
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>						\$4,695	\$0	\$0	\$0	\$0	\$4,695
	Escalation						\$19,371	\$0	\$0	\$0	\$0	\$19,371
	Management Reserve											
---	<b>Total 1.4.1 Provide Quality Inspections During Construction - First Line</b>				<b>640</b>		<b>\$74,716</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$74,716</b>

**1.4.2 Quality Assurance Oversight**

*Memo: Based on estimator's judgment.*

	Review and Assess subcontractor quality program	BEA	1.00	Allow	80	\$111.17 E17W5	8893.6 \$8,894	0 \$0	0 \$0	0 \$0	0 \$0	8893.6 \$8,894
	Subtotal						\$8,894	\$0	\$0	\$0	\$0	\$8,894
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>						\$824	\$0	\$0	\$0	\$0	\$824
	Escalation						\$3,401	\$0	\$0	\$0	\$0	\$3,401
	Management Reserve											
---	<b>Total 1.4.2 Quality Assurance Oversight</b>				<b>80</b>		<b>\$13,119</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$13,119</b>

**2.1 Provide CM Oversight/Support during Execution - Level of Effort (LOE)**

*Memo: Construction management coverage is based on conversation with R. Strong (BEA Construction Manager). Allowance is based on full time coverage to support all subcontract work scope.*

	Provide Day-To-Day CFR Field Oversight of the Construction Work (Full Time)	BEA	32.00	Wks	1,280	\$91.32 F31J1	3652.8 \$116,890	0 \$0	0 \$0	0 \$0	0 \$0	3652.8 \$116,890
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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>2.1 Provide CM Oversight/Support during Execution - Level of Effort (LOE)</b>												
<i>Memo: Construction management coverage is based on conversation with R. Strong (BEA Construction Manager). Allowance is based on full time coverage to support all subcontract work scope.</i>												
	Provide Day-To-Day Administration Data Support for Vendor Data, Job Logs, Etc.	BEA	32.00	Wks	128	4 \$43.03 A13K7	172.12 \$5,508	0	0	0	0	172.12 \$5,508
							U.C. per Wks					
							0.00%					
<b>Subtotal</b>							\$122,397	\$0	\$0	\$0	\$0	\$122,397
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>							\$11,346	\$0	\$0	\$0	\$0	\$11,346
Escalation							\$46,810	\$0	\$0	\$0	\$0	\$46,810
Management Reserve												
<b>---Total 2.1 Provide CM Oversight/Support during Execution - Level of Effort (LOE)</b>					<b>1,408</b>		<b>\$180,554</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$180,554</b>
<b>2.2 BEA - Provide CM Supervision - OPC</b>												
<i>Memo: Construction management coverage is based on conversation with R. Strong (BEA Construction Manager).</i>												
	Provide Overall Project CM Supervision	BEA	32.00	wks	160	5 \$91.32 F31J1	456.6 \$14,611	0	0	0	0	456.6 \$14,611
							U.C. per wks					
							0.00%					
<b>Subtotal</b>							\$14,611	\$0	\$0	\$0	\$0	\$14,611
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>							\$1,354	\$0	\$0	\$0	\$0	\$1,354
Escalation							\$5,588	\$0	\$0	\$0	\$0	\$5,588
Management Reserve												
<b>---Total 2.2 BEA - Provide CM Supervision - OPC</b>					<b>160</b>		<b>\$21,554</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$21,554</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>2.3 Provide Safety Oversight/Support during Execution - LOE</b>												
<i>Memo: Construction management coverage is based on conversation with R. Strong (BEA Construction Manager). Allowance is based on 3/4 time coverage during the execution phase of the subcontracted work.</i>												
	BEA	U.C. per Wks			30	\$114.99	3449.7	0	0	0	0	3449.7
	Provide Part-Time Safety Oversight (3/4 Time)		32.00	Wks	960	E19H1	\$110,390	\$0	\$0	\$0	\$0	\$110,390
<b>Subtotal</b>							\$110,390	\$0	\$0	\$0	\$0	\$110,390
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$110,390
Escalation							\$10,233	\$0	\$0	\$0	\$0	\$10,233
Management Reserve							\$42,218	\$0	\$0	\$0	\$0	\$42,218
<b>---Total 2.3 Provide Safety Oversight/Support during Execution - LOE</b>					<b>960</b>		<b>\$162,842</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$162,842</b>

<b>2.4 Provide Industrial Hygiene Oversight/Support during Execution - LOE</b>												
<i>Memo: Construction management coverage is based on conversation with R. Strong (BEA Construction Manager). Allowance is based on quarter time coverage during the execution of the subcontractor work.</i>												
	BEA	U.C. per Wks			10	\$158.95	1589.5	0	0	0	0	1589.5
	Provide Air-Borne IH Dust Checks (1/4 Time Coverage)		32.00	Wks	320	S06B3	\$50,864	\$0	\$0	\$0	\$0	\$50,864
<b>Subtotal</b>							\$50,864	\$0	\$0	\$0	\$0	\$50,864
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$50,864
Escalation							\$4,715	\$0	\$0	\$0	\$0	\$4,715
Management Reserve							\$19,453	\$0	\$0	\$0	\$0	\$19,453
<b>---Total 2.4 Provide Industrial Hygiene Oversight/Support during Execution - LOE</b>					<b>320</b>		<b>\$75,032</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$75,032</b>

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
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**2.5 Perform Subsurface Investigations Prior to Excav'ns, Floor and Wall Penetrations**

**Memo:** The detail items, resources, and productivities are based upon discussions with R. Strong, construction management. Kevin Wells is lead technician for subsurface investigations.

BEA	U.C. per loc		2.5		\$79.14		197.85	0	0	0	0	197.85
Perform subsurface investigation on interior walls			10.00	loc	25	T02J1	\$1,979	\$0	\$0	\$0	\$0	\$1,979

Memo: The duration of this activity, 2.5 hours per location, is based on the estimator's judgment.

BEA	U.C. per Report		3		\$79.14		237.42	0	0	0	0	237.42
Prepare subsurface investigation report on interior walls			10.00	Report	30	T02J1	\$2,374	\$0	\$0	\$0	\$0	\$2,374

Memo: Downloading of information from the subsurface equipment and preparation of proper technical report requires approximately 3 hours per location.

BEA	U.C. per loc		40		\$79.14		3165.6	0	0	0	0	3165.6
Perform subsurface investigation on exterior floor slab			1.00	loc	40	T02J1	\$3,166	\$0	\$0	\$0	\$0	\$3,166

Memo: The duration of this activity, 2.5 hours per location, is based on the estimator's judgment.

BEA	U.C. per Report		20		\$79.14		1582.8	0	0	0	0	1582.8
Prepare subsurface investigation report on floor slab			1.00	Report	20	T02J1	\$1,583	\$0	\$0	\$0	\$0	\$1,583

Memo: Downloading of information from the subsurface equipment and preparation of proper technical report requires approximately 3 hours per location.

BEA	U.C. per Area		20		\$79.14		1582.8	0	0	0	0	1582.8
Perform subsurface investigation on interior floor slab			1.00	Area	20	T02J1	\$1,583	\$0	\$0	\$0	\$0	\$1,583

BEA	U.C. per Report		10		\$79.14		791.4	0	0	0	0	791.4
Prepare subsurface investigation report on floor slab			1.00	Report	10	T02J1	\$791	\$0	\$0	\$0	\$0	\$791

Memo: Downloading of information from the subsurface equipment and preparation of proper technical report.

Subtotal							\$11,475	\$0	\$0	\$0	\$0	\$11,475
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups	0.00%						\$0	\$0	\$0	\$0	\$0	\$0

Subtotal Estimate							\$11,475					\$11,475
Escalation							\$1,064	\$0	\$0	\$0	\$0	\$1,064
Management Reserve							\$4,389	\$0	\$0	\$0	\$0	\$4,389

---Total 2.5 Perform Subsurface Investigations Prior to Excav'ns, Floor and Wall Penetrations			145				\$16,928	\$0	\$0	\$0	\$0	\$16,928
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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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DETAIL ITEM REPORT

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>2.6 CM Support During Design and Closeout</b>												
<i>Memo: Allowance based on estimator judgment.</i>												
	BEA	U.C. per Allow			25	\$91.32	2283	0	0	0	0	2283
CM Support - Constructability Review			1.00	Allow	25	F31J1	\$2,283	\$0	\$0	\$0	\$0	\$2,283
	BEA	U.C. per Allow			20	\$91.32	1826.4	0	0	0	0	1826.4
CM Support - During Closeout			1.00	Allow	20	F31J1	\$1,826	\$0	\$0	\$0	\$0	\$1,826
Subtotal							\$4,109	\$0	\$0	\$0	\$0	\$4,109
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												<b>\$4,109</b>
Escalation							\$381	\$0	\$0	\$0	\$0	\$381
Management Reserve							\$1,572	\$0	\$0	\$0	\$0	\$1,572
<b>--- Total 2.6 CM Support During Design and Closeout</b>					<b>45</b>		<b>\$6,062</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,062</b>

**3.1.1 BEA Engineering & Design Conceptual Phase**

*Memo: Based on estimator judgment.*

E34W2	BEA	U.C. per Wks	8.00	Wks	10	\$133.25	1332.5	0	0	0	0	1332.5
PROJECT ENGINEER (1/4 Time Coverage)					80	E34W2	\$10,660	\$0	\$0	\$0	\$0	\$10,660
E04W1	BEA	U.C. per Wks	8.00	Wks	30	\$148.58	4457.4	0	0	0	0	4457.4
CIVIL/STRUCTURAL ENGR					240	E04W1	\$35,659	\$0	\$0	\$0	\$0	\$35,659
E11W1	BEA	U.C. per Wks	8.00	Wks	30	\$119.29	3578.7	0	0	0	0	3578.7
MECHANICAL ENGINEERING					240	E11W1	\$28,630	\$0	\$0	\$0	\$0	\$28,630
E41W1	BEA	U.C. per Wks	8.00	Wks	10	\$126.49	1264.9	0	0	0	0	1264.9
FIRE PROTECTION					80	E41W1	\$10,119	\$0	\$0	\$0	\$0	\$10,119
E06W1	BEA	U.C. per Wks	8.00	Wks	20	\$118.73	2374.6	0	0	0	0	2374.6
ELECTRICAL ENGINEERING					160	E06W1	\$18,997	\$0	\$0	\$0	\$0	\$18,997
E19H1	BEA	U.C. per Wks	8.00	Wks	10	\$114.99	1149.9	0	0	0	0	1149.9
SAFETY ENGINEERING					80	E19H1	\$9,199	\$0	\$0	\$0	\$0	\$9,199

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>3.1.1 BEA Engineering &amp; Design Conceptual Phase</b>												
<i>Memo: Based on estimator judgment.</i>												
E35W1	INSTRUMENTATION AND CONTROLS	BEA	8.00	Wks	80	E35W1	\$10,535	\$0	\$0	\$0	\$0	\$10,535
E05W1	DESIGNER	BEA	8.00	Wks	80	E05W1	\$7,221	\$0	\$0	\$0	\$0	\$7,221
T03J1	DRAFTER	BEA	8.00	Wks	320	T03W1	\$21,766	\$0	\$0	\$0	\$0	\$21,766
E32W1	SYSTEM/SSC ENGINEER	BEA	1.00	Reviews	20	E32W1	\$2,439	\$0	\$0	\$0	\$0	\$2,439
E41W1	FIRE PROTECTION	BEA	1.00	Reviews	10	E41W1	\$1,265	\$0	\$0	\$0	\$0	\$1,265
E35W1	INSTRUMENTATION AND CONTROLS	BEA	1.00	Reviews	10	E35W1	\$1,317	\$0	\$0	\$0	\$0	\$1,317
E08W2	ENVIRONMENTAL ENGINEERING	BEA	1.00	Reviews	6	E08W2	\$790	\$0	\$0	\$0	\$0	\$790
E05W1	DESIGNER	BEA	1.00	Reviews	10	E05W1	\$903	\$0	\$0	\$0	\$0	\$903
E17W5	QUALITY ENGINEERING	BEA	1.00	Reviews	20	E17W5	\$2,223	\$0	\$0	\$0	\$0	\$2,223
E19H1	SAFETY ENGINEERING	BEA	1.00	Reviews	10	E19H1	\$1,150	\$0	\$0	\$0	\$0	\$1,150

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>3.1.1 BEA Engineering &amp; Design Conceptual Phase</b>												
<i>Memo: Based on estimator judgment.</i>												
E18H6	RADIOLOGICAL ENGINEERING	BEA	1.00	Reviews	20	E18H6	\$2,153	\$0	\$0	\$0	\$0	\$2,153
							\$165,026	\$0	\$0	\$0	\$0	\$165,026
Subtotal							\$0	\$0	\$0	\$0	\$0	\$0
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$165,026</b>
Escalation							\$9,175	\$0	\$0	\$0	\$0	\$9,175
Management Reserve							\$60,970	\$0	\$0	\$0	\$0	\$60,970
<b>---Total 3.1.1 BEA Engineering &amp; Design Conceptual Phase</b>					<b>1,466</b>		<b>\$235,171</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$235,171</b>

**3.1.2 BEA Engineering & Design Preliminary Phase**

*Memo: Based on estimator judgment.*

E34W2	PROJECT ENGINEER (1/4 Time Coverage)	BEA	6.00	Wks	60	E34W2	\$7,995	\$0	\$0	\$0	\$0	\$7,995
							\$0	\$0	\$0	\$0	\$0	\$0
Subtotal							\$0	\$0	\$0	\$0	\$0	\$0
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$14,248</b>
Escalation							\$9,175	\$0	\$0	\$0	\$0	\$9,175
Management Reserve							\$60,970	\$0	\$0	\$0	\$0	\$60,970
<b>---Total 3.1.2 BEA Engineering &amp; Design Preliminary Phase</b>					<b>1,466</b>		<b>\$235,171</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$235,171</b>

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>3.1.2 BEA Engineering &amp; Design Preliminary Phase</b>												
<i>Memo: Based on estimator judgment.</i>												
E05W1	DESIGNER	BEA	6.00	Wks	60	E05W1	\$5,416	\$0	\$0	\$0	\$0	\$5,416
T03J1	DRAFTER	BEA	6.00	Wks	240	T03W1	\$16,325	\$0	\$0	\$0	\$0	\$16,325
E32W1	SYSTEM/SSC ENGINEER	BEA	1.00	Reviews	20	E32W1	\$2,439	\$0	\$0	\$0	\$0	\$2,439
E41W1	FIRE PROTECTION	BEA	1.00	Reviews	10	E41W1	\$1,265	\$0	\$0	\$0	\$0	\$1,265
E35W1	INSTRUMENTATION AND CONTROLS	BEA	1.00	Reviews	10	E35W1	\$1,317	\$0	\$0	\$0	\$0	\$1,317
E08W2	ENVIRONMENTAL ENGINEERING	BEA	1.00	Reviews	6	E08W2	\$790	\$0	\$0	\$0	\$0	\$790
E05W1	DESIGNER	BEA	1.00	Reviews	10	E05W1	\$903	\$0	\$0	\$0	\$0	\$903
E17W5	QUALITY ENGINEERING	BEA	1.00	Reviews	20	E17W5	\$2,223	\$0	\$0	\$0	\$0	\$2,223
E19H1	SAFETY ENGINEERING	BEA	1.00	Reviews	10	E19H1	\$1,150	\$0	\$0	\$0	\$0	\$1,150

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>3.1.2 BEA Engineering &amp; Design Preliminary Phase</b>												
<i>Memo: Based on estimator judgment.</i>												
E18H6	BEA RADIOLOGICAL ENGINEERING		1.00	Reviews	20	E18H6	\$2,153	\$0	\$0	\$0	\$0	\$2,153
							\$126,829	\$0	\$0	\$0	\$0	\$126,829
Subtotal							\$0	\$0	\$0	\$0	\$0	\$0
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							\$7,052	\$0	\$0	\$0	\$0	\$7,052
Subtotal Estimate							\$46,858	\$0	\$0	\$0	\$0	\$46,858
Escalation												
Management Reserve												
<b>---Total 3.1.2 BEA Engineering &amp; Design Preliminary Phase</b>					<b>1,126</b>		<b>\$180,739</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$180,739</b>

**3.1.3 BEA Engineering & Design Final Phase**

*Memo: Based on estimator judgment.*

E34W2	BEA PROJECT ENGINEER (1/4 Time Coverage)		10.00	Wks	100	E34W2	\$13,325	\$0	\$0	\$0	\$0	\$13,325
							\$44,574	\$0	\$0	\$0	\$0	\$44,574
E04W1							\$44,574	\$0	\$0	\$0	\$0	\$44,574
CIVIL/STRUCTURAL ENGR												
							\$35,787	\$0	\$0	\$0	\$0	\$35,787
E11W1							\$35,787	\$0	\$0	\$0	\$0	\$35,787
MECHANICAL ENGINEERING												
							\$12,649	\$0	\$0	\$0	\$0	\$12,649
E41W1							\$12,649	\$0	\$0	\$0	\$0	\$12,649
FIRE PROTECTION												
							\$23,746	\$0	\$0	\$0	\$0	\$23,746
E06W1							\$23,746	\$0	\$0	\$0	\$0	\$23,746
ELECTRICAL ENGINEERING												
							\$11,499	\$0	\$0	\$0	\$0	\$11,499
E19H1							\$11,499	\$0	\$0	\$0	\$0	\$11,499
SAFETY ENGINEERING												
							\$13,169	\$0	\$0	\$0	\$0	\$13,169
E35W1							\$13,169	\$0	\$0	\$0	\$0	\$13,169
INSTRUMENTATION AND CONTROLS												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>3.1.3 BEA Engineering &amp; Design Final Phase</b>												
<b>Memo: Based on estimator judgment.</b>												
E05W1	DESIGNER	BEA	10.00	Wks	100	E05W1	\$9,026	\$0	\$0	\$0	\$0	\$9,026
					10		\$90.26	902.6	0	0	0	902.6
			<i>U.C. per Wks</i>									
T03J1	DRAFTER	BEA	10.00	Wks	400	T03W1	\$27,208	\$0	\$0	\$0	\$0	\$27,208
					40		\$68.02	2720.8	0	0	0	2720.8
			<i>U.C. per Wks</i>									
E32W1	SYSTEM/SSC ENGINEER	BEA	1.00	Reviews	20	E32W1	\$2,439	\$0	\$0	\$0	\$0	\$2,439
					20		\$121.94	2438.8	0	0	0	2438.8
			<i>U.C. per Reviews</i>									
E41W1	FIRE PROTECTION	BEA	1.00	Reviews	10	E41W1	\$1,265	\$0	\$0	\$0	\$0	\$1,265
					10		\$126.49	1264.9	0	0	0	1264.9
			<i>U.C. per Reviews</i>									
E35W1	INSTRUMENTATION AND CONTROLS	BEA	1.00	Reviews	10	E35W1	\$1,317	\$0	\$0	\$0	\$0	\$1,317
					10		\$131.69	1316.9	0	0	0	1316.9
			<i>U.C. per Reviews</i>									
E08W2	ENVIRONMENTAL ENGINEERING	BEA	1.00	Reviews	6	E08W2	\$790	\$0	\$0	\$0	\$0	\$790
					6		\$131.59	789.54	0	0	0	789.54
			<i>U.C. per Reviews</i>									
E05W1	DESIGNER	BEA	1.00	Reviews	10	E05W1	\$903	\$0	\$0	\$0	\$0	\$903
					10		\$90.26	902.6	0	0	0	902.6
			<i>U.C. per Reviews</i>									
E17W5	QUALITY ENGINEERING	BEA	1.00	Reviews	20	E17W5	\$2,223	\$0	\$0	\$0	\$0	\$2,223
					20		\$111.17	2223.4	0	0	0	2223.4
			<i>U.C. per Reviews</i>									
E19H1	SAFETY ENGINEERING	BEA	1.00	Reviews	10	E19H1	\$1,150	\$0	\$0	\$0	\$0	\$1,150
					10		\$114.99	1149.9	0	0	0	1149.9
			<i>U.C. per Reviews</i>									

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>3.1.3 BEA Engineering &amp; Design Final Phase</b>												
<i>Memo: Based on estimator judgment.</i>												
E18H6	BEA											
	RADIOLOGICAL ENGINEERING		1.00	Reviews	20	E18H6	\$2,153	\$0	\$0	\$0	\$0	\$2,153
							\$203,222	\$0	\$0	\$0	\$0	\$203,222
Subtotal							\$0	\$0	\$0	\$0	\$0	\$0
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$203,222</b>
Escalation							\$11,299	\$0	\$0	\$0	\$0	\$11,299
Management Reserve							\$75,082	\$0	\$0	\$0	\$0	\$75,082
<b>---Total 3.1.3 BEA Engineering &amp; Design Final Phase</b>					<b>1,806</b>		<b>\$289,604</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$289,604</b>

**4.1 Environmental Documents (NEPA Checklist)**

*Memo: Allowance to prepare the environmental checklist documentation for the project, estimator's judgment.*

	BEA											
	Prepare NEPA Documentation (Environmental Checklist - EC)		40.00	Hrs	40	S21GC	\$4,898	\$0	\$0	\$0	\$0	\$4,898
							\$4,898	\$0	\$0	\$0	\$0	\$4,898
Subtotal							\$0	\$0	\$0	\$0	\$0	\$0
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$4,898</b>
Escalation							\$272	\$0	\$0	\$0	\$0	\$272
Management Reserve							\$1,809	\$0	\$0	\$0	\$0	\$1,809
<b>---Total 4.1 Environmental Documents (NEPA Checklist)</b>					<b>40</b>		<b>\$6,979</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,979</b>

**4.2.1 Prepare Fire Hazards Analysis Report**

*Memo: Allowance to prepare hazards documents for the project, based on information provided by BEA fire protection engineering*

Z03M2	BEA											
	Fire Hazards Analysis Report		1.00	Allow	160	Z03GB	\$22,568	\$0	\$0	\$0	\$0	\$22,568
							\$22,568	\$0	\$0	\$0	\$0	\$22,568

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>4.2.1 Prepare Fire Hazards Analysis Report</b>												
<i>Memo: Allowance to prepare hazards documents for the project, based on information provided by BEA fire protection engineering</i>												
	Subtotal						\$22,568	\$0	\$0	\$0	\$0	\$22,568
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>						\$1,255	\$0	\$0	\$0	\$0	\$1,255
	Escalation						\$8,338	\$0	\$0	\$0	\$0	\$8,338
	Management Reserve											
<b>--- Total 4.2.1 Prepare Fire Hazards Analysis Report</b>			<b>160</b>				<b>\$32,161</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$32,161</b>

**4.3.1 Prepare Davis Bacon Determination Documents**

*Memo: Allowance for Davis Bacon Determination.*

	BEA	<i>U.C. per each</i>			80	\$142.89	11431.2	0	0	0	0	11431.2
	Prepare Davis Bacon Determination and Documents		1.00	each	80	F35P1	\$11,431	\$0	\$0	\$0	\$0	\$11,431
	Subtotal						\$11,431	\$0	\$0	\$0	\$0	\$11,431
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>						\$636	\$0	\$0	\$0	\$0	\$11,431
	Escalation						\$4,223	\$0	\$0	\$0	\$0	\$636
	Management Reserve											\$4,223
<b>--- Total 4.3.1 Prepare Davis Bacon Determination Documents</b>			<b>80</b>				<b>\$16,290</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$16,290</b>

**4.4 Prepare Unreviewed Safety Questions (USQs)**

*Memo: Based on discussion with SMEs with prior experience working at the ATR facility.*

	BEA	<i>U.C. per EA</i>			120	\$119.29	14314.8	0	0	0	0	14314.8
	Prepared USQ Documentation		6.00	EA	720	E11W1	\$85,889	\$0	\$0	\$0	\$0	\$85,889

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>4.4 Prepare Unreviewed Safety Questions (USQs)</b>												
<i>Memo: Based on discussion with SMEs with prior experience working at the ATR facility.</i>												
	Subtotal						\$85,889	\$0	\$0	\$0	\$0	\$85,889
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>											<b>\$85,889</b>
	Escalation						\$4,775	\$0	\$0	\$0	\$0	\$4,775
	Management Reserve						\$31,732	\$0	\$0	\$0	\$0	\$31,732
<b>---Total 4.4 Prepare Unreviewed Safety Questions (USQs)</b>					<b>720</b>		<b>\$122,397</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$122,397</b>

**4.5.1 Probabilistic Risk Assessment (PRA) Preliminary**

*Memo: Based on discussion with the project team.*

E63W3	BEA	<i>U.C. per Allow</i>			90	\$107.42	9667.8	0	0	0	0	9667.8
	NUCLEAR SAFETY ANALYSIS		1.00	Allow	90	E63W3	\$9,668	\$0	\$0	\$0	\$0	\$9,668
F05A0	BEA	<i>U.C. per Allow</i>			90	\$109.78	9880.2	0	0	0	0	9880.2
	FAC OPERATIONS		1.00	Allow	90	F05GB	\$9,880	\$0	\$0	\$0	\$0	\$9,880
Z04W4	BEA	<i>U.C. per Allow</i>			60	\$173.21	10392.6	0	0	0	0	10392.6
	MANAGER, SCI/ENG FUNCTION		1.00	Allow	60	Z04W4	\$10,393	\$0	\$0	\$0	\$0	\$10,393
	Subtotal						\$29,941	\$0	\$0	\$0	\$0	\$29,941
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>											<b>\$29,941</b>
	Escalation						\$1,665	\$0	\$0	\$0	\$0	\$1,665
	Management Reserve						\$11,062	\$0	\$0	\$0	\$0	\$11,062
<b>---Total 4.5.1 Probabilistic Risk Assessment (PRA) Preliminary</b>					<b>240</b>		<b>\$42,667</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$42,667</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>4.5.2 Probabilistic Risk Assessment (PRA) Final</b>												
<i>Memo: Based on discussion with the project team.</i>												
E63W3	NUCLEAR SAFETY ANALYSIS	BEA	1.00	Allow	150	E63W3	\$16,113	\$0	\$0	\$0	\$0	\$16,113
F05A0	FAC OPERATIONS	BEA	1.00	Allow	150	F05GB	\$16,467	\$0	\$0	\$0	\$0	\$16,467
Z04W4	MANAGER, SCI/ENG FUNCTION	BEA	1.00	Allow	60	Z04W4	\$10,393	\$0	\$0	\$0	\$0	\$10,393
Subtotal							\$42,973	\$0	\$0	\$0	\$0	\$42,973
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
Subtotal Estimate							\$42,973	\$0	\$0	\$0	\$0	\$42,973
Escalation							\$2,389	\$0	\$0	\$0	\$0	\$2,389
Management Reserve							\$15,877	\$0	\$0	\$0	\$0	\$15,877
<b>---Total 4.5.2 Probabilistic Risk Assessment (PRA) Final</b>					<b>360</b>		<b>\$61,239</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$61,239</b>

**5.1.1.1 General Contractor**

*Memo: Based on estimators judgment and the duration of the project. Construction management suggested that this project's sub-tier forces would be directed utilizing a general subcontractor approach.*

Construction Superintendent (Full Time)	GEN	U.C. per mo	8.00	mo	1,280	CNCARPF	\$62,771	\$0	\$0	\$0	\$0	\$62,771
Job Truck Usage	GEN	U.C. per mo	8.00	mo	0		\$0	\$16,800	\$0	\$0	\$0	\$16,800
Mobilization/Demobilization	GEN	U.C. per allow	1.00	allow	30	CNCARPCF	\$1,481	\$0	\$0	\$0	\$0	\$1,481
Signs & Barriers	GEN	U.C. per allow	1.00	allow	20	CNCARPCF	\$987	\$0	\$250	\$0	\$0	\$1,237
Vendor Data Submittals	GEN	U.C. per allow	1.00	allow	120	CNCARPCF	\$5,922	\$0	\$0	\$0	\$0	\$5,922

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.1.1 General Contractor</b>												
<i>Memo: Based on estimators judgment and the duration of the project. Construction management suggested that this project's subtier forces would be directed utilizing a general subcontractor approach.</i>												
	Equipment Usage (Lifts, Cranes, etc)	GEN	1.00	U.C. per mo mo		NM80	0	0	18000	0	0	18000
							\$0	\$18,000	\$0	\$0	\$0	\$18,000
<b>Subtotal</b>							\$71,161	\$34,800	\$250	\$0	\$0	\$106,211
<b>Sales Tax</b>							\$0	\$0	\$15	\$0	\$0	\$15
<b>Markups</b>							\$25,448	\$12,445	\$95	\$0	\$0	\$37,988
<b>Subtotal Estimate</b>												\$144,214
<b>Escalation</b>							\$8,956	\$4,380	\$33	\$0	\$0	\$13,369
<b>Management Reserve</b>							\$36,948	\$18,069	\$138	\$0	\$0	\$55,154
<b>---Total 5.1.1.1 General Contractor</b>					<b>1,450</b>		<b>\$142,513</b>	<b>\$69,693</b>	<b>\$531</b>	<b>\$0</b>	<b>\$0</b>	<b>\$212,737</b>

**5.1.1.2 Piping Contractor**

*Memo: Based on estimators judgment and the duration of the project.*

	Craft Supervision @ 20% Admin Duties	MECH	8.00	U.C. per Months Months		NM80	320	\$53.87	2154.8	0	0	2154.8
							CNPIPE	\$17,238	\$0	\$0	\$0	\$17,238
	Job Truck & Equipment Usage Allowance	MECH	8.00	U.C. per Months Months		NM80	0	0	650	0	0	650
								\$0	\$5,200	\$0	\$0	\$5,200
	Vendor Data	MECH	1.00	U.C. per allow allow		NM80	40	\$53.87	2154.8	200	0	2354.8
							CNPIPE	\$2,155	\$0	\$200	\$0	\$2,355
	Misc Testing	MECH	1.00	U.C. per allow allow		NM80	480	\$53.87	25857.6	2000	0	27857.6
							CNPIPE	\$25,858	\$0	\$2,000	\$0	\$27,858
	Sign & Barriers	MECH	1.00	U.C. per allow allow		NM80	80	\$53.87	4309.6	250	0	4559.6
							CNPIPE	\$4,310	\$0	\$250	\$0	\$4,560
	Piping Labels	MECH	1.00	U.C. per Allow Allow		NM80	40	\$53.87	2154.8	1000	0	3154.8
							CNPIPE	\$2,155	\$0	\$1,000	\$0	\$3,155

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.1.2 Piping Contractor</b>												
<i>Memo: Based on estimators judgment and the duration of the project.</i>												
	MECH			NM80	120	\$53.87	6464.4	0	0	0	0	6464.4
	Drain the Existing Pipe System	U.C. per Allow	1.00	Allow	120	CNPIPE	\$6,464	\$0	\$0	\$0	\$0	\$6,464
<b>Subtotal</b>							\$58,180	\$5,200	\$3,450	\$0	\$0	\$66,830
<b>Sales Tax</b>							\$0	\$0	\$207	\$0	\$0	\$207
<b>Markups</b>							\$28,525	\$2,550	\$1,793	\$0	\$0	\$32,868
							49.03%					
<b>Subtotal Estimate</b>												\$99,904
<b>Escalation</b>							\$8,038	\$718	\$505	\$0	\$0	\$9,261
<b>Management Reserve</b>							\$33,160	\$2,964	\$2,084	\$0	\$0	\$38,208
<b>---Total 5.1.1.2 Piping Contractor</b>					<b>1,080</b>		<b>\$127,902</b>	<b>\$11,432</b>	<b>\$8,040</b>	<b>\$0</b>	<b>\$0</b>	<b>\$147,373</b>

**5.1.1.3 Electrical Contractor**

*Memo: Based on estimators judgment and the duration of the project.*

	ELECT	U.C. per mo	6.00	NM80	32	\$70.54	2257.28	0	0	0	0	2257.28
	Working Superintendent 20% Admin Duties		6.00	mo	192	CNLINEF	\$13,544	\$0	\$0	\$0	\$0	\$13,544
	Electrical Truck Allowance	U.C. per mo	6.00	mo	0		0	2100	0	0	0	2100
							\$0	\$12,600	\$0	\$0	\$0	\$12,600
	Electrical Contractor Mob/Demob	U.C. per weeks	2.00	weeks	40	CNELECGF	\$2,290	\$0	\$0	\$0	\$0	\$2,290
							1145					1145
	Electrical Labels	U.C. per Allow	1.00	Allow	40	CNELECGF	\$2,290	\$0	\$1,000	\$0	\$0	\$3,290
							2290		1000			3290
	Electrical Testing	U.C. per Allow	1.00	Allow	240	CNELECGF	\$13,740	\$0	\$150	\$0	\$0	\$13,890
							13740		150			13890
	Vendor Data	U.C. per allow	1.00	allow	40	CNELECGF	\$2,290	\$0	\$0	\$0	\$0	\$2,290
							2290		0			2290

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.1.3 Electrical Contractor</b>												
<i>Memo: Based on estimators judgment and the duration of the project.</i>												
	Sign & Barriers	ELECT	1.00	NM80 allow	40	\$57.25 CNELECGF	2290	\$0	\$0	\$0	\$0	\$2,290
							\$36,444	\$12,600	\$1,150	\$0	\$0	\$50,194
Subtotal							\$0	\$0	\$69	\$0	\$0	\$69
Sales Tax							\$17,868	\$6,178	\$598	\$0	\$0	\$24,644
Markups 49.03%												
<b>Subtotal Estimate</b>							\$5,035	\$1,741	\$168	\$0	\$0	\$74,906
Escalation							\$20,771	\$7,181	\$695	\$0	\$0	\$28,648
Management Reserve												
<b>---Total 5.1.1.3 Electrical Contractor</b>					<b>592</b>		<b>\$80,118</b>	<b>\$27,700</b>	<b>\$2,680</b>	<b>\$0</b>	<b>\$0</b>	<b>\$110,498</b>

**Main Supply Demolition (Canal Area 40' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 22 05 05.10 for labor to demo existing piping.*

	Overhead Metal Piping Demolition Supply Piping (Canal Area)	MECH	200.00	Lnft	0.455	\$53.87 CNPIPE	24,532	\$0	\$0	\$0	\$0	\$4,906
							\$4,906	\$0	\$0	\$0	\$0	\$4,906
Subtotal							\$0	\$0	\$0	\$0	\$0	\$0
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups 49.03%							\$2,406	\$0	\$0	\$0	\$0	\$2,406
<b>Subtotal Estimate</b>							\$678	\$0	\$0	\$0	\$0	\$7,312
Escalation							\$2,796	\$0	\$0	\$0	\$0	\$678
Management Reserve												
<b>---Total Main Supply Demolition (Canal Area 40' Elevation)</b>					<b>91</b>		<b>\$10,786</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,786</b>

**Main Supply Insulation Demolition (Canal Area 40' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 02 82 13.43 for insulation demolition.*

	Piping Insulation Removal (Canal Area)	MECH	200.00	Lnft	0.853	\$53.87 CNPIPE	45,951	\$1,310	\$0	\$0	\$0	\$10,500
							\$9,190	\$1,310	\$0	\$0	\$0	\$10,500

BEA  
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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Demolition (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	Subtotal						\$9,190	\$1,310	\$0	\$0	\$0	\$10,500
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$4,506	\$642	\$0	\$0	\$0	\$5,148
<b>Subtotal Estimate</b>												<b>\$15,648</b>
	Escalation						\$1,270	\$181	\$0	\$0	\$0	\$1,451
	Management Reserve						\$5,238	\$747	\$0	\$0	\$0	\$5,985
<b>--- Total Main Supply Insulation Demolition (Canal Area 40' Elevation)</b>			<b>171</b>				<b>\$20,204</b>	<b>\$2,880</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$23,084</b>

<b><u>Main Return Demolition (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	MECH	<i>U.C. per Lrft</i>					0.455	\$53.87	24.532	0	0	24.532
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		200.00	Lrft	91	CNPIPE	\$4,906	\$0	\$0	\$0	\$0	\$4,906
<b>Subtotal</b>												<b>\$4,906</b>
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$2,406	\$0	\$0	\$0	\$0	\$2,406
<b>Subtotal Estimate</b>												<b>\$7,312</b>
	Escalation						\$678	\$0	\$0	\$0	\$0	\$678
	Management Reserve						\$2,796	\$0	\$0	\$0	\$0	\$2,796
<b>--- Total Main Return Demolition (Canal Area 40' Elevation)</b>			<b>91</b>				<b>\$10,786</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,786</b>

<b><u>Main Return Insulation Demolition (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	MECH	<i>U.C. per Lrft</i>					0.853	\$53.87	45.951	6.55	0	52.501
	Piping Insulation Removal		200.00	Lrft	171	CNPIPE	\$9,190	\$1,310	\$0	\$0	\$0	\$10,500

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Demolition (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 02 82 13.43 for insulation demolition.</i>						
	Subtotal						\$9,190	\$1,310	\$0	\$0	\$0	\$10,500
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$4,506	\$642	\$0	\$0	\$0	\$5,148
	<b>Subtotal Estimate</b>											<b>\$15,648</b>
	Escalation						\$1,270	\$181	\$0	\$0	\$0	\$1,451
	Management Reserve						\$5,238	\$747	\$0	\$0	\$0	\$5,985
<b>--- Total</b>	<b>Main Return Insulation Demolition (Canal Area 40' Elevation)</b>				<b>171</b>		<b>\$20,204</b>	<b>\$2,880</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$23,084</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	<i>U.C. per Month</i>				<i>4</i>	<i>\$53.87</i>	<i>215.48</i>	<i>5370</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>5985.48</i>
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		2.00	Month		8	CNPIPE	\$431	\$10,740	\$0	\$0	\$0	\$11,171
	Subtotal							\$431	\$10,740	\$0	\$0	\$0	\$11,171
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$211	\$5,266	\$0	\$0	\$0	\$5,477
	<b>Subtotal Estimate</b>												<b>\$16,648</b>
	Escalation							\$60	\$1,484	\$0	\$0	\$0	\$1,543
	Management Reserve							\$246	\$6,121	\$0	\$0	\$0	\$6,367
<b>--- Total</b>	<b>Overhead Working Equipment</b>					<b>8</b>		<b>\$947</b>	<b>\$23,611</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$24,558</b>

**Main Supply Demolition (Canal Mezzanine Area 40' Elevation)**

*Memo: RSMeans 22 01 02.20 for labor adjustment factors.*

*RSMeans 22 05 05.10 for labor to demo existing piping.*

	MECH	<i>U.C. per Lift</i>				<i>0.455</i>	<i>\$53.87</i>	<i>24.532</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>24.532</i>
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		70.00	Lift		32	CNPIPE	\$1,717	\$0	\$0	\$0	\$0	\$1,717

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Demolition (Canal Mezzanine Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>						
	Subtotal						\$1,717	\$0	\$0	\$0	\$0	\$1,717
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$842	\$0	\$0	\$0	\$0	\$842
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$2,559</b>
	Escalation						\$237	\$0	\$0	\$0	\$0	\$237
	Management Reserve						\$979	\$0	\$0	\$0	\$0	\$979
<hr/>												
---	<b>Total Main Supply Demolition (Canal Mezzanine Area 40' Elevation)</b>				<b>32</b>		<b>\$3,775</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,775</b>

<b><u>Main Supply Insulation Demolition (Canal Mezzanine Area 40' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 02 82 13.43 for insulation demolition.</i>							
	Piping Insulation Removal	MECH	U.C. per Lnft	70.00	Lnft	0.893 60	\$53.87 CNPIPE	45.951 \$3,217	6.55 \$459	0 \$0	0 \$0	0 \$0	52.501 \$3,675
<hr/>													
	Subtotal							\$3,217	\$459	\$0	\$0	\$3,675	
	Sales Tax							\$0	\$0	\$0	\$0	\$0	
	Markups	49.03%						\$1,577	\$225	\$0	\$0	\$1,802	
<hr/>													
	<b>Subtotal Estimate</b>											<b>\$5,477</b>	
	Escalation							\$444	\$63	\$0	\$0	\$508	
	Management Reserve							\$1,833	\$261	\$0	\$0	\$2,095	
<hr/>													
---	<b>Total Main Supply Insulation Demolition (Canal Mezzanine Area 40' Elevation)</b>				<b>60</b>			<b>\$7,071</b>	<b>\$1,008</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,079</b>	

<b><u>Main Return Demolition (Canal Mezzanine Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>						
	Overhead Metal Piping Demolition Supply Piping (Canal Area)	MECH	U.C. per Lnft	70.00	Lnft	0.455 32	\$53.87 CNPIPE	24.532 \$1,717	0 \$0	0 \$0	0 \$0	24.532 \$1,717

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b><u>Main Return Demolition (Canal Mezzanine Area 40' Elevation)</u></b>													
<b>Memo:</b>						<b>RSMeans 22 01 02.20 for labor adjustment factors.</b>							<b>RSMeans 22 05 10.10 for labor to demo existing piping.</b>
	Subtotal						\$1,717	\$0	\$0	\$0	\$0	\$1,717	
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0	
	Markups	49.03%					\$842	\$0	\$0	\$0	\$0	\$842	
<b>Subtotal Estimate</b>												<b>\$2,559</b>	
	Escalation						\$237	\$0	\$0	\$0	\$0	\$237	
	Management Reserve						\$979	\$0	\$0	\$0	\$0	\$979	
---	<b>Total Main Return Demolition (Canal Mezzanine Area 40' Elevation)</b>				<b>32</b>		<b>\$3,775</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,775</b>	

<b><u>Main Return Insulation Demolition (Canal Mezzanine Area 40' Elevation)</u></b>													
<b>Memo:</b>						<b>RSMeans 02 82 13.43 for insulation demolition.</b>							
	Piping Insulation Removal	MECH	U.C. per Lnft	70.00	Lnft	0.853 60	\$53.87 CNPIPE	45.951 \$3,217	6.55 \$459	0 \$0	0 \$0	0 \$0	52.501 \$3,675
	Subtotal							\$3,217	\$459	\$0	\$0	\$0	\$3,675
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$1,577	\$225	\$0	\$0	\$0	\$1,802
<b>Subtotal Estimate</b>												<b>\$5,477</b>	
	Escalation							\$444	\$63	\$0	\$0	\$0	\$508
	Management Reserve							\$1,833	\$261	\$0	\$0	\$0	\$2,095
---	<b>Total Main Return Insulation Demolition (Canal Mezzanine Area 40' Elevation)</b>				<b>60</b>			<b>\$7,071</b>	<b>\$1,008</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,079</b>

<b><u>Overhead Working Equipment</u></b>													
<b>Memo:</b>						<b>This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</b>							
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)	MECH	U.C. per Month	1.00	Month	0		0 \$0	5370 \$5,370	0 \$0	0 \$0	0 \$0	5370 \$5,370

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Overhead Working Equipment</b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	Subtotal						\$0	\$5,370	\$0	\$0	\$0	\$5,370
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$2,633	\$0	\$0	\$0	\$2,633
<b>Subtotal Estimate</b>												<b>\$8,003</b>
	Escalation						\$0	\$742	\$0	\$0	\$0	\$742
	Management Reserve						\$0	\$3,061	\$0	\$0	\$0	\$3,061
<b>--- Total Overhead Working Equipment</b>					<b>0</b>		<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**Main Supply Demolition (West Canal Area 30' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 22 05 05.10 for labor to demo existing piping.*

	MECH	<i>U.C. per Lift</i>				0.455	\$53.87	24.532	0	0	0	0	24.532
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		70.00	Lnft		32	CNPIPE	\$1,717	\$0	\$0	\$0	\$0	\$1,717
<b>Subtotal</b>												<b>\$1,717</b>	
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$842	\$0	\$0	\$0	\$0	\$842
<b>Subtotal Estimate</b>												<b>\$2,559</b>	
	Escalation							\$237	\$0	\$0	\$0	\$0	\$237
	Management Reserve							\$979	\$0	\$0	\$0	\$0	\$979
<b>--- Total Main Supply Demolition (West Canal Area 30' Elevation)</b>					<b>32</b>		<b>\$3,775</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,775</b>	

**Main Supply Insulation Demolition (West Canal Area 30' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 02 82 13.43 for insulation demolition.*

	MECH	<i>U.C. per Lift</i>				0.853	\$53.87	45.951	6.55	0	0	0	52.501
	Piping Insulation Removal		70.00	Lnft		60	CNPIPE	\$3,217	\$459	\$0	\$0	\$0	\$3,675

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Demolition (West Canal Area 30' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	Subtotal						\$3,217	\$459	\$0	\$0	\$0	\$3,675
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,577	\$225	\$0	\$0	\$0	\$1,802
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$5,477</b>
	Escalation						\$444	\$63	\$0	\$0	\$0	\$508
	Management Reserve						\$1,833	\$261	\$0	\$0	\$0	\$2,095
<hr/>												
---	<b>Total Main Supply Insulation Demolition (West Canal Area 30' Elevation)</b>				<b>60</b>		<b>\$7,071</b>	<b>\$1,008</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,079</b>

<b><u>Main Return Demolition (West Canal Area 30' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	MECH	U.C. per Lnft			0.455	\$53.87	24.532	0	0	0	0	24.532
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		70.00	Lnft	32	CNPIPE	\$1,717	\$0	\$0	\$0	\$0	\$1,717
<hr/>												
	Subtotal						\$1,717	\$0	\$0	\$0	\$0	\$1,717
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$842	\$0	\$0	\$0	\$0	\$842
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$2,559</b>
	Escalation						\$237	\$0	\$0	\$0	\$0	\$237
	Management Reserve						\$979	\$0	\$0	\$0	\$0	\$979
<hr/>												
---	<b>Total Main Return Demolition (West Canal Area 30' Elevation)</b>				<b>32</b>		<b>\$3,775</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,775</b>

<b><u>Main Return Insulation Demolition (West Canal Area 30' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	MECH	U.C. per Lnft			0.853	\$53.87	45.951	6.55	0	0	0	52.501
	Piping Insulation Removal		70.00	Lnft	60	CNPIPE	\$3,217	\$459	\$0	\$0	\$0	\$3,675

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Demolition (West Canal Area 30' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 02 82 13.43 for insulation demolition.</i>						
	Subtotal						\$3,217	\$459	\$0	\$0	\$0	\$3,675
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,577	\$225	\$0	\$0	\$0	\$1,802
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$5,477</b>
	Escalation						\$444	\$63	\$0	\$0	\$0	\$508
	Management Reserve						\$1,833	\$261	\$0	\$0	\$0	\$2,095
<hr/>												
---	<b>Total Main Return Insulation Demolition (West Canal Area 30' Elevation)</b>				<b>60</b>		<b>\$7,071</b>	<b>\$1,008</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,079</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	<i>U.C. per Month</i>					0	5370	0	0	0	5370
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month	4		\$0	\$5,370	\$0	\$0	\$0	\$5,370
<hr/>												
	Subtotal						\$0	\$5,370	\$0	\$0	\$0	\$5,370
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$2,633	\$0	\$0	\$0	\$2,633
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$8,003</b>
	Escalation						\$0	\$742	\$0	\$0	\$0	\$742
	Management Reserve						\$0	\$3,061	\$0	\$0	\$0	\$3,061
<hr/>												
---	<b>Total Overhead Working Equipment</b>				<b>4</b>		<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**Main Supply Demolition (West Canal Area 40' Elevation)**

*Memo: RSMeans 22 01 02.20 for labor adjustment factors.*

*RSMeans 22 05 05.10 for labor to demo existing piping.*

	MECH	<i>U.C. per Lift</i>					0.455	\$53.97	24.532	0	0	24.532
	Vertical Metal Piping Demolition Supply Piping (Canal Area)		30.00	Lift	14	CNPIPE	\$736	\$0	\$0	\$0	\$0	\$736

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Demolition (West Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	Subtotal						\$736	\$0	\$0	\$0	\$0	\$736
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$361	\$0	\$0	\$0	\$0	\$361
<b>Subtotal Estimate</b>												<b>\$1,097</b>
	Escalation						\$102	\$0	\$0	\$0	\$0	\$102
	Management Reserve						\$419	\$0	\$0	\$0	\$0	\$419
<b>--- Total Main Supply Demolition (West Canal Area 40' Elevation)</b>			<b>14</b>				<b>\$1,618</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,618</b>

<b><u>Main Supply Insulation Demolition (West Canal Area 40' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>										
	Piping Insulation Removal	MECH	U.C. per Lrft	30.00	Lnft	0.853 26	\$53.87 CNPIPE	45.951 \$1,379	6.55 \$197	0 \$0	0 \$0	0 \$0	52.501 \$1,575
	Subtotal							\$1,379	\$197	\$0	\$0	\$0	\$1,575
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$676	\$96	\$0	\$0	\$0	\$772
<b>Subtotal Estimate</b>												<b>\$2,347</b>	
	Escalation							\$190	\$27	\$0	\$0	\$0	\$218
	Management Reserve							\$786	\$112	\$0	\$0	\$0	\$898
<b>--- Total Main Supply Insulation Demolition (West Canal Area 40' Elevation)</b>			<b>26</b>				<b>\$3,031</b>	<b>\$432</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,463</b>	

<b><u>Main Return Demolition (West Canal Area 40' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>										
	Vertical Metal Piping Demolition Supply Piping (Canal Area)	MECH	U.C. per Lrft	30.00	Lnft	0.455 14	\$53.87 CNPIPE	24.532 \$736	0 \$0	0 \$0	0 \$0	0 \$0	24.532 \$736

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Demolition (West Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 22 05 10.10 for labor to demo existing piping.</i>						
	Subtotal						\$736	\$0	\$0	\$0	\$0	\$736
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$361	\$0	\$0	\$0	\$0	\$361
<b>Subtotal Estimate \$1,097</b>												
	Escalation						\$102	\$0	\$0	\$0	\$0	\$102
	Management Reserve						\$419	\$0	\$0	\$0	\$0	\$419
<b>--- Total Main Return Demolition (West Canal Area 40' Elevation) 14 \$1,618 \$0 \$0 \$0 \$0 \$1,618</b>												

<b><u>Main Return Insulation Demolition (West Canal Area 40' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>						<i>RSMeans 02 82 13.43 for insulation demolition.</i>							
	Piping Insulation Removal	MECH	U.C. per Lift	30.00	Lnft	0.853 26	\$53.87 CNPIPE	45.951 \$1,379	6.55 \$197	0 \$0	0 \$0	0 \$0	52.501 \$1,575
	Subtotal							\$1,379	\$197	\$0	\$0	\$0	\$1,575
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$676	\$96	\$0	\$0	\$0	\$772
<b>Subtotal Estimate \$2,347</b>													
	Escalation							\$190	\$27	\$0	\$0	\$0	\$218
	Management Reserve							\$786	\$112	\$0	\$0	\$0	\$898
<b>--- Total Main Return Insulation Demolition (West Canal Area 40' Elevation) 26 \$3,031 \$432 \$0 \$0 \$0 \$3,463</b>													

<b><u>Overhead Working Equipment</u></b>													
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>													
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)	MECH	U.C. per Month	1.00	Month	0		0 \$0	5370 \$5,370	0 \$0	0 \$0	0 \$0	5370 \$5,370

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Overhead Working Equipment</u></b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	Subtotal						\$0	\$5,370	\$0	\$0	\$0	\$5,370
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$2,633	\$0	\$0	\$0	\$2,633
<b>Subtotal Estimate</b>												<b>\$8,003</b>
	Escalation						\$0	\$742	\$0	\$0	\$0	\$742
	Management Reserve						\$0	\$3,061	\$0	\$0	\$0	\$3,061
<b>--- Total Overhead Working Equipment</b>					<b>0</b>		<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**Main Supply Demolition (Laydown Area West Wall 20' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 22 05 05.10 for labor to demo existing piping.*

	MECH	<i>U.C. per Lift</i>				0.491	\$53.87	26.461	0	0	0	0	26.461
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		70.00	Lnft	34	CNPIPE	\$1,852	\$0	\$0	\$0	\$0	\$0	\$1,852
<b>Subtotal</b>												<b>\$1,852</b>	
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$908	\$0	\$0	\$0	\$0	\$0	\$908
<b>Subtotal Estimate</b>												<b>\$2,760</b>	
	Escalation						\$256	\$0	\$0	\$0	\$0	\$0	\$256
	Management Reserve						\$1,056	\$0	\$0	\$0	\$0	\$0	\$1,056
<b>--- Total Main Supply Demolition (Laydown Area West Wall 20' Elevation)</b>					<b>34</b>		<b>\$4,072</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,072</b>	

**Main Supply Insulation Demolition (Laydown Area West Wall 20' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 02 82 13.43 for insulation demolition.*

	MECH	<i>U.C. per Lift</i>				0.853	\$53.87	45.951	6.55	0	0	0	52.501
	Piping Insulation Removal		70.00	Lnft	60	CNPIPE	\$3,217	\$459	\$0	\$0	\$0	\$0	\$3,675

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Demolition (Laydown Area West Wall 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	Subtotal						\$3,217	\$459	\$0	\$0	\$0	\$3,675
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,577	\$225	\$0	\$0	\$0	\$1,802
	<b>Subtotal Estimate</b>											<b>\$5,477</b>
	Escalation						\$444	\$63	\$0	\$0	\$0	\$508
	Management Reserve						\$1,833	\$261	\$0	\$0	\$0	\$2,095
---	<b>Total Main Supply Insulation Demolition (Laydown Area West Wall 20' Elevation)</b>				<b>60</b>		<b>\$7,071</b>	<b>\$1,008</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,079</b>

<b><u>Main Return Demolition (Laydown Area West Wall 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	MECH	U.C. per Lnft			0.491	\$53.87	26.461	0	0	0	0	26.461
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		70.00	Lnft	34	CNPIPE	\$1,852	\$0	\$0	\$0	\$0	\$1,852
	Subtotal						\$1,852	\$0	\$0	\$0	\$0	\$1,852
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$908	\$0	\$0	\$0	\$0	\$908
	<b>Subtotal Estimate</b>											<b>\$2,760</b>
	Escalation						\$256	\$0	\$0	\$0	\$0	\$256
	Management Reserve						\$1,056	\$0	\$0	\$0	\$0	\$1,056
---	<b>Total Main Return Demolition (Laydown Area West Wall 20' Elevation)</b>				<b>34</b>		<b>\$4,072</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,072</b>

<b><u>Main Return Insulation Demolition (Laydown Area West Wall 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	MECH	U.C. per Lnft			0.853	\$53.87	45.951	6.55	0	0	0	52.501
	Piping Insulation Removal		70.00	Lnft	60	CNPIPE	\$3,217	\$459	\$0	\$0	\$0	\$3,675

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Demolition (Laydown Area West Wall 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	Subtotal						\$3,217	\$459	\$0	\$0	\$0	\$3,675
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,577	\$225	\$0	\$0	\$0	\$1,802
	<b>Subtotal Estimate</b>											<b>\$5,477</b>
	Escalation						\$444	\$63	\$0	\$0	\$0	\$508
	Management Reserve						\$1,833	\$261	\$0	\$0	\$0	\$2,095
<b>---</b>	<b>Total Main Return Insulation Demolition (Laydown Area West Wall 20' Elevation)</b>		<b>60</b>				<b>\$7,071</b>	<b>\$1,008</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,079</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	<i>U.C. per Month</i>					0	5370	0	0	0	5370
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month	0		\$0	\$5,370	\$0	\$0	\$0	\$5,370
	Subtotal						\$0	\$5,370	\$0	\$0	\$0	\$5,370
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$2,633	\$0	\$0	\$0	\$2,633
	<b>Subtotal Estimate</b>											<b>\$8,003</b>
	Escalation						\$0	\$742	\$0	\$0	\$0	\$742
	Management Reserve						\$0	\$3,061	\$0	\$0	\$0	\$3,061
<b>---</b>	<b>Total Overhead Working Equipment</b>		<b>0</b>				<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**Main Supply Demolition (Laydown Area North Wall 20' Elevation)**

*Memo: RSMeans 22 01 02.20 for labor adjustment factors.*

*RSMeans 22 05 05.10 for labor to demo existing piping.*

	MECH	<i>U.C. per Lift</i>				0.491	\$53.97	26.461	0	0	0	26.461
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		80.00	Lift	39	CNPIPE	\$2,117	\$0	\$0	\$0	\$0	\$2,117

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Demolition (Laydown Area North Wall 20' Elevation)</u></b>												
<i>Memo: RSMMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMMeans 22 05 05.10 for labor to demo existing piping.</i>									
	Subtotal						\$2,117	\$0	\$0	\$0	\$0	\$2,117
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,038	\$0	\$0	\$0	\$0	\$1,038
<b>Subtotal Estimate</b>												<b>\$3,155</b>
	Escalation						\$292	\$0	\$0	\$0	\$0	\$292
	Management Reserve						\$1,207	\$0	\$0	\$0	\$0	\$1,207
---	<b>Total</b>	<b>Main Supply Demolition (Laydown Area North Wall 20' Elevation)</b>	<b>39</b>				<b>\$4,654</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,654</b>

<b><u>Main Supply Insulation Demolition (Laydown Area North Wall 20' Elevation)</u></b>													
<i>Memo: RSMMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMMeans 02 82 13.43 for insulation demolition.</i>										
	Piping Insulation Removal	MECH	U.C. per Lnft	80.00	Lnft	0.853 68	\$53.87 CNPIPE	45.951 \$3,676	6.55 \$524	0 \$0	0 \$0	0 \$0	52.501 \$4,200
	Subtotal							\$3,676	\$524	\$0	\$0	\$0	\$4,200
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$1,802	\$257	\$0	\$0	\$0	\$2,059
<b>Subtotal Estimate</b>												<b>\$6,259</b>	
	Escalation							\$508	\$72	\$0	\$0	\$0	\$580
	Management Reserve							\$2,095	\$299	\$0	\$0	\$0	\$2,394
---	<b>Total</b>	<b>Main Supply Insulation Demolition (Laydown Area North Wall 20' Elevation)</b>		<b>68</b>				<b>\$8,082</b>	<b>\$1,152</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$9,233</b>

<b><u>Main Return Demolition (Laydown Area North Wall 20' Elevation)</u></b>													
<i>Memo: RSMMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMMeans 22 05 05.10 for labor to demo existing piping.</i>										
	Overhead Metal Piping Demolition Supply Piping (Canal Area)	MECH	U.C. per Lnft	80.00	Lnft	0.491 39	\$53.87 CNPIPE	26.461 \$2,117	0 \$0	0 \$0	0 \$0	0 \$0	26.461 \$2,117

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>						
<b><u>Main Return Demolition (Laydown Area North Wall 20' Elevation)</u></b>																		
<b>Memo:</b>						<b>RSMeans 22 01 02.20 for labor adjustment factors.</b>							<b>RSMeans 22 05 05.10 for labor to demo existing piping.</b>					
	Subtotal						\$2,117	\$0	\$0	\$0	\$0	\$2,117						
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0						
	Markups	49.03%					\$1,038	\$0	\$0	\$0	\$0	\$1,038						
<hr/>																		
	<b>Subtotal Estimate</b>											<b>\$3,155</b>						
	Escalation						\$292	\$0	\$0	\$0	\$0	\$292						
	Management Reserve						\$1,207	\$0	\$0	\$0	\$0	\$1,207						
<hr/>																		
---	<b>Total Main Return Demolition (Laydown Area North Wall 20' Elevation)</b>				<b>39</b>		<b>\$4,654</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,654</b>						

<b><u>Main Return Insulation Demolition (Laydown Area North Wall 20' Elevation)</u></b>																		
<b>Memo:</b>						<b>RSMeans 22 01 02.20 for labor adjustment factors.</b>							<b>RSMeans 02 82 13.43 for insulation demolition.</b>					
	Piping Insulation Removal	MECH	U.C. per Lnft	80.00	Lnft	0.853	\$53.87	45.951	6.55	0	0	0	52.501					
							CNPIPE	\$3,676	\$524	\$0	\$0	\$0	\$4,200					
<hr/>																		
	Subtotal							\$3,676	\$524	\$0	\$0	\$4,200						
	Sales Tax							\$0	\$0	\$0	\$0	\$0						
	Markups	49.03%						\$1,802	\$257	\$0	\$0	\$2,059						
<hr/>																		
	<b>Subtotal Estimate</b>											<b>\$6,259</b>						
	Escalation							\$508	\$72	\$0	\$0	\$580						
	Management Reserve							\$2,095	\$299	\$0	\$0	\$2,394						
<hr/>																		
---	<b>Total Main Return Insulation Demolition (Laydown Area North Wall 20' Elevation)</b>				<b>68</b>			<b>\$8,082</b>	<b>\$1,152</b>	<b>\$0</b>	<b>\$0</b>	<b>\$9,233</b>						

<b><u>Overhead Working Equipment</u></b>													
<b>Memo:</b>						<b>This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</b>							
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)	MECH	U.C. per Month	1.00	Month	0		0	5370	0	0	0	5370
								\$0	\$5,370	\$0	\$0	\$0	\$5,370

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Overhead Working Equipment</b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	Subtotal						\$0	\$5,370	\$0	\$0	\$0	\$5,370
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$2,633	\$0	\$0	\$0	\$2,633
<b>Subtotal Estimate</b>												<b>\$8,003</b>
	Escalation						\$0	\$742	\$0	\$0	\$0	\$742
	Management Reserve						\$0	\$3,061	\$0	\$0	\$0	\$3,061
<b>--- Total Overhead Working Equipment</b>					<b>0</b>		<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**Main Supply Demolition (Southwest Area 40' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 22 05 05.10 for labor to demo existing piping.*

	MECH	<i>U.C. per Lnft</i>				0.491	\$53.87	26.461	0	0	0	0	26.461
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		140.00	Lnft	69	CNPIPE	\$3,705	\$0	\$0	\$0	\$0	\$0	\$3,705
<b>Subtotal</b>												<b>\$3,705</b>	
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,816	\$0	\$0	\$0	\$0	\$0	\$1,816
<b>Subtotal Estimate</b>												<b>\$5,521</b>	
	Escalation						\$512	\$0	\$0	\$0	\$0	\$0	\$512
	Management Reserve						\$2,111	\$0	\$0	\$0	\$0	\$0	\$2,111
<b>--- Total Main Supply Demolition (Southwest Area 40' Elevation)</b>					<b>69</b>		<b>\$8,144</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,144</b>	

**Main Supply Insulation Demolition (Southwest Area 40' Elevation)**

*Memo: RSMMeans 22 01 02.20 for labor adjustment factors.*

*RSMMeans 02 82 13.43 for insulation demolition.*

	MECH	<i>U.C. per Lnft</i>				0.853	\$53.87	45.951	6.55	0	0	0	52.501
	Piping Insulation Removal		140.00	Lnft	119	CNPIPE	\$6,433	\$917	\$0	\$0	\$0	\$0	\$7,350

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Demolition (Southwest Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	Subtotal						\$6,433	\$917	\$0	\$0	\$0	\$7,350
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$3,154	\$450	\$0	\$0	\$0	\$3,604
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$10,954</b>
	Escalation						\$889	\$127	\$0	\$0	\$0	\$1,015
	Management Reserve						\$3,667	\$523	\$0	\$0	\$0	\$4,189
<hr/>												
---	<b>Total Main Supply Insulation Demolition (Southwest Area 40' Elevation)</b>				<b>119</b>		<b>\$14,143</b>	<b>\$2,016</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$16,159</b>

<b><u>Main Return Demolition (Southwest Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	MECH	<i>U.C. per Lnft</i>			<i>0.491</i>	<i>\$53.87</i>	<i>26.461</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>26.461</i>
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		140.00	Lnft	69	CNPIPE	\$3,705	\$0	\$0	\$0	\$0	\$3,705
<hr/>												
	Subtotal						\$3,705	\$0	\$0	\$0	\$0	\$3,705
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$1,816	\$0	\$0	\$0	\$0	\$1,816
<hr/>												
	<b>Subtotal Estimate</b>											<b>\$5,521</b>
	Escalation						\$512	\$0	\$0	\$0	\$0	\$512
	Management Reserve						\$2,111	\$0	\$0	\$0	\$0	\$2,111
<hr/>												
---	<b>Total Main Return Demolition (Southwest Area 40' Elevation)</b>				<b>69</b>		<b>\$8,144</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,144</b>

<b><u>Main Return Insulation Demolition (Southwest Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>									
	MECH	<i>U.C. per Lnft</i>			<i>0.853</i>	<i>\$53.87</i>	<i>45.951</i>	<i>6.55</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>52.501</i>
	Piping Insulation Removal		140.00	Lnft	119	CNPIPE	\$6,433	\$917	\$0	\$0	\$0	\$7,350

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b><u>Main Return Insulation Demolition (Southwest Area 40' Elevation)</u></b>													
<b>Memo:</b>						<b>RSMeans 22 01 02.20 for labor adjustment factors.</b>							<b>RSMeans 02 82 13.43 for insulation demolition.</b>
	Subtotal						\$6,433	\$917	\$0	\$0	\$0	\$7,350	
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0	
	Markups	49.03%					\$3,154	\$450	\$0	\$0	\$0	\$3,604	
<b>Subtotal Estimate</b>												<b>\$10,954</b>	
	Escalation						\$889	\$127	\$0	\$0	\$0	\$1,015	
	Management Reserve						\$3,667	\$523	\$0	\$0	\$0	\$4,189	
<b>--- Total Main Return Insulation Demolition (Southwest Area 40' Elevation)</b>					<b>119</b>		<b>\$14,143</b>	<b>\$2,016</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$16,159</b>	

**Overhead Working Equipment**

**Memo:** *This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	U.C. per Month					0	5370	0	0	0	5370
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		2.00	Month			\$0	\$10,740	\$0	\$0	\$0	\$10,740
<b>Subtotal</b>												<b>\$10,740</b>
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$5,266	\$0	\$0	\$0	\$5,266
<b>Subtotal Estimate</b>												<b>\$16,006</b>
	Escalation						\$0	\$1,484	\$0	\$0	\$0	\$1,484
	Management Reserve						\$0	\$6,121	\$0	\$0	\$0	\$6,121
<b>--- Total Overhead Working Equipment</b>					<b>0</b>		<b>\$0</b>	<b>\$23,611</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$23,611</b>

**Main Supply Demolition (Diesel Generator Room Area North Wall 20' Elevation)**

**Memo:** **RSMeans 22 01 02.20 for labor adjustment factors.**

**RSMeans 22 05 05.10 for labor to demo existing piping.**

	MECH	U.C. per Lift				0.491	\$53.97	26.461	0	0	0	26.461
	Overhead Metal Piping Demolition Supply Piping (Canal Area)		50.00	Lift		25	CNPIPE	\$1,323	\$0	\$0	\$0	\$1,323

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Demolition (Diesel Generator Room Area North Wall 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	Subtotal						\$1,323	\$0	\$0	\$0	\$0	\$1,323
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$649	\$0	\$0	\$0	\$0	\$649
	<b>Subtotal Estimate</b>											<b>\$1,972</b>
	Escalation						\$183	\$0	\$0	\$0	\$0	\$183
	Management Reserve						\$754	\$0	\$0	\$0	\$0	\$754
---	<b>Total Main Supply Demolition (Diesel Generator Room Area North Wall 20' Elevation)</b>				<b>25</b>		<b>\$2,909</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,909</b>

<b><u>Main Supply Insulation Demolition (Diesel Generator Room Area North Wall 20' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>										
	Piping Insulation Removal	MECH	U.C. per Lnft	50.00	Lnft	0.853 43	\$53.87 CNPIPE	45.951 \$2,298	6.55 \$328	0 \$0	0 \$0	0 \$0	52.501 \$2,625
	Subtotal							\$2,298	\$328	\$0	\$0	\$0	\$2,625
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$1,287	\$161	\$0	\$0	\$0	\$1,287
	<b>Subtotal Estimate</b>												<b>\$3,912</b>
	Escalation							\$317	\$45	\$0	\$0	\$0	\$363
	Management Reserve							\$1,310	\$187	\$0	\$0	\$0	\$1,496
---	<b>Total Main Supply Insulation Demolition (Diesel Generator Room Area North Wall 20' Elevation)</b>				<b>43</b>			<b>\$5,051</b>	<b>\$720</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,771</b>

<b><u>Main Return Demolition (Diesel Generator Room Area North Wall 20' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>										
	Overhead Metal Piping Demolition Supply Piping (Canal Area)	MECH	U.C. per Lnft	50.00	Lnft	0.491 25	\$53.87 CNPIPE	26.461 \$1,323	0 \$0	0 \$0	0 \$0	0 \$0	26.461 \$1,323

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Demolition (Diesel Generator Room Area North Wall 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 22 05 05.10 for labor to demo existing piping.</i>									
	Subtotal						\$1,323	\$0	\$0	\$0	\$0	\$1,323
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$649	\$0	\$0	\$0	\$0	\$649
	<b>Subtotal Estimate</b>											<b>\$1,972</b>
	Escalation						\$183	\$0	\$0	\$0	\$0	\$183
	Management Reserve						\$754	\$0	\$0	\$0	\$0	\$754
<b>--- Total</b>	<b>Main Return Demolition (Diesel Generator Room Area North Wall 20' Elevation)</b>		<b>25</b>				<b>\$2,909</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,909</b>

<b><u>Main Return Insulation Demolition (Diesel Generator Room Area West Wall 20' Elevation)</u></b>													
<i>Memo: RSMeans 22 01 02.20 for labor adjustment factors.</i>			<i>RSMeans 02 82 13.43 for insulation demolition.</i>										
	Piping Insulation Removal	MECH	U.C. per Lnft	50.00	Lnft	0.853 43	\$53.87 CNPIPE	45.951 \$2,298	6.55 \$328	0 \$0	0 \$0	0 \$0	52.501 \$2,625
	Subtotal							\$2,298	\$328	\$0	\$0	\$0	\$2,625
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$1,126	\$161	\$0	\$0	\$0	\$1,287
	<b>Subtotal Estimate</b>												<b>\$3,912</b>
	Escalation							\$317	\$45	\$0	\$0	\$0	\$363
	Management Reserve							\$1,310	\$187	\$0	\$0	\$0	\$1,496
<b>--- Total</b>	<b>Main Return Insulation Demolition (Diesel Generator Room Area West Wall 20' Elevation)</b>			<b>43</b>				<b>\$5,051</b>	<b>\$720</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,771</b>

<b><u>Overhead Working Equipment</u></b>													
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>													
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)	MECH	U.C. per Month	1.00	Month	0		0 \$0	5370 \$5,370	0 \$0	0 \$0	0 \$0	5370 \$5,370

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Overhead Working Equipment</b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	Subtotal							\$0	\$5,370	\$0	\$0	\$5,370
	Sales Tax							\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$0	\$2,633	\$0	\$0	\$2,633
<b>Subtotal Estimate</b>												<b>\$8,003</b>
	Escalation							\$0	\$742	\$0	\$0	\$742
	Management Reserve							\$0	\$3,061	\$0	\$0	\$3,061
<b>---Total</b>	<b>Overhead Working Equipment</b>		<b>0</b>					<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**5.1.2.1.9 Demo Existing Coils**

*Memo: Based on RS Means and includes a factor of 1.55 to account for congested & elevated work area.*

	MECH	<i>U.C. per SF</i>			0.15	\$53.87	8.081	0	0	0	0	8.081
Demo Heating Coil HVS-1	(size 10' x 12')		120.00	SF	18	CNPIPE	\$970	\$0	\$0	\$0	\$0	\$970
	MECH	<i>U.C. per SF</i>			0.15	\$53.87	8.081	0	0	0	0	8.081
Demo Heating Coil HVS-2	(size 10' x 12')		120.00	SF	18	CNPIPE	\$970	\$0	\$0	\$0	\$0	\$970
	MECH	<i>U.C. per SF</i>			0.15	\$53.87	8.081	0	0	0	0	8.081
Demo Heating Coil HVS-3	(size 10' x 12')		120.00	SF	18	CNPIPE	\$970	\$0	\$0	\$0	\$0	\$970
	MECH	<i>U.C. per SF</i>			0.15	\$53.87	8.081	0	0	0	0	8.081
Demo Heating Coil HVS-4	(size 10' x 12')		120.00	SF	18	CNPIPE	\$970	\$0	\$0	\$0	\$0	\$970

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.2.1.9 Demo Existing Coils</b>												
<i>Memo: Based on RS Means and includes a factor of 1.55 to account for congested &amp; elevated work area.</i>												
	MECH				0.15	\$53.87	8.081	0	0	0	0	8.081
	Demo Heating Coil HVS-5 (size 10' x 12')	U.C. per SF	120.00	SF	18	CNPIPE	\$970	\$0	\$0	\$0	\$0	\$970
<b>Subtotal</b>							<b>\$4,848</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,848</b>
<b>Sales Tax</b>							<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Markups</b>							<b>\$2,377</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,377</b>
<b>Subtotal Estimate</b>												<b>\$7,225</b>
<b>Escalation</b>							<b>\$670</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$670</b>
<b>Management Reserve</b>							<b>\$2,763</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,763</b>
<b>---Total 5.1.2.1.9 Demo Existing Coils</b>					<b>90</b>		<b>\$10,659</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,659</b>

**Main Supply Installation (Canal Area 40' Elevation)**

	MECH				1.27	\$53.87	68.415	0	55	0	0	123.415
	Overhead Metal Piping 8", Installation Supply Piping (Canal Area)	U.C. per Lnft	200.00	Lnft	254	CNPIPE	\$13,683	\$0	\$11,000	\$0	\$0	\$24,683
<i>Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area</i>												
	MECH				4.8	\$53.87	258.577	0	85	0	0	343.577
	8" - Piping Flange Fitting Installation	U.C. per Ea	3.00	Ea	14	CNPIPE	\$776	\$0	\$255	\$0	\$0	\$1,031
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH				9	\$53.87	484.83	0	200	0	0	684.83
	8" - 90 Degree Elbow Pipe Fitting Installation	U.C. per Ea	2.00	Ea	18	CNPIPE	\$970	\$0	\$400	\$0	\$0	\$1,370
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH				9	\$53.87	484.83	0	165	0	0	649.83
	8" - 45 Degree Elbow Pipe Fitting Installation	U.C. per Ea	4.00	Ea	36	CNPIPE	\$1,939	\$0	\$660	\$0	\$0	\$2,599
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH				13.44	\$53.87	724.013	0	355	0	0	1079.013
	8" - Tee Straight Pipe Fitting Installation	U.C. per Ea	4.00	Ea	54	CNPIPE	\$2,896	\$0	\$1,420	\$0	\$0	\$4,316
<i>Memo: RSMMeans 22 11 13.47</i>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (Canal Area 40' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.598	0	35.5	0	0	169.098
	Memo: RSMMeans 22 11 13.47		13.00	Ea	32	CNPIPE	\$1,737	\$0	\$462	\$0	\$0	\$2,198
							\$22,001	\$0	\$14,197	\$0	\$0	\$36,197
							\$0	\$0	\$852	\$0	\$0	\$852
							\$10,787	\$0	\$7,378	\$0	\$0	\$18,165
							\$22,001	\$0	\$14,197	\$0	\$0	\$36,197
							\$0	\$0	\$852	\$0	\$0	\$852
							\$10,787	\$0	\$7,378	\$0	\$0	\$18,165
<b>Subtotal Estimate</b>												<b>\$55,214</b>
Escalation							\$3,039	\$0	\$2,079	\$0	\$0	\$5,118
Management Reserve							\$12,539	\$0	\$8,577	\$0	\$0	\$21,116
<b>---Total Main Supply Installation (Canal Area 40' Elevation)</b>					<b>408</b>		<b>\$48,366</b>	<b>\$0</b>	<b>\$33,082</b>	<b>\$0</b>	<b>\$0</b>	<b>\$81,448</b>

**Main Return Installation (Canal Area 40' Elevation)**

	Overhead Metal Piping 8", Installation Supply Piping (Canal Area)	MECH			1.27	\$53.87	68.415	0	55	0	0	123.415
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area		200.00	Lnft	254	CNPIPE	\$13,683	\$0	\$11,000	\$0	\$0	\$24,683
							\$13,683	\$0	\$11,000	\$0	\$0	\$24,683
	8" - Piping Flange Fitting Installation	MECH			4.8	\$53.87	258.577	0	85	0	0	343.577
	Memo: RSMMeans 22 11 13.47		3.00	Ea	14	CNPIPE	\$776	\$0	\$255	\$0	\$0	\$1,031
							\$776	\$0	\$255	\$0	\$0	\$1,031
	8" - 90 Degree Elbow Pipe Fitting Installation	MECH			9	\$53.87	484.83	0	200	0	0	684.83
	Memo: RSMMeans 22 11 13.47		2.00	Ea	18	CNPIPE	\$970	\$0	\$400	\$0	\$0	\$1,370
							\$970	\$0	\$400	\$0	\$0	\$1,370
	8" - 45 Degree Elbow Pipe Fitting Installation	MECH			9	\$53.87	484.83	0	165	0	0	649.83
	Memo: RSMMeans 22 11 13.47		4.00	Ea	36	CNPIPE	\$1,939	\$0	\$660	\$0	\$0	\$2,599
							\$1,939	\$0	\$660	\$0	\$0	\$2,599
	8" - Tee Straight Pipe Fitting Installation	MECH			13.44	\$53.87	724.013	0	355	0	0	1079.013
	Memo: RSMMeans 22 11 13.47		4.00	Ea	54	CNPIPE	\$2,896	\$0	\$1,420	\$0	\$0	\$4,316
							\$2,896	\$0	\$1,420	\$0	\$0	\$4,316

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

Page No. 44

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (Canal Area 40' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.598	0	35.5	0	0	169.098
	Memo: RSMMeans 22 11 13.47		13.00	Ea	32	CNPIPE	\$1,737	\$0	\$462	\$0	\$0	\$2,198
	Subtotal						\$22,001	\$0	\$14,197	\$0	\$0	\$36,197
	Sales Tax						\$0	\$0	\$852	\$0	\$0	\$852
	Markups	49.03%					\$10,787	\$0	\$7,378	\$0	\$0	\$18,165
	<b>Subtotal Estimate</b>											<b>\$55,214</b>
	Escalation						\$3,039	\$0	\$2,079	\$0	\$0	\$5,118
	Management Reserve						\$12,539	\$0	\$8,577	\$0	\$0	\$21,116
<b>---Total</b>	<b>Main Return Installation (Canal Area 40' Elevation)</b>				<b>408</b>		<b>\$48,366</b>	<b>\$0</b>	<b>\$33,082</b>	<b>\$0</b>	<b>\$0</b>	<b>\$81,448</b>
<b><u>Main Supply Insulation Installation (Canal Area 40' Elevation)</u></b>												
	Memo: RSMMeans 22 07 19.30											
	Piping Insulation Installation	MECH			0.37	\$53.87	19.932	0	10.15	0	0	30.082
			200.00	Lnft	74	CNPIPE	\$3,986	\$0	\$2,030	\$0	\$0	\$6,016
	Piping Fitting Insulation Installation	MECH			0.5	\$53.87	26.935	0	20	0	0	46.935
			13.00	Ea	7	CNPIPE	\$350	\$0	\$260	\$0	\$0	\$610
	Subtotal						\$4,337	\$0	\$2,290	\$0	\$0	\$6,627
	Sales Tax						\$0	\$0	\$137	\$0	\$0	\$137
	Markups	49.03%					\$2,126	\$0	\$1,190	\$0	\$0	\$3,316
	<b>Subtotal Estimate</b>											<b>\$10,080</b>
	Escalation						\$589	\$0	\$335	\$0	\$0	\$934
	Management Reserve						\$2,472	\$0	\$1,384	\$0	\$0	\$3,855
<b>---Total</b>	<b>Main Supply Insulation Installation (Canal Area 40' Elevation)</b>				<b>81</b>		<b>\$9,533</b>	<b>\$0</b>	<b>\$5,336</b>	<b>\$0</b>	<b>\$0</b>	<b>\$14,870</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Installation (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	U.C. per Lft			0.37	\$53.87	19.932	0	10.15	0	0	30.082
	Piping Insulation Installation		200.00	Lft	74	CNPIPE	\$3,986	\$0	\$2,030	\$0	\$0	\$6,016
	MECH	U.C. per Ea			0.5	\$53.87	26.935	0	20	0	0	46.935
	Piping Fitting Insulation Installation		13.00	Ea	7	CNPIPE	\$350	\$0	\$260	\$0	\$0	\$610
<b>Subtotal</b>							\$4,337	\$0	\$2,290	\$0	\$0	\$6,627
<b>Sales Tax</b>							\$0	\$0	\$137	\$0	\$0	\$137
<b>Markups</b>							\$2,126	\$0	\$1,190	\$0	\$0	\$3,316
<b>Subtotal Estimate</b>												\$10,080
<b>Escalation</b>							\$599	\$0	\$335	\$0	\$0	\$934
<b>Management Reserve</b>							\$2,472	\$0	\$1,384	\$0	\$0	\$3,855
<b>---Total Main Return Insulation Installation (Canal Area 40' Elevation)</b>					<b>81</b>		<b>\$9,533</b>	<b>\$0</b>	<b>\$5,336</b>	<b>\$0</b>	<b>\$0</b>	<b>\$14,870</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	U.C. per Month			4	\$53.87	215.48	5370	0	0	0	5595.48
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		3.00	Month	12	CNPIPE	\$646	\$16,110	\$0	\$0	\$0	\$16,756
<b>Subtotal</b>							\$646	\$16,110	\$0	\$0	\$0	\$16,756
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$317	\$7,899	\$0	\$0	\$0	\$8,216
<b>Subtotal Estimate</b>												\$24,972
<b>Escalation</b>							\$89	\$2,226	\$0	\$0	\$0	\$2,315
<b>Management Reserve</b>							\$368	\$9,182	\$0	\$0	\$0	\$9,550
<b>---Total Overhead Working Equipment</b>					<b>12</b>		<b>\$1,421</b>	<b>\$35,416</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$36,837</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (Canal Area 40' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			0.66	\$53.87	35.554	0	35	0	0	70.554
	Overhead Metal Piping Installation Supply Piping 4" (Canal Area)		70.00	Lft	46	CNPIPE	\$2,489	\$0	\$2,450	\$0	\$0	\$4,939
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area											
	MECH	<i>U.C. per Ea</i>			2.6	\$53.87	140.063	0	33	0	0	173.063
	Piping Flange Fitting 4", Installation		3.00	Ea	8	CNPIPE	\$420	\$0	\$99	\$0	\$0	\$519
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	48	0	0	290.415
	4" - 90 Degree Elbow Pipe Fitting Installation		2.00	Ea	9	CNPIPE	\$495	\$0	\$96	\$0	\$0	\$591
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	49.5	0	0	291.915
	4" - 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	18	CNPIPE	\$970	\$0	\$198	\$0	\$0	\$1,168
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			7.5	\$53.87	404.025	0	118	0	0	522.025
	4" - Tee Straight Pipe Fitting Installation		4.00	Ea	30	CNPIPE	\$1,616	\$0	\$472	\$0	\$0	\$2,088
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.598	0	35.5	0	0	169.098
	Gasket and Bolt Set		13.00	Ea	32	CNPIPE	\$1,737	\$0	\$462	\$0	\$0	\$2,199
	Memo: RSMMeans 22 11 13.47											
	Subtotal						\$7,716	\$0	\$3,777	\$0	\$0	\$11,493
	Sales Tax						\$0	\$0	\$227	\$0	\$0	\$227
	Markups	49.03%					\$3,783	\$0	\$1,963	\$0	\$0	\$5,746
	<b>Subtotal Estimate</b>											<b>\$17,465</b>
	Escalation						\$1,066	\$0	\$553	\$0	\$0	\$1,619
	Management Reserve						\$4,398	\$0	\$2,282	\$0	\$0	\$6,680
	<b>---Total Main Supply Installation (Canal Area 40' Elevation)</b>				<b>143</b>		<b>\$16,964</b>	<b>\$0</b>	<b>\$8,800</b>	<b>\$0</b>	<b>\$0</b>	<b>\$25,764</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (Canal Area 40' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			0.66	\$53.87	35.554	0	35	0	0	70.554
	Overhead Metal Piping Installation Supply Piping 4" (Canal Area)		70.00	Lft	46	CNPIPE	\$2,489	\$0	\$2,450	\$0	\$0	\$4,939
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area											
	MECH	<i>U.C. per Ea</i>			2.6	\$53.87	140.063	0	33	0	0	173.063
	Piping Flange Fitting 4", Installation		3.00	Ea	8	CNPIPE	\$420	\$0	\$99	\$0	\$0	\$519
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	48	0	0	290.415
	4" - 90 Degree Elbow Pipe Fitting Installation		2.00	Ea	9	CNPIPE	\$495	\$0	\$96	\$0	\$0	\$591
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	49.5	0	0	291.915
	4" - 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	18	CNPIPE	\$970	\$0	\$198	\$0	\$0	\$1,168
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			7.5	\$53.87	404.025	0	118	0	0	522.025
	4" - Tee Straight Pipe Fitting Installation		4.00	Ea	30	CNPIPE	\$1,616	\$0	\$472	\$0	\$0	\$2,088
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.598	0	35.5	0	0	169.098
	Gasket and Bolt Set		13.00	Ea	32	CNPIPE	\$1,737	\$0	\$462	\$0	\$0	\$2,199
	Memo: RSMMeans 22 11 13.47											
	Subtotal						\$7,716	\$0	\$3,777	\$0	\$0	\$11,493
	Sales Tax						\$0	\$0	\$227	\$0	\$0	\$227
	Markups	49.03%					\$3,783	\$0	\$1,963	\$0	\$0	\$5,746
	<b>Subtotal Estimate</b>											<b>\$17,465</b>
	Escalation						\$1,066	\$0	\$553	\$0	\$0	\$1,619
	Management Reserve						\$4,398	\$0	\$2,282	\$0	\$0	\$6,680
	<b>---Total Main Return Installation (Canal Area 40' Elevation)</b>				<b>143</b>		<b>\$16,964</b>	<b>\$0</b>	<b>\$8,800</b>	<b>\$0</b>	<b>\$0</b>	<b>\$25,764</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Installation (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	<i>U.C. per Lnft</i>			<i>0.37</i>	<i>\$53.87</i>	<i>19.932</i>	<i>0</i>	<i>10.15</i>	<i>0</i>	<i>0</i>	<i>30.082</i>
	Piping Insulation Installation		70.00	Lnft	26	CNPIPE	\$1,395	\$0	\$711	\$0	\$0	\$2,106
	MECH	<i>U.C. per Ea</i>			<i>0.5</i>	<i>\$53.87</i>	<i>26.935</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>46.935</i>
	Piping Fitting Insulation Installation		13.00	Ea	7	CNPIPE	\$350	\$0	\$260	\$0	\$0	\$610
Subtotal							\$1,745	\$0	\$971	\$0	\$0	\$2,716
Sales Tax							\$0	\$0	\$58	\$0	\$0	\$58
Markups							\$856	\$0	\$504	\$0	\$0	\$1,360
Markups							49.03%					
<b>Subtotal Estimate</b>							\$241	\$0	\$142	\$0	\$0	\$4,134
Escalation							\$995	\$0	\$586	\$0	\$0	\$383
Management Reserve												\$1,581
<b>---Total Main Supply Insulation Installation (Canal Area 40' Elevation)</b>					<b>32</b>		<b>\$3,837</b>	<b>\$0</b>	<b>\$2,262</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,099</b>

<b><u>Main Return Insulation Installation (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	<i>U.C. per Lnft</i>			<i>0.37</i>	<i>\$53.87</i>	<i>19.932</i>	<i>0</i>	<i>10.15</i>	<i>0</i>	<i>0</i>	<i>30.082</i>
	Piping Insulation Installation		70.00	Lnft	26	CNPIPE	\$1,395	\$0	\$711	\$0	\$0	\$2,106
	MECH	<i>U.C. per Ea</i>			<i>0.5</i>	<i>\$53.87</i>	<i>26.935</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>46.935</i>
	Piping Fitting Insulation Installation		13.00	Ea	7	CNPIPE	\$350	\$0	\$260	\$0	\$0	\$610
Subtotal							\$1,745	\$0	\$971	\$0	\$0	\$2,716
Sales Tax							\$0	\$0	\$58	\$0	\$0	\$58
Markups							\$856	\$0	\$504	\$0	\$0	\$1,360
Markups							49.03%					
<b>Subtotal Estimate</b>							\$241	\$0	\$142	\$0	\$0	\$4,134
Escalation							\$995	\$0	\$586	\$0	\$0	\$383
Management Reserve												\$1,581
<b>---Total Main Return Insulation Installation (Canal Area 40' Elevation)</b>					<b>32</b>		<b>\$3,837</b>	<b>\$0</b>	<b>\$2,262</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,099</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Overhead Working Equipment</b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	MECH			<i>U.C. per Month</i>	4	\$53.87	215.48	5370	0	0	0	5585.48
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		2.00	Month	8	CNPIPE	\$431	\$10,740	\$0	\$0	\$0	\$11,171
<b>Subtotal</b>							\$431	\$10,740	\$0	\$0	\$0	\$11,171
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$211	\$5,266	\$0	\$0	\$0	\$5,477
<b>Subtotal Estimate</b>												<b>\$16,648</b>
<b>Escalation</b>							\$60	\$1,484	\$0	\$0	\$0	\$1,543
<b>Management Reserve</b>							\$246	\$6,121	\$0	\$0	\$0	\$6,367
<b>---Total Overhead Working Equipment</b>					<b>8</b>		<b>\$947</b>	<b>\$23,611</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$24,558</b>

**Main Supply Installation (West Canal Area 30' Elevation)**

	MECH			<i>U.C. per Lnft</i>	1.27	\$53.87	68.415	0	55	0	0	123.415
	Overhead Metal Piping 8" Installation Supply Piping (Canal Area)		70.00	Lnft	89	CNPIPE	\$4,789	\$0	\$3,850	\$0	\$0	\$8,639
<i>Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area</i>												
	MECH			<i>U.C. per Ea</i>	4.8	\$53.87	258.577	0	85	0	0	343.577
	8" Piping Flange Fitting Installation		3.00	Ea	14	CNPIPE	\$776	\$0	\$255	\$0	\$0	\$1,031
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>	9	\$53.87	484.83	0	200	0	0	684.83
	8" 90 Degree Elbow Pipe Fitting Installation		1.00	Ea	9	CNPIPE	\$485	\$0	\$200	\$0	\$0	\$685
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>	9	\$53.87	484.83	0	163	0	0	647.83
	8" 45 Degree Elbow Pipe Fitting Installation		2.00	Ea	18	CNPIPE	\$970	\$0	\$326	\$0	\$0	\$1,296
<i>Memo: RSMMeans 22 11 13.47</i>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

Page No. 50

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (West Canal Area 30' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.598	0	35	0	0	168.598
	Memo: RSMMeans 22 11 13.47		6.00	Ea	15	CNPIPE	\$802	\$0	\$210	\$0	\$0	\$1,012
							<b>\$7,821</b>	<b>\$0</b>	<b>\$4,841</b>	<b>\$0</b>	<b>\$0</b>	<b>\$12,662</b>
Subtotal							\$0	\$0	\$290	\$0	\$0	\$290
Sales Tax							\$3,835	\$0	\$2,516	\$0	\$0	\$6,350
Markups							49.03%					
<b>Subtotal Estimate</b>							<b>\$1,080</b>	<b>\$0</b>	<b>\$709</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,789</b>
Escalation							\$4,458	\$0	\$2,925	\$0	\$0	\$7,382
Management Reserve												
<b>---Total Main Supply Installation (West Canal Area 30' Elevation)</b>					<b>145</b>		<b>\$17,193</b>	<b>\$0</b>	<b>\$11,281</b>	<b>\$0</b>	<b>\$0</b>	<b>\$28,474</b>

<b><u>Main Return Installation (West Canal Area 30' Elevation)</u></b>												
	Overhead Metal Piping 8" Installation Supply Piping (Canal Area)	MECH			1.27	\$53.87	68.415	0	55	0	0	123.415
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area		70.00	Lnft	89	CNPIPE	\$4,789	\$0	\$3,850	\$0	\$0	\$8,639
	8" Piping Flange Fitting Installation	MECH			4.8	\$53.87	258.577	0	85	0	0	343.577
	Memo: RSMMeans 22 11 13.47		3.00	Ea	14	CNPIPE	\$776	\$0	\$255	\$0	\$0	\$1,031
	8" 90 Degree Elbow Pipe Fitting Installation	MECH			9	\$53.87	484.83	0	200	0	0	684.83
	Memo: RSMMeans 22 11 13.47		1.00	Ea	9	CNPIPE	\$485	\$0	\$200	\$0	\$0	\$685
	8" 45 Degree Elbow Pipe Fitting Installation	MECH			9	\$53.87	484.83	0	163	0	0	647.83
	Memo: RSMMeans 22 11 13.47		2.00	Ea	18	CNPIPE	\$970	\$0	\$326	\$0	\$0	\$1,296

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

Page No. 51

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (West Canal Area 30' Elevation)</u></b>												
	Gasket and Bolt Set	MECH	6.00	Ea	2.48	\$53.87	133.598	0	35	0	0	168.598
	Memo: RSMMeans 22 11 13.47											
					15	CNPIPE	\$802	\$0	\$210	\$0	\$0	\$1,012
	Subtotal						\$7,821	\$0	\$4,841	\$0	\$0	\$12,662
	Sales Tax						\$0	\$0	\$290	\$0	\$0	\$290
	Markups	49.03%					\$3,835	\$0	\$2,516	\$0	\$0	\$6,350
	<b>Subtotal Estimate</b>											<b>\$19,303</b>
	Escalation						\$1,080	\$0	\$709	\$0	\$0	\$1,789
	Management Reserve						\$4,458	\$0	\$2,925	\$0	\$0	\$7,382
<b>---Total</b>	<b>Main Return Installation (West Canal Area 30' Elevation)</b>				<b>145</b>		<b>\$17,193</b>	<b>\$0</b>	<b>\$11,281</b>	<b>\$0</b>	<b>\$0</b>	<b>\$28,474</b>
<b><u>Main Supply Insulation Installation (West Canal Area 30' Elevation)</u></b>												
Memo: RSMMeans 22 07 19.30												
	Piping Insulation Installation	MECH	70.00	Lnft	0.37	\$53.87	19.932	0	10.15	0	0	30.082
					26	CNPIPE	\$1,395	\$0	\$711	\$0	\$0	\$2,106
	Piping Fitting Insulation Installation	MECH	3.00	Ea	0.5	\$53.87	26.933	0	20	0	0	46.933
					2	CNPIPE	\$81	\$0	\$60	\$0	\$0	\$141
	Subtotal						\$1,476	\$0	\$771	\$0	\$0	\$2,247
	Sales Tax						\$0	\$0	\$46	\$0	\$0	\$46
	Markups	49.03%					\$724	\$0	\$400	\$0	\$0	\$1,124
	<b>Subtotal Estimate</b>											<b>\$3,417</b>
	Escalation						\$204	\$0	\$113	\$0	\$0	\$317
	Management Reserve						\$841	\$0	\$466	\$0	\$0	\$1,307
<b>---Total</b>	<b>Main Supply Insulation Installation (West Canal Area 30' Elevation)</b>				<b>27</b>		<b>\$3,245</b>	<b>\$0</b>	<b>\$1,796</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,040</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Installation (West Canal Area 30' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	U.C. per Lft			0.37	\$53.87	19.932	0	10.15	0	0	30.082
	Piping Insulation Installation		70.00	Lft	26	CNPIPE	\$1,395	\$0	\$711	\$0	\$0	\$2,106
	MECH	U.C. per Ea			0.5	\$53.87	26.933	0	20	0	0	46.933
	Piping Fitting Insulation Installation		3.00	Ea	2	CNPIPE	\$81	\$0	\$60	\$0	\$0	\$141
<b>Subtotal</b>							\$1,476	\$0	\$771	\$0	\$0	\$2,247
<b>Sales Tax</b>							\$0	\$0	\$46	\$0	\$0	\$46
<b>Markups</b>							\$724	\$0	\$400	\$0	\$0	\$1,124
<b>Subtotal Estimate</b>							\$204	\$0	\$113	\$0	\$0	\$317
<b>Escalation</b>							\$841	\$0	\$466	\$0	\$0	\$1,307
<b>Management Reserve</b>												
<b>---Total Main Return Insulation Installation (West Canal Area 30' Elevation)</b>					<b>27</b>		<b>\$3,245</b>	<b>\$0</b>	<b>\$1,796</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,040</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	U.C. per Month			4		0	5370	0	0	0	5370
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month	4		\$0	\$5,370	\$0	\$0	\$0	\$5,370
<b>Subtotal</b>							\$0	\$5,370	\$0	\$0	\$0	\$5,370
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$2,633	\$0	\$0	\$0	\$2,633
<b>Subtotal Estimate</b>							\$0	\$742	\$0	\$0	\$0	\$742
<b>Escalation</b>							\$0	\$3,061	\$0	\$0	\$0	\$3,061
<b>Management Reserve</b>												
<b>---Total Overhead Working Equipment</b>					<b>4</b>		<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (West Canal Area 40' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			1.27	\$53.87	68.415	0	55	0	0	123.415
	Vertical Metal Piping 8" Installation Supply Piping (Canal Area)		30.00	Lft	38	CNPIPE	\$2,052	\$0	\$1,650	\$0	\$0	\$3,702
Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area												
	MECH	<i>U.C. per Ea</i>			4.8	\$53.87	258.58	0	85	0	0	343.58
	8" Piping Flange Fitting Installation		1.00	Ea	5	CNPIPE	\$259	\$0	\$85	\$0	\$0	\$344
Memo: RSMMeans 22 11 13.47												
	MECH	<i>U.C. per Ea</i>			9	\$53.87	484.83	0	200	0	0	684.83
	8" 90 Degree Elbow Pipe Fitting Installation		1.00	Ea	9	CNPIPE	\$485	\$0	\$200	\$0	\$0	\$685
Memo: RSMMeans 22 11 13.47												
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.6	0	35.5	0	0	169.1
	Gasket and Bolt Set		2.00	Ea	5	CNPIPE	\$267	\$0	\$71	\$0	\$0	\$338
Memo: RSMMeans 22 11 13.47												
<b>Subtotal</b>							\$3,063	\$0	\$2,006	\$0	\$0	\$5,069
<b>Sales Tax</b>							\$0	\$0	\$120	\$0	\$0	\$120
<b>Markups</b>							\$1,502	\$0	\$1,043	\$0	\$0	\$2,544
<b>Subtotal Estimate</b>												\$7,734
<b>Escalation</b>							\$423	\$0	\$294	\$0	\$0	\$717
<b>Management Reserve</b>							\$1,746	\$0	\$1,212	\$0	\$0	\$2,958
<b>---Total Main Supply Installation (West Canal Area 40' Elevation)</b>					<b>57</b>		<b>\$6,734</b>	<b>\$0</b>	<b>\$4,675</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,408</b>
<b><u>Main Return Installation (West Canal Area 40' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			1.27	\$53.87	68.415	0	55	0	0	123.415
	Vertical Metal Piping 8" Installation Supply Piping (Canal Area)		30.00	Lft	38	CNPIPE	\$2,052	\$0	\$1,650	\$0	\$0	\$3,702
Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area												
	MECH	<i>U.C. per Ea</i>			4.8	\$53.87	258.58	0	85	0	0	343.58
	8" Piping Flange Fitting Installation		1.00	Ea	5	CNPIPE	\$259	\$0	\$85	\$0	\$0	\$344
Memo: RSMMeans 22 11 13.47												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b><u>Main Return Installation (West Canal Area 40' Elevation)</u></b>													
	MECH	<i>U.C. per Ea</i>			9	\$53.87	484.83	0	200	0	0	684.83	
	8" 90 Degree Elbow Pipe Fitting Installation		1.00	Ea	9	CNPIPE	\$485	\$0	\$200	\$0	\$0	\$685	
Memo: RSMMeans 22 11 13.47													
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.6	0	35.5	0	0	169.1	
	Gasket and Bolt Set		2.00	Ea	5	CNPIPE	\$267	\$0	\$71	\$0	\$0	\$338	
Memo: RSMMeans 22 11 13.47													
Subtotal							\$3,063	\$0	\$2,006	\$0	\$0	\$5,069	
Sales Tax							\$0	\$0	\$120	\$0	\$0	\$120	
Markups									\$1,043	\$0	\$0	\$2,544	
							49.03%	\$1,502	\$0	\$1,043	\$0	\$0	\$2,544
<b>Subtotal Estimate</b>												<b>\$7,734</b>	
Escalation							\$423	\$0	\$294	\$0	\$0	\$717	
Management Reserve							\$1,746	\$0	\$1,212	\$0	\$0	\$2,958	
<b>---Total Main Return Installation (West Canal Area 40' Elevation)</b>					<b>57</b>		<b>\$6,734</b>	<b>\$0</b>	<b>\$4,675</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,408</b>	

**Main Supply Insulation Installation (West Canal Area 40' Elevation)**

Memo: **RSMMeans 22 07 19.30**

	MECH	<i>U.C. per Lnft</i>			0.37	\$53.87	19.932	0	10.15	0	0	30.082
	Piping Insulation Installation		30.00	Lnft	11	CNPIPE	\$598	\$0	\$305	\$0	\$0	\$902

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Installation (West Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	U.C. per Ea			0.5	\$53.87	26.935	0	20	0	0	46.935
	Piping Fitting Insulation Installation		2.00	Ea	1	CNPIPE	\$54	\$0	\$40	\$0	\$0	\$94
<b>Subtotal</b>							\$652	\$0	\$345	\$0	\$0	\$996
<b>Sales Tax</b>							\$0	\$0	\$21	\$0	\$0	\$21
<b>Markups</b>							\$320	\$0	\$179	\$0	\$0	\$499
<b>Subtotal Estimate</b>												\$1,516
<b>Escalation</b>							\$90	\$0	\$50	\$0	\$0	\$140
<b>Management Reserve</b>							\$372	\$0	\$208	\$0	\$0	\$580
<b>---Total Main Supply Insulation Installation (West Canal Area 40' Elevation)</b>					<b>12</b>		<b>\$1,433</b>	<b>\$0</b>	<b>\$803</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,236</b>

<b><u>Main Return Insulation Installation (West Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	U.C. per Lnft			0.37	\$53.87	19.932	0	10.15	0	0	30.082
	Piping Insulation Installation		30.00	Lnft	11	CNPIPE	\$598	\$0	\$305	\$0	\$0	\$902
	MECH	U.C. per Ea			0.5	\$53.87	26.935	0	20	0	0	46.935
	Piping Fitting Insulation Installation		2.00	Ea	1	CNPIPE	\$54	\$0	\$40	\$0	\$0	\$94
<b>Subtotal</b>							\$652	\$0	\$345	\$0	\$0	\$996
<b>Sales Tax</b>							\$0	\$0	\$21	\$0	\$0	\$21
<b>Markups</b>							\$320	\$0	\$179	\$0	\$0	\$499
<b>Subtotal Estimate</b>												\$1,516
<b>Escalation</b>							\$90	\$0	\$50	\$0	\$0	\$140
<b>Management Reserve</b>							\$372	\$0	\$208	\$0	\$0	\$580
<b>---Total Main Return Insulation Installation (West Canal Area 40' Elevation)</b>					<b>12</b>		<b>\$1,433</b>	<b>\$0</b>	<b>\$803</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,236</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Overhead Working Equipment</b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	MECH			<i>U.C. per Month</i>			0	5370	0	0	0	5370
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month			\$0	\$5,370	\$0	\$0	\$0	\$5,370
<b>Subtotal</b>							\$0	\$5,370	\$0	\$0	\$0	\$5,370
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$2,633	\$0	\$0	\$0	\$2,633
<b>Subtotal Estimate</b>												<b>\$8,003</b>
<b>Escalation</b>							\$0	\$742	\$0	\$0	\$0	\$742
<b>Management Reserve</b>							\$0	\$3,061	\$0	\$0	\$0	\$3,061
<b>---Total Overhead Working Equipment</b>					<b>0</b>		<b>\$0</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,805</b>

**Main Supply Installation (Canal Area 30' Elevation)**

	MECH			<i>U.C. per Lnft</i>		1.27	\$53.97	68.415	0	55	0	123.415
	Overhead Metal Piping 8" Installation Supply Piping (Canal Area)		70.00	Lnft		89	CNPIPE	\$4,789	\$0	\$3,850	\$0	\$8,639
<i>Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area</i>												
	MECH			<i>U.C. per Ea</i>		4.8	\$53.97	258.58	0	85	0	343.58
	8" Piping Flange Fitting Installation		1.00	Ea		5	CNPIPE	\$259	\$0	\$85	\$0	\$344
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>		9	\$53.97	484.83	0	200	0	684.83
	8" 90 Degree Elbow Pipe Fitting Installation		8.00	Ea		72	CNPIPE	\$3,879	\$0	\$1,600	\$0	\$5,479
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>		9	\$53.97	484.83	0	163	0	647.83
	8" 45 Degree Elbow Pipe Fitting Installation		4.00	Ea		36	CNPIPE	\$1,939	\$0	\$652	\$0	\$2,591
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>		13.44	\$53.97	724.015	0	355	0	1079.015
	8" Tee Straight Pipe Fitting Installation		2.00	Ea		27	CNPIPE	\$1,448	\$0	\$710	\$0	\$2,158
<i>Memo: RSMMeans 22 11 13.47</i>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (Canal Area 30' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.597	0	35.5	0	0	169.087
	Memo: RSMMeans 22 11 13.47		15.00	Ea	37	CNPIPE	\$2,004	\$0	\$533	\$0	\$0	\$2,536
	Subtotal						\$14,318	\$0	\$7,430	\$0	\$0	\$21,747
	Sales Tax						\$0	\$0	\$446	\$0	\$0	\$446
	Markups	49.03%					\$7,020	\$0	\$3,861	\$0	\$0	\$10,881
	<b>Subtotal Estimate</b>											<b>\$33,074</b>
	Escalation						\$1,978	\$0	\$1,088	\$0	\$0	\$3,066
	Management Reserve						\$8,160	\$0	\$4,489	\$0	\$0	\$12,649
<b>---Total</b>	<b>Main Supply Installation (Canal Area 30' Elevation)</b>				<b>266</b>		<b>\$31,476</b>	<b>\$0</b>	<b>\$17,313</b>	<b>\$0</b>	<b>\$0</b>	<b>\$48,789</b>

<b><u>Main Return Installation (Canal Area 30' Elevation)</u></b>												
	Overhead Metal Piping 8" Installation Supply Piping (Canal Area)	MECH			1.27	\$53.87	68.415	0	55	0	0	123.415
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area		70.00	Lnft	89	CNPIPE	\$4,789	\$0	\$3,850	\$0	\$0	\$8,639
	8" Piping Flange Fitting Installation	MECH			4.8	\$53.87	258.58	0	85	0	0	343.58
	Memo: RSMMeans 22 11 13.47		1.00	Ea	5	CNPIPE	\$259	\$0	\$85	\$0	\$0	\$344
	8" 90 Degree Elbow Pipe Fitting Installation	MECH			9	\$53.87	484.83	0	200	0	0	684.83
	Memo: RSMMeans 22 11 13.47		8.00	Ea	72	CNPIPE	\$3,879	\$0	\$1,600	\$0	\$0	\$5,479
	8" 45 Degree Elbow Pipe Fitting Installation	MECH			9	\$53.87	484.83	0	163	0	0	647.83
	Memo: RSMMeans 22 11 13.47		4.00	Ea	36	CNPIPE	\$1,939	\$0	\$652	\$0	\$0	\$2,591
	8" Tee Straight Pipe Fitting Installation	MECH			13.44	\$53.87	724.015	0	355	0	0	1079.015
	Memo: RSMMeans 22 11 13.47		2.00	Ea	27	CNPIPE	\$1,448	\$0	\$710	\$0	\$0	\$2,158

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

Page No. 58

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (Canal Area 30' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.597	0	35.5	0	0	169.087
	Memo: RSMMeans 22 11 13.47		15.00	Ea	37	CNPIPE	\$2,004	\$0	\$533	\$0	\$0	\$2,536
	Subtotal						\$14,318	\$0	\$7,430	\$0	\$0	\$21,747
	Sales Tax						\$0	\$0	\$446	\$0	\$0	\$446
	Markups	49.03%					\$7,020	\$0	\$3,861	\$0	\$0	\$10,881
	<b>Subtotal Estimate</b>											<b>\$33,074</b>
	Escalation						\$1,978	\$0	\$1,088	\$0	\$0	\$3,066
	Management Reserve						\$8,160	\$0	\$4,489	\$0	\$0	\$12,649
	<b>---Total Main Return Installation (Canal Area 30' Elevation)</b>				<b>266</b>		<b>\$31,476</b>	<b>\$0</b>	<b>\$17,313</b>	<b>\$0</b>	<b>\$0</b>	<b>\$48,789</b>
<b><u>Main Supply Insulation Installation (Canal Area 30' Elevation)</u></b>												
	Memo: RSMMeans 22 07 19.30											
	Piping Insulation Installation	MECH			0.37	\$53.87	19.932	0	10.15	0	0	30.082
			70.00	Lnft	26	CNPIPE	\$1,395	\$0	\$711	\$0	\$0	\$2,106
	Piping Fitting Insulation Installation	MECH			0.5	\$53.87	26.935	0	20	0	0	46.935
			15.00	Ea	8	CNPIPE	\$404	\$0	\$300	\$0	\$0	\$704
	Subtotal						\$1,799	\$0	\$1,011	\$0	\$0	\$2,810
	Sales Tax						\$0	\$0	\$61	\$0	\$0	\$61
	Markups	49.03%					\$882	\$0	\$525	\$0	\$0	\$1,407
	<b>Subtotal Estimate</b>											<b>\$4,278</b>
	Escalation						\$249	\$0	\$148	\$0	\$0	\$397
	Management Reserve						\$1,025	\$0	\$610	\$0	\$0	\$1,636
	<b>---Total Main Supply Insulation Installation (Canal Area 30' Elevation)</b>				<b>33</b>		<b>\$3,955</b>	<b>\$0</b>	<b>\$2,355</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,310</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Installation (Canal Area 30' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	U.C. per Lft			0.37	\$53.87	19.932	0	10.15	0	0	30.082
	Piping Insulation Installation		70.00	Lft	26	CNPIPE	\$1,395	\$0	\$711	\$0	\$0	\$2,106
	MECH	U.C. per Ea			0.5	\$53.87	26.935	0	20	0	0	46.935
	Piping Fitting Insulation Installation		15.00	Ea	8	CNPIPE	\$404	\$0	\$300	\$0	\$0	\$704
<b>Subtotal</b>							\$1,799	\$0	\$1,011	\$0	\$0	\$2,810
<b>Sales Tax</b>							\$0	\$0	\$61	\$0	\$0	\$61
<b>Markups</b>							\$882	\$0	\$525	\$0	\$0	\$1,407
<b>Subtotal Estimate</b>												\$4,278
<b>Escalation</b>							\$249	\$0	\$148	\$0	\$0	\$397
<b>Management Reserve</b>							\$1,025	\$0	\$610	\$0	\$0	\$1,635
<b>---Total Main Return Insulation Installation (Canal Area 30' Elevation)</b>					<b>33</b>		<b>\$3,955</b>	<b>\$0</b>	<b>\$2,355</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,310</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	U.C. per Month			4	\$53.87	215.48	5370	0	0	0	5585.48
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month	4	CNPIPE	\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Subtotal</b>							\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$106	\$2,633	\$0	\$0	\$0	\$2,739
<b>Subtotal Estimate</b>												\$8,324
<b>Escalation</b>							\$30	\$742	\$0	\$0	\$0	\$772
<b>Management Reserve</b>							\$123	\$3,061	\$0	\$0	\$0	\$3,183
<b>---Total Overhead Working Equipment</b>					<b>4</b>		<b>\$474</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$12,279</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (Canal Area 20' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			1.27	\$53.87	68,415	0	55	0	0	123,415
	Overhead Metal Piping 8" Installation Supply Piping (Canal Area)		80.00	Lft	102	CNPIPE	\$5,473	\$0	\$4,400	\$0	\$0	\$9,873
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area											
	MECH	<i>U.C. per Ea</i>			4.8	\$53.87	258.58	0	85	0	0	343.58
	8" Piping Flange Fitting Installation		1.00	Ea	5	CNPIPE	\$259	\$0	\$85	\$0	\$0	\$344
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			.9	\$53.87	484.83	0	200	0	0	684.83
	8" 90 Degree Elbow Pipe Fitting Installation		4.00	Ea	36	CNPIPE	\$1,939	\$0	\$800	\$0	\$0	\$2,739
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			.9	\$53.87	484.83	0	163	0	0	647.83
	8" 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	36	CNPIPE	\$1,939	\$0	\$652	\$0	\$0	\$2,591
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			13.44	\$53.87	724,015	0	355	0	0	1079,015
	8" Tee Straight Pipe Fitting Installation		2.00	Ea	27	CNPIPE	\$1,448	\$0	\$710	\$0	\$0	\$2,158
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133,597	0	35.5	0	0	169,097
	Gasket and Bolt Set		11.00	Ea	27	CNPIPE	\$1,470	\$0	\$391	\$0	\$0	\$1,860
	Memo: RSMMeans 22 11 13.47											
	Subtotal						\$12,528	\$0	\$7,038	\$0	\$0	\$19,566
	Sales Tax						\$0	\$0	\$422	\$0	\$0	\$422
	Markups	49.03%					\$6,142	\$0	\$3,657	\$0	\$0	\$9,800
	<b>Subtotal Estimate</b>											<b>\$29,788</b>
	Escalation						\$1,731	\$0	\$1,031	\$0	\$0	\$2,761
	Management Reserve						\$7,140	\$0	\$4,252	\$0	\$0	\$11,392
	<b>---Total Main Supply Installation (Canal Area 20' Elevation)</b>				<b>233</b>		<b>\$27,542</b>	<b>\$0</b>	<b>\$16,400</b>	<b>\$0</b>	<b>\$0</b>	<b>\$43,941</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (Canal Area 20' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			1.27	\$53.87	68,415	0	55	0	0	123,415
	Overhead Metal Piping 8" Installation Supply Piping (Canal Area)		80.00	Lft	102	CNPIPE	\$5,473	\$0	\$4,400	\$0	\$0	\$9,873
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area											
	MECH	<i>U.C. per Ea</i>			4.8	\$53.87	258.58	0	85	0	0	343.58
	8" Piping Flange Fitting Installation		1.00	Ea	5	CNPIPE	\$259	\$0	\$85	\$0	\$0	\$344
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			.9	\$53.87	484.83	0	200	0	0	684.83
	8" 90 Degree Elbow Pipe Fitting Installation		4.00	Ea	36	CNPIPE	\$1,939	\$0	\$800	\$0	\$0	\$2,739
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			.9	\$53.87	484.83	0	163	0	0	647.83
	8" 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	36	CNPIPE	\$1,939	\$0	\$652	\$0	\$0	\$2,591
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			13.44	\$53.87	724.015	0	355	0	0	1079.015
	8" Tee Straight Pipe Fitting Installation		2.00	Ea	27	CNPIPE	\$1,448	\$0	\$710	\$0	\$0	\$2,158
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.597	0	35.5	0	0	169.097
	Gasket and Bolt Set		11.00	Ea	27	CNPIPE	\$1,470	\$0	\$391	\$0	\$0	\$1,860
	Memo: RSMMeans 22 11 13.47											
	Subtotal						\$12,528	\$0	\$7,038	\$0	\$0	\$19,566
	Sales Tax						\$0	\$0	\$422	\$0	\$0	\$422
	Markups	49.03%					\$6,142	\$0	\$3,657	\$0	\$0	\$9,800
	<b>Subtotal Estimate</b>											<b>\$29,788</b>
	Escalation						\$1,731	\$0	\$1,031	\$0	\$0	\$2,761
	Management Reserve						\$7,140	\$0	\$4,252	\$0	\$0	\$11,392
	<b>---Total Main Return Installation (Canal Area 20' Elevation)</b>				<b>233</b>		<b>\$27,542</b>	<b>\$0</b>	<b>\$16,400</b>	<b>\$0</b>	<b>\$0</b>	<b>\$43,941</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Installation (Canal Area 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	<i>U.C. per Lnft</i>			<i>0.37</i>	<i>\$53.87</i>	<i>19.932</i>	<i>0</i>	<i>10.15</i>	<i>0</i>	<i>0</i>	<i>30.082</i>
	Piping Insulation Installation		80.00	Lnft	30	CNPIPE	\$1,595	\$0	\$812	\$0	\$0	\$2,407
	MECH	<i>U.C. per Ea</i>			<i>0.5</i>	<i>\$53.87</i>	<i>26.935</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>46.935</i>
	Piping Fitting Insulation Installation		11.00	Ea	6	CNPIPE	\$296	\$0	\$220	\$0	\$0	\$516
Subtotal							\$1,891	\$0	\$1,032	\$0	\$0	\$2,923
Sales Tax							\$0	\$0	\$62	\$0	\$0	\$62
Markups							49.03%	\$927	\$0	\$536	\$0	\$1,463
<b>Subtotal Estimate</b>												<b>\$4,448</b>
Escalation							\$261	\$0	\$151	\$0	\$0	\$412
Management Reserve							\$1,078	\$0	\$623	\$0	\$0	\$1,701
<b>---Total Main Supply Insulation Installation (Canal Area 20' Elevation)</b>					<b>35</b>		<b>\$4,157</b>	<b>\$0</b>	<b>\$2,405</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,562</b>

<b><u>Main Return Insulation Installation (Canal Area 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	<i>U.C. per Lnft</i>			<i>0.37</i>	<i>\$53.87</i>	<i>19.932</i>	<i>0</i>	<i>10.15</i>	<i>0</i>	<i>0</i>	<i>30.082</i>
	Piping Insulation Installation		80.00	Lnft	30	CNPIPE	\$1,595	\$0	\$812	\$0	\$0	\$2,407
	MECH	<i>U.C. per Ea</i>			<i>0.5</i>	<i>\$53.87</i>	<i>26.935</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>46.935</i>
	Piping Fitting Insulation Installation		11.00	Ea	6	CNPIPE	\$296	\$0	\$220	\$0	\$0	\$516
Subtotal							\$1,891	\$0	\$1,032	\$0	\$0	\$2,923
Sales Tax							\$0	\$0	\$62	\$0	\$0	\$62
Markups							49.03%	\$927	\$0	\$536	\$0	\$1,463
<b>Subtotal Estimate</b>												<b>\$4,448</b>
Escalation							\$261	\$0	\$151	\$0	\$0	\$412
Management Reserve							\$1,078	\$0	\$623	\$0	\$0	\$1,701
<b>---Total Main Return Insulation Installation (Canal Area 20' Elevation)</b>					<b>35</b>		<b>\$4,157</b>	<b>\$0</b>	<b>\$2,405</b>	<b>\$0</b>	<b>\$0</b>	<b>\$6,562</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Overhead Working Equipment</b>												
<i>Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.</i>												
	MECH			<i>U.C. per Month</i>	4	\$53.87	215.48	5370	0	0	0	5585.48
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month	4	CNPIPE	\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Subtotal</b>							\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$106	\$2,633	\$0	\$0	\$0	\$2,739
<b>Subtotal Estimate</b>												\$8,324
<b>Escalation</b>							\$30	\$742	\$0	\$0	\$0	\$772
<b>Management Reserve</b>							\$123	\$3,061	\$0	\$0	\$0	\$3,183
<b>---Total Overhead Working Equipment</b>					<b>4</b>		<b>\$474</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$12,279</b>

**Main Supply Installation (Canal Area 40' Elevation)**

	MECH			<i>U.C. per Lnft</i>	0.66	\$53.87	35.554	0	35	0	0	70.554
	Overhead Metal Piping Installation Supply Piping 4" (Canal Area)		140.00	Lnft	92	CNPIPE	\$4,978	\$0	\$4,900	\$0	\$0	\$9,878
<i>Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area</i>												
	MECH			<i>U.C. per Ea</i>	2.6	\$53.87	140.063	0	33	0	0	173.063
	Piping Flange Fitting 4", Installation		3.00	Ea	8	CNPIPE	\$420	\$0	\$99	\$0	\$0	\$519
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>	4.5	\$53.87	242.415	0	48	0	0	290.415
	4" - 90 Degree Elbow Pipe Fitting Installation		2.00	Ea	9	CNPIPE	\$485	\$0	\$96	\$0	\$0	\$581
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>	4.5	\$53.87	242.415	0	49.5	0	0	291.915
	4" - 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	18	CNPIPE	\$970	\$0	\$198	\$0	\$0	\$1,168
<i>Memo: RSMMeans 22 11 13.47</i>												
	MECH			<i>U.C. per Ea</i>	7.5	\$53.87	404.025	0	118	0	0	522.025
	4" - Tee Straight Pipe Fitting Installation		2.00	Ea	15	CNPIPE	\$808	\$0	\$236	\$0	\$0	\$1,044
<i>Memo: RSMMeans 22 11 13.47</i>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (Canal Area 40' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.597	0	35.5	0	0	169.087
	Memo: RSMMeans 22 11 13.47		11.00	Ea	27	CNPIPE	\$1,470	\$0	\$391	\$0	\$0	\$1,860
	Subtotal						\$9,130	\$0	\$5,920	\$0	\$0	\$15,049
	Sales Tax						\$0	\$0	\$355	\$0	\$0	\$355
	Markups	49.03%					\$4,476	\$0	\$3,076	\$0	\$0	\$7,553
	<b>Subtotal Estimate</b>											<b>\$22,957</b>
	Escalation						\$1,261	\$0	\$867	\$0	\$0	\$2,128
	Management Reserve						\$5,204	\$0	\$3,576	\$0	\$0	\$8,780
	<b>---Total Main Supply Installation (Canal Area 40' Elevation)</b>				<b>169</b>		<b>\$20,071</b>	<b>\$0</b>	<b>\$13,794</b>	<b>\$0</b>	<b>\$0</b>	<b>\$33,865</b>

**Main Return Installation (Canal Area 40' Elevation)**

	Overhead Metal Piping Installation Supply Piping 4" (Canal Area)	MECH			0.66	\$53.87	35.554	0	35	0	0	70.554
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area		140.00	Lnft	92	CNPIPE	\$4,978	\$0	\$4,900	\$0	\$0	\$9,878
	Piping Flange Fitting 4", Installation	MECH			2.6	\$53.87	140.063	0	33	0	0	173.063
	Memo: RSMMeans 22 11 13.47		3.00	Ea	8	CNPIPE	\$420	\$0	\$99	\$0	\$0	\$519
	4" - 90 Degree Elbow Pipe Fitting Installation	MECH			4.5	\$53.87	242.415	0	48	0	0	290.415
	Memo: RSMMeans 22 11 13.47		2.00	Ea	9	CNPIPE	\$485	\$0	\$96	\$0	\$0	\$581
	4" - 45 Degree Elbow Pipe Fitting Installation	MECH			4.5	\$53.87	242.415	0	49.5	0	0	291.915
	Memo: RSMMeans 22 11 13.47		4.00	Ea	18	CNPIPE	\$970	\$0	\$198	\$0	\$0	\$1,168
	4" - Tee Straight Pipe Fitting Installation	MECH			7.5	\$53.87	404.025	0	118	0	0	522.025
	Memo: RSMMeans 22 11 13.47		2.00	Ea	15	CNPIPE	\$808	\$0	\$236	\$0	\$0	\$1,044

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

Page No. 65

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (Canal Area 40' Elevation)</u></b>												
	Gasket and Bolt Set	MECH			2.48	\$53.87	133.597	0	35.5	0	0	169.087
	Memo: RSMMeans 22 11 13.47		11.00	Ea	27	CNPIPE	\$1,470	\$0	\$391	\$0	\$0	\$1,860
	Subtotal						\$9,130	\$0	\$5,920	\$0	\$0	\$15,049
	Sales Tax						\$0	\$0	\$355	\$0	\$0	\$355
	Markups	49.03%					\$4,476	\$0	\$3,076	\$0	\$0	\$7,553
	<b>Subtotal Estimate</b>											<b>\$22,957</b>
	Escalation						\$1,261	\$0	\$867	\$0	\$0	\$2,128
	Management Reserve						\$5,204	\$0	\$3,576	\$0	\$0	\$8,780
---	<b>Total Main Return Installation (Canal Area 40' Elevation)</b>				<b>169</b>		<b>\$20,071</b>	<b>\$0</b>	<b>\$13,794</b>	<b>\$0</b>	<b>\$0</b>	<b>\$33,865</b>
<b><u>Main Supply Insulation Installation (Canal Area 40' Elevation)</u></b>												
	Memo: RSMMeans 22 07 19.30											
	Piping Insulation Installation	MECH			0.37	\$53.87	19.932	0	10.15	0	0	30.082
			140.00	Lnft	52	CNPIPE	\$2,790	\$0	\$1,421	\$0	\$0	\$4,211
	Piping Fitting Insulation Installation	MECH			0.5	\$53.87	26.935	0	20	0	0	46.935
			11.00	Ea	6	CNPIPE	\$296	\$0	\$220	\$0	\$0	\$516
	Subtotal						\$3,087	\$0	\$1,641	\$0	\$0	\$4,728
	Sales Tax						\$0	\$0	\$98	\$0	\$0	\$98
	Markups	49.03%					\$1,513	\$0	\$853	\$0	\$0	\$2,366
	<b>Subtotal Estimate</b>											<b>\$7,192</b>
	Escalation						\$426	\$0	\$240	\$0	\$0	\$667
	Management Reserve						\$1,759	\$0	\$991	\$0	\$0	\$2,751
---	<b>Total Main Supply Insulation Installation (Canal Area 40' Elevation)</b>				<b>57</b>		<b>\$6,786</b>	<b>\$0</b>	<b>\$3,824</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,610</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Installation (Canal Area 40' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	U.C. per Lft			0.37	\$53.87	19.932	0	10.15	0	0	30.082
	Piping Insulation Installation		140.00	Lft	52	CNPIPE	\$2,790	\$0	\$1,421	\$0	\$0	\$4,211
	MECH	U.C. per Ea			0.5	\$53.87	26.935	0	20	0	0	46.935
	Piping Fitting Insulation Installation		11.00	Ea	6	CNPIPE	\$296	\$0	\$220	\$0	\$0	\$516
<b>Subtotal</b>							\$3,087	\$0	\$1,641	\$0	\$0	\$4,728
<b>Sales Tax</b>							\$0	\$0	\$98	\$0	\$0	\$98
<b>Markups</b>							\$1,513	\$0	\$853	\$0	\$0	\$2,366
<b>Subtotal Estimate</b>												\$7,192
<b>Escalation</b>							\$426	\$0	\$240	\$0	\$0	\$667
<b>Management Reserve</b>							\$1,759	\$0	\$991	\$0	\$0	\$2,751
<b>---Total Main Return Insulation Installation (Canal Area 40' Elevation)</b>					<b>57</b>		<b>\$6,786</b>	<b>\$0</b>	<b>\$3,824</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,610</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH	U.C. per Month			4	\$53.87	215.48	5370	0	0	0	5585.48
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)		1.00	Month	4	CNPIPE	\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Subtotal</b>							\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$106	\$2,633	\$0	\$0	\$0	\$2,739
<b>Subtotal Estimate</b>												\$8,324
<b>Escalation</b>							\$30	\$742	\$0	\$0	\$0	\$772
<b>Management Reserve</b>							\$123	\$3,061	\$0	\$0	\$0	\$3,183
<b>---Total Overhead Working Equipment</b>					<b>4</b>		<b>\$474</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$12,279</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Installation (Canal Area 20' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			0.66	\$53.87	35.554	0	35	0	0	70.554
	Overhead Metal Piping Installation Supply Piping 4" (Canal Area)		100.00	Lft	66	CNPIPE	\$3,555	\$0	\$3,500	\$0	\$0	\$7,055
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area											
	MECH	<i>U.C. per Ea</i>			2.6	\$53.87	140.063	0	33	0	0	173.063
	Piping Flange Fitting 4", Installation		3.00	Ea	8	CNPIPE	\$420	\$0	\$99	\$0	\$0	\$519
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	48	0	0	290.415
	4" - 90 Degree Elbow Pipe Fitting Installation		2.00	Ea	9	CNPIPE	\$495	\$0	\$96	\$0	\$0	\$591
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	49.5	0	0	291.915
	4" - 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	18	CNPIPE	\$970	\$0	\$198	\$0	\$0	\$1,168
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			7.5	\$53.87	404.025	0	118	0	0	522.025
	4" - Tee Straight Pipe Fitting Installation		2.00	Ea	15	CNPIPE	\$808	\$0	\$236	\$0	\$0	\$1,044
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.597	0	35.5	0	0	169.097
	Gasket and Bolt Set		11.00	Ea	27	CNPIPE	\$1,470	\$0	\$391	\$0	\$0	\$1,860
	Memo: RSMMeans 22 11 13.47											
	Subtotal						\$7,708	\$0	\$4,520	\$0	\$0	\$12,227
	Sales Tax						\$0	\$0	\$271	\$0	\$0	\$271
	Markups	49.03%					\$3,779	\$0	\$2,349	\$0	\$0	\$6,128
	<b>Subtotal Estimate</b>											<b>\$18,626</b>
	Escalation						\$1,065	\$0	\$662	\$0	\$0	\$1,727
	Management Reserve						\$4,393	\$0	\$2,730	\$0	\$0	\$7,124
<b>---Total Main Supply Installation (Canal Area 20' Elevation)</b>					<b>143</b>		<b>\$16,945</b>	<b>\$0</b>	<b>\$10,532</b>	<b>\$0</b>	<b>\$0</b>	<b>\$27,477</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Installation (Canal Area 20' Elevation)</u></b>												
	MECH	<i>U.C. per Lft</i>			0.66	\$53.87	35.554	0	35	0	0	70.554
	Overhead Metal Piping Installation Supply Piping 4" (Canal Area)		100.00	Lft	66	CNPIPE	\$3,555	\$0	\$3,500	\$0	\$0	\$7,055
	Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area											
	MECH	<i>U.C. per Ea</i>			2.6	\$53.87	140.063	0	33	0	0	173.063
	Piping Flange Fitting 4", Installation		3.00	Ea	8	CNPIPE	\$420	\$0	\$99	\$0	\$0	\$519
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	48	0	0	290.415
	4" - 90 Degree Elbow Pipe Fitting Installation		2.00	Ea	9	CNPIPE	\$495	\$0	\$96	\$0	\$0	\$591
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			4.5	\$53.87	242.415	0	49.5	0	0	291.915
	4" - 45 Degree Elbow Pipe Fitting Installation		4.00	Ea	18	CNPIPE	\$970	\$0	\$198	\$0	\$0	\$1,168
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			7.5	\$53.87	404.025	0	118	0	0	522.025
	4" - Tee Straight Pipe Fitting Installation		2.00	Ea	15	CNPIPE	\$808	\$0	\$236	\$0	\$0	\$1,044
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.597	0	35.5	0	0	169.097
	Gasket and Bolt Set		11.00	Ea	27	CNPIPE	\$1,470	\$0	\$391	\$0	\$0	\$1,860
	Memo: RSMMeans 22 11 13.47											
	Subtotal						\$7,708	\$0	\$4,520	\$0	\$0	\$12,227
	Sales Tax						\$0	\$0	\$271	\$0	\$0	\$271
	Markups	49.03%					\$3,779	\$0	\$2,349	\$0	\$0	\$6,128
	<b>Subtotal Estimate</b>											<b>\$18,626</b>
	Escalation						\$1,065	\$0	\$662	\$0	\$0	\$1,727
	Management Reserve						\$4,393	\$0	\$2,730	\$0	\$0	\$7,124
	<b>---Total Main Return Installation (Canal Area 20' Elevation)</b>				<b>143</b>		<b>\$16,945</b>	<b>\$0</b>	<b>\$10,532</b>	<b>\$0</b>	<b>\$0</b>	<b>\$27,477</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Supply Insulation Installation (Canal Area 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	<i>U.C. per Lnft</i>			<i>0.37</i>	<i>\$53.87</i>	<i>19.932</i>	<i>0</i>	<i>10.15</i>	<i>0</i>	<i>0</i>	<i>30.082</i>
	Piping Insulation Installation		100.00	Lnft	37	CNPIPE	\$1,993	\$0	\$1,015	\$0	\$0	\$3,008
<i>Memo: RSMeans 22 07 19.30</i>												
	MECH	<i>U.C. per Ea</i>			<i>0.5</i>	<i>\$53.87</i>	<i>26.935</i>	<i>0</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>46.935</i>
	Piping Fitting Insulation Installation		11.00	Ea	6	CNPIPE	\$296	\$0	\$220	\$0	\$0	\$516
<b>Subtotal</b>							\$2,289	\$0	\$1,235	\$0	\$0	\$3,524
<b>Sales Tax</b>							\$0	\$0	\$74	\$0	\$0	\$74
<b>Markups</b>							\$1,123	\$0	\$642	\$0	\$0	\$1,764
<b>Subtotal Estimate</b>												\$5,363
<b>Escalation</b>							\$316	\$0	\$181	\$0	\$0	\$497
<b>Management Reserve</b>							\$1,305	\$0	\$746	\$0	\$0	\$2,051
<b>--- Total Main Supply Insulation Installation (Canal Area 20' Elevation)</b>					<b>43</b>		<b>\$5,033</b>	<b>\$0</b>	<b>\$2,878</b>	<b>\$0</b>	<b>\$0</b>	<b>\$7,911</b>

**Main Return Insulation Installation (Canal Area 20' Elevation)**

*Memo: RSMeans 22 07 19.10*

	MECH	<i>U.C. per Lnft</i>			<i>0.37</i>	<i>\$53.87</i>	<i>19.932</i>	<i>0</i>	<i>10.15</i>	<i>0</i>	<i>0</i>	<i>30.082</i>
	Piping Insulation Installation		100.00	Lnft	37	CNPIPE	\$1,993	\$0	\$1,015	\$0	\$0	\$3,008

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Main Return Insulation Installation (Canal Area 20' Elevation)</u></b>												
<i>Memo: RSMeans 22 07 19.10</i>												
	MECH					0.5	\$53.87	26.935	0	20	0	46.935
	Piping Fitting Insulation Installation	U.C. per Ea	11.00	Ea	6	CNPIPE	\$296	\$0	\$220	\$0	\$0	\$516
<b>Subtotal</b>							\$2,289	\$0	\$1,235	\$0	\$0	\$3,524
<b>Sales Tax</b>							\$0	\$0	\$74	\$0	\$0	\$74
<b>Markups</b>							\$1,123	\$0	\$642	\$0	\$0	\$1,764
<b>Subtotal Estimate</b>												\$5,363
<b>Escalation</b>							\$316	\$0	\$181	\$0	\$0	\$497
<b>Management Reserve</b>							\$1,305	\$0	\$746	\$0	\$0	\$2,051
<b>---Total Main Return Insulation Installation (Canal Area 20' Elevation)</b>					<b>43</b>		<b>\$5,033</b>	<b>\$0</b>	<b>\$2,878</b>	<b>\$0</b>	<b>\$0</b>	<b>\$7,911</b>

**Overhead Working Equipment**

*Memo: This is a monthly cost for two snorkel lifts obtained from the Rental Rate Blue Book for Construction Equipment.*

	MECH					4	\$53.87	215.48	5370	0	0	5595.48
	Snorkel Lift (2 Each To Spread The Load Of The Metal Piping)	U.C. per Month	1.00	Month	4	CNPIPE	\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Subtotal</b>							\$215	\$5,370	\$0	\$0	\$0	\$5,585
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$106	\$2,633	\$0	\$0	\$0	\$2,739
<b>Subtotal Estimate</b>												\$8,324
<b>Escalation</b>							\$30	\$742	\$0	\$0	\$0	\$772
<b>Management Reserve</b>							\$123	\$3,061	\$0	\$0	\$0	\$3,183
<b>---Total Overhead Working Equipment</b>					<b>4</b>		<b>\$474</b>	<b>\$11,805</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$12,279</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.2.2.9 Piping, Valve, Colls. &amp; Control System</b>												
<b>Memo: Based on RS Means and includes a factor of 1.55 to account for congested &amp; elevated work area.</b>												
	MECH	U.C. per Ea			14.88	\$53.87	801.585	0	2925	0	0	3726.585
	Flanged 125# Gate Valve 6" thru 10"		8.00	Ea	119	CNPIPE	\$6,413	\$0	\$23,400	\$0	\$0	\$29,813
	MECH	U.C. per Ea			16.895	\$53.87	910.135	0	4225	0	0	5135.135
	Flanged 150# Check Valve 10"		2.00	Ea	34	CNPIPE	\$1,820	\$0	\$8,450	\$0	\$0	\$10,270
	MECH	U.C. per Ea			9.3	\$53.87	500.991	0	2200	0	0	2700.991
	Flanged 150 Actuated Control Valves 4"		10.00	Ea	93	CNPIPE	\$5,010	\$0	\$22,000	\$0	\$0	\$27,010
	MECH	U.C. per Ea			7.75	\$53.87	417.493	0	4300	0	0	4717.493
	Pressure Relief Valves 2"-4"		4.00	Ea	31	CNPIPE	\$1,670	\$0	\$17,200	\$0	\$0	\$18,870
	MECH	U.C. per Ea			4.96	\$53.87	267.195	0	50	0	0	325.195
	Slip-on Flanges 150# 4" thru 6"		28.00	Ea	139	CNPIPE	\$7,481	\$0	\$1,624	\$0	\$0	\$9,105
	MECH	U.C. per Ea			9.3	\$53.87	500.991	0	143	0	0	643.991
	Slip-on Flanges 150# 8" thru 10"		16.00	Ea	149	CNPIPE	\$8,016	\$0	\$2,288	\$0	\$0	\$10,304
	MECH	U.C. per Ea			3.844	\$53.87	207.076	0	35.5	0	0	242.576
	Gasket and Bolt Set 4" thru 6"		28.00	Ea	108	CNPIPE	\$5,798	\$0	\$994	\$0	\$0	\$6,792
<b>Memo: RSMMeans 22 11 13.47 (140% has been added to the installation cost for the weight and for the congested areas. RSMMeans)</b>												
	MECH	U.C. per Ea			3.844	\$53.87	207.076	0	35.5	0	0	242.576
	Gasket and Bolt Set 8" thru 10"		16.00	Ea	62	CNPIPE	\$3,313	\$0	\$568	\$0	\$0	\$3,881
<b>Memo: RSMMeans 22 11 13.47 (140% has been added to the installation cost for the weight and for the congested areas. RSMMeans)</b>												
	MECH	U.C. per Ea			9.3	\$53.87	500.99	0	700	0	0	1200.99
	Flex Couplings 6" thru 10"		4.00	Ea	37	CNPIPE	\$2,004	\$0	\$2,800	\$0	\$0	\$4,804
	ELECT	U.C. per Ea			.200	\$50.06	100.12	0	15000	0	0	2501.2
	HVAC Control System		1.00	Ea	200	CNELEC	\$10,012	\$0	\$15,000	\$0	\$0	\$25,012
<b>Memo: Based on estimator judgment.</b>												
	MECH	U.C. per SF			0.31	\$53.87	16.7	0	200	0	0	216.7
	Heating Coil HVS-1 (size 10' x 12')		120.00	SF	37	CNPIPE	\$2,004	\$0	\$24,000	\$0	\$0	\$26,004
	MECH	U.C. per SF			0.31	\$53.87	16.7	0	200	0	0	216.7
	Heating Coil HVS-2 (size 10' x 12')		120.00	SF	37	CNPIPE	\$2,004	\$0	\$24,000	\$0	\$0	\$26,004

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.2.2.9 Piping, Valve, Coils, &amp; Control System</b>												
<i>Memo: Based on RS Means and includes a factor of 1.55 to account for congested &amp; elevated work area.</i>												
	MECH				0.31	\$53.87	16.7	0	200	0	0	216.7
	Heating Coil HVS-3 (size 10' x 12')		120.00	SF	37	CNPIPE	\$2,004	\$0	\$24,000	\$0	\$0	\$26,004
	MECH				0.31	\$53.87	16.7	0	200	0	0	216.7
	Heating Coil HVS-4 (size 10' x 12')		120.00	SF	37	CNPIPE	\$2,004	\$0	\$24,000	\$0	\$0	\$26,004
	MECH				0.31	\$53.87	16.7	0	200	0	0	216.7
	Heating Coil HVS-5 (size 10' x 12')		120.00	SF	37	CNPIPE	\$2,004	\$0	\$24,000	\$0	\$0	\$26,004
<b>Subtotal</b>							\$61,557	\$0	\$214,324	\$0	\$0	\$275,881
<b>Sales Tax</b>							\$0	\$0	\$12,859	\$0	\$0	\$12,859
<b>Markups</b>							\$30,181	\$0	\$111,387	\$0	\$0	\$141,569
<b>Subtotal Estimate</b>												\$430,309
<b>Escalation</b>							\$8,504	\$0	\$31,396	\$0	\$0	\$39,890
<b>Management Reserve</b>							\$35,085	\$0	\$129,485	\$0	\$0	\$164,570
<b>---Total 5.1.2.2.9 Piping, Valve, Coils, &amp; Control System</b>					<b>1,157</b>		<b>\$135,328</b>	<b>\$0</b>	<b>\$499,441</b>	<b>\$0</b>	<b>\$0</b>	<b>\$634,769</b>

**Building Piping Vacuum Excavations**

*Memo: Due to the number of utilities located on the north side of Building TRA-670, 100% of the excavations will be performed by a vacuum excavator.*

	EARTHW						0	0	0	357	0	357	
	Vacuum Excavations For The Heat Recovery Water Lines (80' X 7' x 7')		150.00	Cyd	0		\$0	\$0	\$0	\$53,550	\$0	\$53,550	
<b>Subtotal</b>							\$0	\$0	\$0	\$53,550	\$0	\$53,550	
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$26,255	\$0	\$0	\$26,255
<b>Subtotal Estimate</b>													\$79,805
<b>Escalation</b>							\$0	\$0	\$0	\$7,398	\$0	\$0	\$7,398
<b>Management Reserve</b>							\$0	\$0	\$0	\$30,521	\$0	\$0	\$30,521
<b>---Total Building Piping Vacuum Excavations</b>					<b>0</b>		<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$117,725</b>	<b>\$0</b>	<b>\$117,725</b>	

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Pump House Building Foundation Excavation</u></b>												
<i>Memo: Due to the number of utilities located on the north side of Building TRA-670, 100% of the excavations will be performed by a vacuum excavator.</i>												
	EARTHW			<i>U.C. per Cyd</i>			0	0	0	357	0	357
	Vacuum Excavation For Pump House (60' X 30') Slab on Grade		70.00	Cyd			0	\$0	\$0	\$0	\$24,990	\$24,990
<b>Subtotal</b>								\$0	\$0	\$0	\$24,990	\$24,990
<b>Sales Tax</b>								\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							49.03%	\$0	\$0	\$0	\$12,253	\$12,253
<b>Subtotal Estimate</b>								\$0	\$0	\$0	\$3,452	\$3,452
<b>Escalation</b>								\$0	\$0	\$0	\$14,243	\$14,243
<b>Management Reserve</b>								\$0	\$0	\$0	\$0	\$0
<b>---Total Pump House Building Foundation Excavation</b>					<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$54,938</b>	<b>\$54,938</b>

**Backfill Excavations**

*Memo: RSMMeans 31 23 23.13 (0100)*

	EARTHW			<i>U.C. per Cyd</i>			0	0	18.53	0	0	18.53
	Excavation Backfill		230.00	Cyd			0	\$0	\$0	\$4,262	\$0	\$4,262
<b>Subtotal</b>								\$0	\$0	\$4,262	\$0	\$4,262
<b>Sales Tax</b>								\$0	\$0	\$256	\$0	\$256
<b>Markups</b>							49.03%	\$0	\$0	\$2,215	\$0	\$2,215
<b>Subtotal Estimate</b>								\$0	\$0	\$624	\$0	\$624
<b>Escalation</b>								\$0	\$0	\$2,575	\$0	\$2,575
<b>Management Reserve</b>								\$0	\$0	\$0	\$0	\$0
<b>---Total Backfill Excavations</b>					<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$9,932</b>	<b>\$0</b>	<b>\$9,932</b>

**Building Concrete Footings**

	CONC			<i>U.C. per Cyd</i>			0	0	0	377.5	0	377.5
	Heat Exchanger Footing		13.20	Cyd			0	\$0	\$0	\$0	\$4,983	\$4,983
<i>Memo: RSMMeans 03 30 53.40 This is only for the concrete and rebar installations.</i>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b><u>Building Concrete Footings</u></b>													
	Subtotal											\$4,983	
	Sales Tax											\$0	
	Markups		49.03%									\$2,443	
<b>Subtotal Estimate</b>												<b>\$7,426</b>	
	Escalation											\$688	
	Management Reserve											\$2,840	
<b>---Total Building Concrete Footings</b>					<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,955</b>	<b>\$0</b>	<b>\$10,955</b>

**Building Concrete Foundation**

*Memo: RSMeans 03 30 53.40 This is only for the concrete and rebar installations.*

	CONC		<i>U.C. per Cyd</i>									262.5	0	262.5
	Foundation Wall (36" X 12") Reinforced Wall			19.80	Cyd	0						\$5,198	\$0	\$5,198
	Subtotal											\$5,198	\$0	\$5,198
	Sales Tax											\$0	\$0	\$0
	Markups		49.03%									\$2,548	\$0	\$2,548
<b>Subtotal Estimate</b>												<b>\$7,746</b>		
	Escalation											\$718	\$0	\$718
	Management Reserve											\$2,962	\$0	\$2,962
<b>---Total Building Concrete Foundation</b>					<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$11,426</b>	<b>\$0</b>	<b>\$11,426</b>	

**Building Concrete Slab**

	CONC		<i>U.C. per Cyd</i>									194.75	0	194.75
	Concrete Slab			40.00	Cyd	0						\$7,790	\$0	\$7,790
<i>Memo: RSMeans 03 30 53.40</i>														

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b><u>Building Concrete Slab</u></b>													
	Subtotal							\$0	\$0	\$0	\$7,790	\$0	\$7,790
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%						\$0	\$0	\$0	\$3,819	\$0	\$3,819
	<b>Subtotal Estimate</b>							\$0	\$0	\$0	\$1,076	\$0	\$11,609
	Escalation							\$0	\$0	\$0	\$4,440	\$0	\$1,076
	Management Reserve							\$0	\$0	\$0	\$0	\$0	\$4,440
---	<b>Total Building Concrete Slab</b>				<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$17,126</b>	<b>\$0</b>	<b>\$17,126</b>

**5.1.3.3 Heat Exchanger Building Exterior**

	GEN	<i>U.C. per Sqft</i>						0	0	0	10.18	0	10.18
	Heat Exchanger Building (60' X 30' X 20') Surface Area		4,800.00	Sqft	0			\$0	\$0	\$0	\$48,864	\$0	\$48,864
	Memo: RSMMeans B2010 143												
	ROOF	<i>U.C. per Sqft</i>						0	0	0	3.25	0	3.25
	Roofing Materials and Labor		1,800.00	Sqft	0			\$0	\$0	\$0	\$5,850	\$0	\$5,850
	Memo: RSMMeans B3010 120												
	Subtotal							\$0	\$0	\$0	\$54,714	\$0	\$54,714
	Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
	Markups	37.18%						\$0	\$0	\$0	\$20,343	\$0	\$20,343
	<b>Subtotal Estimate</b>							\$0	\$0	\$0	\$6,958	\$0	\$75,057
	Escalation							\$0	\$0	\$0	\$28,705	\$0	\$6,958
	Management Reserve							\$0	\$0	\$0	\$0	\$0	\$28,705
---	<b>Total 5.1.3.3 Heat Exchanger Building Exterior</b>				<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$110,720</b>	<b>\$0</b>	<b>\$110,720</b>

**5.1.3.4 Heat Exchanger Building Interior**

	GEN	<i>U.C. per Allow</i>						0	0	0	20000	0	20000
	Interior Wall and Door Allowance		1.00	Allow	0			\$0	\$0	\$0	\$20,000	\$0	\$20,000

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.3.4 Heat Exchanger Building Interior</b>												
	PAINT											
	Painting Allowance (60' X 30' X 20') Surface Area	U.C. per Sqft	4,800.00	Sqft	0.013	\$43.58	0.545	0	0.16	0	0	0.705
Memo:	RSMeans				60	CNPAIN	\$2,615	\$0	\$768	\$0	\$0	\$3,383
<b>Subtotal</b>							\$2,615	\$0	\$768	\$20,000	\$0	\$23,383
<b>Sales Tax</b>							\$0	\$0	\$46	\$0	\$0	\$46
<b>Markups</b>							\$1,282	\$0	\$399	\$7,152	\$0	\$8,834
<b>Subtotal Estimate</b>							\$361	\$0	\$112	\$2,517	\$0	\$3,290
<b>Escalation</b>							\$1,490	\$0	\$464	\$10,384	\$0	\$12,339
<b>Management Reserve</b>												
<b>---Total 5.1.3.4 Heat Exchanger Building Interior</b>					<b>60</b>		<b>\$5,748</b>	<b>\$0</b>	<b>\$1,790</b>	<b>\$40,054</b>	<b>\$0</b>	<b>\$47,592</b>

**5.1.3.5 Heat Exchanger Building HVAC**

	MECH												
	Heating and Cooling	U.C. per Sqft	3,600.00	Sqft	0		0	0	0	12.17	0	12.17	
							\$0	\$0	\$0	\$43,812	\$0	\$43,812	
<b>Subtotal</b>							\$0	\$0	\$0	\$43,812	\$0	\$43,812	
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$21,481	\$0	\$21,481	
<b>Subtotal Estimate</b>													
<b>Escalation</b>							\$0	\$0	\$0	\$6,053	\$0	\$6,053	
<b>Management Reserve</b>							\$0	\$0	\$0	\$24,971	\$0	\$24,971	
<b>---Total 5.1.3.5 Heat Exchanger Building HVAC</b>					<b>0</b>		<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$96,316</b>	<b>\$0</b>	<b>\$96,316</b>	

**Electrical Building Service Connection**

**Memo:** This is based on a 1000 amp 3 phase electrical service obtained from RSMeans. D5010

	ELECT											
	Service Connection	U.C. per Allow	1.00	Allow	0		0	0	0	19250	0	19250
							\$0	\$0	\$0	\$19,250	\$0	\$19,250

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>Electrical Building Service Connection</b>												
<i>Memo: This is based on a 1000 amp 3 phase electrical service obtained from RSMeans. D5010</i>												
	Subtotal									\$19,250	\$0	\$19,250
	Sales Tax									\$0	\$0	\$0
	Markups	49.03%								\$9,438	\$0	\$9,438
	<b>Subtotal Estimate</b>											<b>\$28,688</b>
	Escalation									\$2,659	\$0	\$2,659
	Management Reserve									\$10,972	\$0	\$10,972
<b>---Total</b>	<b>Electrical Building Service Connection</b>		<b>0</b>							<b>\$42,319</b>	<b>\$0</b>	<b>\$42,319</b>

**General Electrical Lighting and Outlets**

*Memo: Based on the square footage of the proposed building. RSMeans 5020*

	ELECT	U.C. per Sqft								10.64	0	10.64
	General Electrical Installation		4,800.00	Sqft	0					\$51,072	\$0	\$51,072
	Subtotal									\$51,072	\$0	\$51,072
	Sales Tax									\$0	\$0	\$0
	Markups	49.03%								\$25,040	\$0	\$25,040
	<b>Subtotal Estimate</b>											<b>\$76,112</b>
	Escalation									\$7,056	\$0	\$7,056
	Management Reserve									\$29,109	\$0	\$29,109
<b>---Total</b>	<b>General Electrical Lighting and Outlets</b>		<b>0</b>							<b>\$112,277</b>	<b>\$0</b>	<b>\$112,277</b>

**Pump House Communication and Fire Alarm System**

*Memo: Based on the square footage of the building. RSMeans*

	ELECT	U.C. per Allow								13950	0	13950
	Communication and Alarm System		1.00	Allow	0					\$13,950	\$0	\$13,950
	<i>Memo: RSMeans D5030</i>											

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Pump House Communication and Fire Alarm System</u></b>												
<i>Memo: Based on the square footage of the building. RSMeans</i>												
	Subtotal						\$0	\$0	\$0	\$13,950	\$0	\$13,950
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$0	\$0	\$6,840	\$0	\$6,840
<b>Subtotal Estimate</b>												<b>\$20,790</b>
	Escalation						\$0	\$0	\$0	\$1,927	\$0	\$1,927
	Management Reserve						\$0	\$0	\$0	\$7,951	\$0	\$7,951
<b>---Total</b>	<b>Pump House Communication and Fire Alarm System</b>		<b>0</b>				<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$30,668</b>	<b>\$0</b>	<b>\$30,668</b>

**Pump & Control Connections**

	ELECT	<i>U.C. per Ea</i>			20	\$50.06	1001.2	0	20000	0	0	21001.2
	Pump Connection Allowance		2.00	Ea	40	CNELEC	\$2,002	\$0	\$40,000	\$0	\$0	\$42,002
<i>Memo: Based on estimator judgment.</i>												
	ELECT	<i>U.C. per Ea</i>			0.12	\$50.06	6.007	0	3.5	0	0	9.507
	Connect Electrical Control Valves (500' per Valve x 10 Each)		5,000.00	Ea	600	CNELEC	\$30,036	\$0	\$17,500	\$0	\$0	\$47,536
	Subtotal						\$32,038	\$0	\$57,500	\$0	\$0	\$89,538
	Sales Tax						\$0	\$0	\$3,450	\$0	\$0	\$3,450
	Markups	49.03%					\$15,708	\$0	\$29,884	\$0	\$0	\$45,592
<b>Subtotal Estimate</b>												<b>\$138,580</b>
	Escalation						\$4,426	\$0	\$8,420	\$0	\$0	\$12,846
	Management Reserve						\$18,260	\$0	\$34,739	\$0	\$0	\$52,999
<b>---Total</b>	<b>Pump &amp; Control Connections</b>				<b>640</b>		<b>\$70,433</b>	<b>\$0</b>	<b>\$133,993</b>	<b>\$0</b>	<b>\$0</b>	<b>\$204,426</b>

**Lightning Protection**

	ELECT	<i>U.C. per Allow</i>					0	0	0	10000	0	10000
	Lightning Protection Allowance		1.00	Allow	0		\$0	\$0	\$0	\$10,000	\$0	\$10,000
<i>Memo: Based on estimator judgment.</i>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b><u>Lightning Protection</u></b>												
	Subtotal							\$0	\$0	\$0	\$10,000	\$10,000
	Sales Tax							\$0	\$0	\$0	\$0	\$0
	Markups		49.03%					\$0	\$0	\$0	\$4,903	\$4,903
	<b>Subtotal Estimate</b>							\$0	\$0	\$0	\$1,382	\$1,382
	Escalation							\$0	\$0	\$0	\$5,700	\$5,700
	Management Reserve							\$0	\$0	\$0	\$0	\$0
---	<b>Total Lightning Protection</b>				<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$21,984</b>	<b>\$21,984</b>

**5.1.3.7 Building Fire Suppression System**

*Memo: Pricing was provided by a local contractor.*

	Fire Suppression Riser	FIRE	U.C. per Allow	1.00	Allow	0		0	0	0	4726	4726
								\$0	\$0	\$0	\$4,726	\$4,726
	Fire Suppression System	FIRE	U.C. per Sqft	4,800.00	Sqft	0		0	0	0	7,23	7,23
								\$0	\$0	\$0	\$34,704	\$34,704
	Subtotal							\$0	\$0	\$0	\$39,430	\$39,430
	Sales Tax							\$0	\$0	\$0	\$0	\$0
	Markups		49.03%					\$0	\$0	\$0	\$19,332	\$19,332
	<b>Subtotal Estimate</b>							\$0	\$0	\$0	\$5,447	\$5,447
	Escalation							\$0	\$0	\$0	\$22,473	\$22,473
	Management Reserve							\$0	\$0	\$0	\$0	\$0
---	<b>Total 5.1.3.7 Building Fire Suppression System</b>				<b>0</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$86,683</b>	<b>\$86,683</b>

**5.1.4 Waste Heat Recovery Tie-in**

	Return and Supply Tie-in	MECH	U.C. per Allow	1.00	Allow	0		0	0	0	100000	100000
								\$0	\$0	\$0	\$100,000	\$100,000
	<i>Memo: Based on estimator judgment.</i>											

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.4 Waste Heat Recovery Tie-In</b>												
	Subtotal						\$0	\$0	\$0	\$100,000	\$0	\$100,000
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	49.03%					\$0	\$0	\$0	\$49,030	\$0	\$49,030
<b>Subtotal Estimate</b>												
	Escalation						\$0	\$0	\$0	\$13,815	\$0	\$13,815
	Management Reserve						\$0	\$0	\$0	\$56,996	\$0	\$56,996
<b>---Total 5.1.4 Waste Heat Recovery Tie-in</b>					<b>0</b>		<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$219,840</b>	<b>\$0</b>	<b>\$219,840</b>

**5.1.5.1 Heat Exchanger**

**Memo: RSMMeans 23 57 19.13**

	MECH	U.C. per Ea	1.00	Ea	133	\$53.87	7164.71	0	114000	0	0	121164.71
	Heat Exchanger Installation (1800 GPM)				133	CNPIPE	\$7,165	\$0	\$114,000	\$0	\$0	\$121,165
<b>Subtotal</b>												
	Sales Tax						\$7,165	\$0	\$114,000	\$0	\$0	\$121,165
	Markups	49.03%					\$3,513	\$0	\$59,247	\$0	\$0	\$62,760
<b>Subtotal Estimate</b>												
	Escalation						\$990	\$0	\$16,694	\$0	\$0	\$17,684
	Management Reserve						\$4,084	\$0	\$68,874	\$0	\$0	\$72,957
<b>---Total 5.1.5.1 Heat Exchanger</b>					<b>133</b>		<b>\$15,751</b>	<b>\$0</b>	<b>\$265,655</b>	<b>\$0</b>	<b>\$0</b>	<b>\$281,406</b>

**5.1.5.2 Heat Exchanger Piping**

	MECH	U.C. per Lnft	300.00	Lnft	1.27	\$53.87	68.415	0	55	0	0	123.415
	Piping C.S. Installation In Pump Bldg				381	CNPIPE	\$20,524	\$0	\$16,500	\$0	\$0	\$37,024
<b>Memo: RSMMeans 22 11 13.44 Pipe Steel This has been factored 55% for the congested area</b>												
	MECH	U.C. per Ea	20.00	Ea	9	\$53.87	484.83	0	200	0	0	684.83
	90 Degree Elbow Pipe Fitting Installation				180	CNPIPE	\$9,697	\$0	\$4,000	\$0	\$0	\$13,697
<b>Memo: RSMMeans 22 11 13.47</b>												

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.5.2 Heat Exchanger Piping</b>												
	MECH	<i>U.C. per Ea</i>			9	\$53.87	484.83	0	163	0	0	647.83
	45 Degree Elbow Pipe Fitting Installation		10.00	Ea	90	CNPIPE	\$4,848	\$0	\$1,630	\$0	\$0	\$6,478
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			13.44	\$53.87	724.013	0	355	0	0	1079.013
	Tee Straight Pipe Fitting Installation		6.00	Ea	81	CNPIPE	\$4,344	\$0	\$2,130	\$0	\$0	\$6,474
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			9.6	\$53.87	517.152	0	2925	0	0	3442.152
	Flanged 125# Gate Valve 6" thru 10"		16.00	Ea	154	CNPIPE	\$8,274	\$0	\$46,800	\$0	\$0	\$55,074
	MECH	<i>U.C. per Ea</i>			10.9	\$53.87	587.183	0	4225	0	0	4812.183
	Flanged 150# Check Valve 10"		4.00	Ea	44	CNPIPE	\$2,349	\$0	\$16,900	\$0	\$0	\$19,249
	MECH	<i>U.C. per Ea</i>			6	\$53.87	323.22	0	2200	0	0	2523.22
	Flanged 150 Actuated Control Valves 4"		2.00	Ea	12	CNPIPE	\$646	\$0	\$4,400	\$0	\$0	\$5,046
	MECH	<i>U.C. per Ea</i>			3.2	\$53.87	172.384	0	58	0	0	230.384
	Slip-on Flanges 150# 4" thru 6"		8.00	Ea	26	CNPIPE	\$1,379	\$0	\$464	\$0	\$0	\$1,843
	MECH	<i>U.C. per Ea</i>			6	\$53.87	323.22	0	143	0	0	466.22
	Slip-on Flanges 150# 8" thru 10"		40.00	Ea	240	CNPIPE	\$12,929	\$0	\$5,720	\$0	\$0	\$18,649
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.598	0	35.5	0	0	169.098
	Gasket and Bolt Set 4" thru 6"		8.00	Ea	20	CNPIPE	\$1,069	\$0	\$284	\$0	\$0	\$1,353
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			2.48	\$53.87	133.598	0	35.5	0	0	169.098
	Gasket and Bolt Set 8" thru 10"		40.00	Ea	99	CNPIPE	\$5,344	\$0	\$1,420	\$0	\$0	\$6,764
	Memo: RSMMeans 22 11 13.47											
	MECH	<i>U.C. per Ea</i>			6	\$53.87	323.22	0	700	0	0	1023.22
	Flex Couplings 6" thru 10"		4.00	Ea	24	CNPIPE	\$1,293	\$0	\$2,800	\$0	\$0	\$4,093
	MECH	<i>U.C. per Lnft</i>			0.4	\$53.87	21.548	0	10.15	0	0	31.698
	Piping Insulation Installation		300.00	Lnft	120	CNPIPE	\$6,464	\$0	\$3,045	\$0	\$0	\$9,509

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.5.2 Heat Exchanger Piping</b>												
	Piping Fitting Insulation Installation	MECH	36.00	Ea	0.35 13	\$53.87 CNPIPE	18,854 \$679	0 \$0	20 \$720	0 \$0	0 \$0	38,854 \$1,399
Subtotal							\$79,840	\$0	\$106,813	\$0	\$0	\$186,653
Sales Tax							\$0	\$0	\$6,409	\$0	\$0	\$6,409
Markups		49.03%					\$39,145	\$0	\$55,512	\$0	\$0	\$94,657
<b>Subtotal Estimate</b>												<b>\$287,719</b>
Escalation							\$11,030	\$0	\$15,642	\$0	\$0	\$26,672
Management Reserve							\$45,505	\$0	\$64,531	\$0	\$0	\$110,037
<b>---Total 5.1.5.2 Heat Exchanger Piping</b>					<b>1,482</b>		<b>\$175,520</b>	<b>\$0</b>	<b>\$248,907</b>	<b>\$0</b>	<b>\$0</b>	<b>\$424,427</b>

**5.1.5.3 Heat Exchanger Pumps & Misc**

	Heat Exchanger Pumps (Primary)	MECH	2.00	Ea	20 40	\$53.87 CNPIPE	1077.4 \$2,155	0 \$0	13400 \$26,800	0 \$0	0 \$0	14477.4 \$28,955
Memo: RSMMeans 23 21.23.13 (5620)												
	Heat Exchanger Pumps (Secondary)	MECH	2.00	Ea	20 40	\$53.87 CNPIPE	1077.4 \$2,155	0 \$0	13400 \$26,800	0 \$0	0 \$0	14477.4 \$28,955
Memo: RSMMeans 23 21.23.13 (5620)												
	Expansion Tank 300 Gal	MECH	1.00	Ea	10 10	\$53.87 CNPIPE	538.7 \$539	0 \$0	8250 \$8,250	0 \$0	0 \$0	8788.7 \$8,789

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

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 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.1.5.3 Heat Exchanger Pumps &amp; Misc</b>												
	Propylene Glycol Solution	MECH	1,822.00	Gallons	182	0.1 \$53.87 CNPIPE	5,387 \$9,815	0	26.52 \$48,319	0	0	31,907 \$58,135
<b>Subtotal</b>							\$14,663	\$0	\$110,169	\$0	\$0	\$124,833
<b>Sales Tax</b>							\$0	\$0	\$6,610	\$0	\$0	\$6,610
<b>Markups</b>							\$7,189	\$0	\$57,257	\$0	\$0	\$64,446
<b>Subtotal Estimate</b>												\$195,889
<b>Escalation</b>							\$2,026	\$0	\$16,133	\$0	\$0	\$18,159
<b>Management Reserve</b>							\$8,358	\$0	\$66,559	\$0	\$0	\$74,917
<b>---Total 5.1.5.3 Heat Exchanger Pumps &amp; Misc</b>					<b>272</b>		<b>\$32,236</b>	<b>\$0</b>	<b>\$256,729</b>	<b>\$0</b>	<b>\$0</b>	<b>\$288,965</b>

**5.2.1 Provide Safeguard and Security Support (Plan Development)**

*Memo: Allowance is based on contact with the ATR Security SME, R. L. Burnham.*

	Security Plan Update	BEA	1.00	Allow	25	25 \$81.39 F12M3	2,035 \$2,035	0	0	0	0	2,034.75 \$2,035
<b>Subtotal</b>							\$2,035	\$0	\$0	\$0	\$0	\$2,035
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$2,035
<b>Escalation</b>							\$189	\$0	\$0	\$0	\$0	\$189
<b>Management Reserve</b>							\$778	\$0	\$0	\$0	\$0	\$778
<b>---Total 5.2.1 Provide Safeguard and Security Support (Plan Development)</b>					<b>25</b>		<b>\$3,002</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$3,002</b>

**5.2.2 Provide Operations Support for Outages**

*Memo: This activity is to provide operations support for rip out and installation.*

U29J5	SYS MECHANIC	BEA	1.00	Allow	40	40 \$68.47 U29GB	2,738.8 \$2,739	0	0	0	0	2,738.8 \$2,739
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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b>5.2.2 Provide Operations Support for Outages</b>													
<i>Memo: This activity is to provide operations support for rip out and installation.</i>													
U52J4	OPERATOR,UTILITY	BEA	1.00	Allow	40	U52J1	\$3,029	\$0	\$0	\$0	\$0	\$3,029	
					40		\$75.72	3028.8				3028.8	
T04W2	ELECTRO/MECH TECHNICIAN	BEA	1.00	Allow	40	T04W2	\$3,055	\$0	\$0	\$0	\$0	\$3,055	
					40		\$76.38	3055.2				3055.2	
Z07M2	SUPERVISOR, FAC SUPPORT SERVICES	BEA	1.00	Allow	10	Z07M2	\$728	\$0	\$0	\$0	\$0	\$728	
					10		\$72.81	728.1				728.1	
Subtotal							\$9,551	\$0	\$0	\$0	\$0	\$9,551	
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0	
Markups							\$0	\$0	\$0	\$0	\$0	\$0	
Subtotal Estimate												\$9,551	
Escalation							\$895	\$0	\$0	\$0	\$0	\$895	
Management Reserve							\$3,653	\$0	\$0	\$0	\$0	\$3,653	
---Total 5.2.2 Provide Operations Support for Outages								\$14,089	\$0	\$0	\$0	\$0	\$14,089
					130								

**5.2.3 Provide Radcon Support During Sub-k Activities**

*Memo: Per the team's direction radcon will be required during all subcontract activities.*

U60H6	RADIOLOGICAL CONTROL TECH #1	BEA	8.00	Months	1,280	U60H6	\$101,133	\$0	\$0	\$0	\$0	\$101,133
					160		\$79.01	12641.6				12641.6

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Cost Estimating

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**DETAIL ITEM REPORT**

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Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.2.3 Provide Radcon Support During Sub-k Activities</b>												
<i>Memo: Per the team's direction radcon will be required during all subcontract activities.</i>												
U60H6	BEA	<i>U.C. per Months</i>			160	\$79.01	12641.6	0	0	0	0	12641.6
	RADIOLOGICAL CONTROL TECH #2		8.00	Months	1,280	U60H6	\$101,133	\$0	\$0	\$0	\$0	\$101,133
<b>Subtotal</b>							\$202,266	\$0	\$0	\$0	\$0	\$202,266
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$202,266
<b>Escalation</b>							\$18,750	\$0	\$0	\$0	\$0	\$18,750
<b>Management Reserve</b>							\$77,355	\$0	\$0	\$0	\$0	\$77,355
<b>---Total 5.2.3 Provide Radcon Support During Sub-k Activities</b>					<b>2,560</b>		<b>\$298,371</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$298,371</b>

<b>5.2.4 Provide for Security/Escorts/Guard Service</b>												
<i>Memo: This is based on 4 days per week, 10 hours per day during the subcontractor work scope.</i>												
U96M4	BEA	<i>U.C. per Months</i>			160	\$53.52	8563.2	0	0	0	0	8563.2
	1 st SECURITY POLICE OFFICER II (SPO II)		8.00	Months	1,280	U96M4	\$68,506	\$0	\$0	\$0	\$0	\$68,506
U96M4	BEA	<i>U.C. per Months</i>			160	\$53.52	8563.2	0	0	0	0	8563.2
	2 nd SECURITY POLICE OFFICER II (SPO II)		8.00	Months	1,280	U96M4	\$68,506	\$0	\$0	\$0	\$0	\$68,506
<b>Subtotal</b>							\$137,011	\$0	\$0	\$0	\$0	\$137,011
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$137,011
<b>Escalation</b>							\$12,701	\$0	\$0	\$0	\$0	\$12,701
<b>Management Reserve</b>							\$52,399	\$0	\$0	\$0	\$0	\$52,399
<b>---Total 5.2.4 Provide for Security/Escorts/Guard Service</b>					<b>2,560</b>		<b>\$202,111</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$202,111</b>

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.3 Provide For Project Specific Training - Subcontractor</b>												
<i>Memo: Training allowance is based on estimator judgment and review of the INL Training List. It is assumed that the general type craft currently engaged with work at the INL will only require updates, etc.</i>												
	GEN		<i>U.C. per Craft</i>									
CARPENTERS - Subcontract Project Supervisor			1.00	NM80 Craft	10	\$49.04	490.4	\$0	\$0	\$0	\$0	490.4
					10	CNCARPF	\$490					\$490
CARPENTERS - CONCRETE - FOREMAN	GEN		<i>U.C. per Craft</i>									
			1.00	NM80 Craft	10	\$49.35	493.5	\$0	\$0	\$0	\$0	493.5
					10	CNCARPCF	\$494					\$494
CARPENTERS	GEN		<i>U.C. per Craft</i>									
			3.00	NM80 Craft	30	\$46.92	469.2	\$0	\$0	\$0	\$0	469.2
					30	CNCARP	\$1,408					\$1,408
CEMENT MASONS	CONC		<i>U.C. per Craft</i>									
			3.00	NM80 Craft	30	\$45.28	452.8	\$0	\$0	\$0	\$0	452.8
					30	CNCEM	\$1,358					\$1,358
IRONWORKERS	STEEL		<i>U.C. per Craft</i>									
			2.00	NM80 Craft	20	\$57.47	574.7	\$0	\$0	\$0	\$0	574.7
					20	CNIRON	\$1,149					\$1,149
IRONWORKERS - FOREMAN	STEEL		<i>U.C. per Craft</i>									
			1.00	NM80 Craft	10	\$58.32	583.2	\$0	\$0	\$0	\$0	583.2
					10	CNIRONF	\$583					\$583
LABORERS	GEN		<i>U.C. per Craft</i>									
			4.00	NM80 Craft	40	\$44.01	440.1	\$0	\$0	\$0	\$0	440.1
					40	CNLAB	\$1,760					\$1,760
LABORERS - GF	GEN		<i>U.C. per Craft</i>									
			1.00	NM80 Craft	10	\$47.55	475.5	\$0	\$0	\$0	\$0	475.5
					10	CNLABGF	\$476					\$476
OPERATORS - CRANES	GEN		<i>U.C. per Craft</i>									
			1.00	NM80 Craft	10	\$48.36	483.6	\$0	\$0	\$0	\$0	483.6
					10	CNOPRCR	\$484					\$484
OPERATORS - Misc	GEN		<i>U.C. per Craft</i>									
			1.00	NM80 Craft	10	\$46.82	468.2	\$0	\$0	\$0	\$0	468.2
					10	CNOPRL1	\$468					\$468

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.3 Provide For Project Specific Training - Subcontractor</b>												
<i>Memo: Training allowance is based on estimator judgment and review of the INL Training List. It is assumed that the general type craft currently engaged with work at the INL will only require updates, etc.</i>												
TEAMSTERS	GEN	U.C. per Craft	1.00	NM80 Craft	10	\$45.53	455.3	0	0	0	0	455.3
							\$455	\$0	\$0	\$0	\$0	\$455
<b>Subtotal</b>							\$9,126	\$0	\$0	\$0	\$0	\$9,126
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$3,674	\$0	\$0	\$0	\$0	\$3,674
							40.26%					
<b>Subtotal Estimate</b>												\$12,799
<b>Escalation</b>							\$1,186	\$0	\$0	\$0	\$0	\$1,186
<b>Management Reserve</b>							\$4,895	\$0	\$0	\$0	\$0	\$4,895
<b>---Total 5.3 Provide For Project Specific Training - Subcontractor</b>					<b>190</b>		<b>\$18,880</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$18,880</b>

**5.4 Provide for 10 CFR 851 Requirements**

*Memo: This requirement is based on any subcontract exceeding 30 days in duration. This includes all lower tier subcontractors even when less than 30 days in duration. This is per R. Strong, BEA Construction Management.*

**	Subcontractor Medical Allowances - See Below	BEA	U.C. per	1.00		0	0	0	0.01	0	0	0.01
							\$0	\$0	\$0	\$0	\$0	\$0
<i>Memo: Based on direction from D. Inskeep of the SWO BEA costs for 10 CFR 851 per covered employee are identified below.</i>												
	Return to Work Evaluations (25% of Total Employees)	BEA	U.C. per Employee	7.00	Employee	0.5	\$210.72	105.36	0	0	0	105.36
						4	X18H2	\$738	\$0	\$0	\$0	\$738
	Pre-Employment Physical (100% of Total Employees)	BEA	U.C. per Employee	29.00	Employee	1	\$210.72	210.72	0	0	0	210.72
						29	X18H2	\$6,111	\$0	\$0	\$0	\$6,111
	Exit Physical (5% of Total Employees)	BEA	U.C. per Employee	2.00	Employee	1	\$210.72	210.72	0	0	0	210.72
						2	X18H2	\$421	\$0	\$0	\$0	\$421
	Employee Assistance Program Visit (10% of Total Employees)	BEA	U.C. per Employee	3.00	Employee	1	\$210.72	210.72	0	0	0	210.72
						3	X18H2	\$632	\$0	\$0	\$0	\$632

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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DETAIL ITEM REPORT

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
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**5.4 Provide for 10 CFR 851 Requirements**

**Memo:** This requirement is based on any subcontract exceeding 30 days in duration. This includes all lower tier subcontractors even when less than 30 days in duration. This is per R. Strong, BEA Construction Management.

	BEA	U.C. per tot-lbr-	NM80				0	0	0.25	0	0	0.25
Misc. Medical Supplies (25% of Total BEA Medical Labor)			tot-lbr-		0		\$0	\$0	\$2,250	\$0	\$0	\$2,250
	GEN	U.C. per Craft	NM80		4	\$49.04	196.16	0	0	0	0	196.16
CARPENTERS - Subcontract Project Supervisor			Craft		4	CNCARPF	\$196	\$0	\$0	\$0	\$0	\$196
Memo: Based on direction from D. Inskeep of the SWO there will be approximately 4 hrs of time charged to the project per covered employee.												
	GEN	U.C. per Craft	NM80		4	\$49.35	197.4	0	0	0	0	197.4
CARPENTERS - CONCRETE - FOREMAN			Craft		4	CNCARPCF	\$197	\$0	\$0	\$0	\$0	\$197
	GEN	U.C. per Craft	NM80		4	\$46.92	187.68	0	0	0	0	187.68
CARPENTERS			Craft		12	CNCARP	\$563	\$0	\$0	\$0	\$0	\$563
	CONC	U.C. per Craft	NM80		4	\$45.28	181.12	0	0	0	0	181.12
CEMENT MASONS			Craft		8	CNCEM	\$362	\$0	\$0	\$0	\$0	\$362
	STEEL	U.C. per Craft	NM80		4	\$57.47	229.88	0	0	0	0	229.88
IRONWORKERS			Craft		8	CNIRON	\$460	\$0	\$0	\$0	\$0	\$460
	STEEL	U.C. per Craft	NM80		4	\$58.32	233.28	0	0	0	0	233.28
IRONWORKERS - FOREMAN			Craft		4	CNIRONF	\$233	\$0	\$0	\$0	\$0	\$233
	GEN	U.C. per Craft	NM80		4	\$44.01	176.04	0	0	0	0	176.04
LABORERS			Craft		16	CNLAB	\$704	\$0	\$0	\$0	\$0	\$704
	GEN	U.C. per Craft	NM80		4	\$47.55	190.2	0	0	0	0	190.2
LABORERS - GF			Craft		4	CNLBGF	\$190	\$0	\$0	\$0	\$0	\$190
	GEN	U.C. per Craft	NM80		4	\$48.36	193.44	0	0	0	0	193.44
OPERATORS - CRANES			Craft		4	CNOPRCR	\$193	\$0	\$0	\$0	\$0	\$193
	GEN	U.C. per Craft	NM80		4	\$46.92	187.28	0	0	0	0	187.28
OPERATORS - Misc			Craft		4	CNOPRL1	\$187	\$0	\$0	\$0	\$0	\$187
	GEN	U.C. per Craft	NM80		4	\$45.53	182.12	0	0	0	0	182.12
TEAMSTERS			Craft		4	CNTEAM	\$182	\$0	\$0	\$0	\$0	\$182

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.4 Provide for 10 CFR 851 Requirements</b>												
<i>Memo: This requirement is based on any subcontract exceeding 30 days in duration. This includes all lower tier subcontractors even when less than 30 days in duration. This is per R. Strong, BEA Construction Management.</i>												
	PIPEFITTERS - FOREMAN	MECH	U.C. per Craft	NM80	4	\$59.07	236.28	0	0	0	0	236.28
			1.00	Craft	4	CNPIPEF	\$236	\$0	\$0	\$0	\$0	\$236
	PIPEFITTERS	MECH	U.C. per Craft	NM80	4	\$53.87	215.48	0	0	0	0	215.48
			5.00	Craft	20	CNPIPE	\$1,077	\$0	\$0	\$0	\$0	\$1,077
	ELECTRICIANS	ELECT	U.C. per Craft	NM80	4	\$50.06	200.24	0	0	0	0	200.24
			1.00	Craft	4	CNELEC	\$200	\$0	\$0	\$0	\$0	\$200
	ELECTRICIANS - GF	ELECT	U.C. per Craft	NM80	4	\$57.25	229	0	0	0	0	229
			2.00	Craft	8	CNELECGF	\$458	\$0	\$0	\$0	\$0	\$458
Subtotal							\$13,343	\$0	\$2,250	\$0	\$0	\$15,593
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							15.05%	\$2,347	\$0	\$0	\$0	\$2,347
<b>Subtotal Estimate</b>												<b>\$17,940</b>
Escalation							\$1,455	\$0	\$209	\$0	\$0	\$1,663
Management Reserve							\$6,001	\$0	\$861	\$0	\$0	\$6,861
<b>---Total 5.4 Provide for 10 CFR 851 Requirements</b>					<b>146</b>		<b>\$23,146</b>	<b>\$0</b>	<b>\$3,319</b>	<b>\$0</b>	<b>\$0</b>	<b>\$26,465</b>

**5.5.1 Provide AE Field Support/Oversight during Execution - Level of Effort (LOE)**

*Memo: Based on estimator judgment and the project team to account for all engineering activities during the execution phase.*

	Provide AE Field Support and Answer Civil/Struct Questions	BEA	U.C. per weeks	32.00	weeks	256	\$148.59	1188.64	0	0	0	0	1188.64
							E04W1	\$38,036	\$0	\$0	\$0	\$0	\$38,036
	Provide AE Field Support and Answer Electrical Questions	BEA	U.C. per weeks	32.00	weeks	320	\$118.73	1187.3	0	0	0	0	1187.3
							E06W1	\$37,994	\$0	\$0	\$0	\$0	\$37,994

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>5.5.1 Provide AE Field Support/Oversight during Execution - Level of Effort (LOE)</b>												
<i>Memo: Based on estimator judgment and the project team to account for all engineering activities during the execution phase.</i>												
	BEA	U.C. per weeks			15	\$119.29	1789.35	0	0	0	0	1789.35
	Provide AE Field Support and Answer Mechanical Questions		32.00	weeks	480	E11W1	\$57,259	\$0	\$0	\$0	\$0	\$57,259
<b>Subtotal</b>							\$133,289	\$0	\$0	\$0	\$0	\$133,289
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							0.00%	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$133,289
Escalation							\$12,356	\$0	\$0	\$0	\$0	\$12,356
Management Reserve							\$50,976	\$0	\$0	\$0	\$0	\$50,976
<b>---Total 5.5.1 Provide AE Field Support/Oversight during Execution - Level of Effort (LOE)</b>					<b>1,056</b>		<b>\$196,621</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$196,621</b>
<b>5.5.2 Provide AE Support Oversight during Execution - Level of Effort (LOE)</b>												
<i>Memo: Based on estimator judgment to provide management oversight to the engineering group.</i>												
	BEA	U.C. per weeks			4	\$133.25	533	0	0	0	0	533
	Engineering Supervision		40.00	weeks	160	E34W2	\$21,320	\$0	\$0	\$0	\$0	\$21,320
<b>Subtotal</b>							\$21,320	\$0	\$0	\$0	\$0	\$21,320
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							0.00%	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$21,320
Escalation							\$1,976	\$0	\$0	\$0	\$0	\$1,976
Management Reserve							\$8,154	\$0	\$0	\$0	\$0	\$8,154
<b>---Total 5.5.2 Provide AE Support Oversight during Execution - Level of Effort (LOE)</b>					<b>160</b>		<b>\$31,450</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$31,450</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>6.0 Environmental Assessment</b>												
<i>Memo: Allowance is based on direction from the project team.</i>												
S21GC	REGULATORY COMPLIANCE - ENVIRONMENTAL ASSESSMENT Allowance	BEA	20,000.00	Allow	0		\$120,000	\$0	\$0	\$0	\$0	\$120,000
							\$120,000	\$0	\$0	\$0	\$0	\$120,000
Subtotal							\$120,000	\$0	\$0	\$0	\$0	\$120,000
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$120,000</b>
Escalation							\$6,672	\$0	\$0	\$0	\$0	\$6,672
Management Reserve							\$44,335	\$0	\$0	\$0	\$0	\$44,335
<b>---Total 6.0 Environmental Assessment</b>					<b>0</b>		<b>\$171,007</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$171,007</b>

**7.1 Preventative Maintenance (PM) Plan Development**

*Memo: Based on prior discussions with ATR Plant Engineering*

	Modify and Update Existing Preventative Maintenance (PM's) Plans (Planner Support)	BEA	12.00	Plans	120	F10GB	\$9,530	\$0	\$300	\$0	\$0	\$9,830
							\$9,530	\$0	\$300	\$0	\$0	\$9,830
	Modify and Update Existing Preventative Maintenance (PM's) Plans (Engineer Support)	BEA	12.00	Plans	120	E48W1	\$12,188	\$0	\$300	\$0	\$0	\$12,488
							\$12,188	\$0	\$300	\$0	\$0	\$12,488
	Develop New PMs for the Recovery System (Planner Support)	BEA	10.00	Plans	250	F10GB	\$19,855	\$0	\$250	\$0	\$0	\$20,105
							\$19,855	\$0	\$250	\$0	\$0	\$20,105

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>7.1 Preventative Maintenance (PM) Plan Development</b>												
<b>Memo: Based on prior discussions with ATR Plant Engineering</b>												
	BEA	U.C. per Plans			25	\$101.57	2539.25	0	25	0	0	2564.25
	Develop New PMs for the Recovery System (Engineer Support)		10.00	Plans	250	E48W1	\$25,393	\$0	\$250	\$0	\$0	\$25,643
<b>Subtotal</b>							\$66,966	\$0	\$1,100	\$0	\$0	\$68,066
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$68,066
<b>Escalation</b>							\$8,739	\$0	\$144	\$0	\$0	\$8,883
<b>Management Reserve</b>							\$26,497	\$0	\$435	\$0	\$0	\$26,932
<b>---Total 7.1 Preventative Maintenance (PM) Plan Development</b>					<b>740</b>		<b>\$102,202</b>	<b>\$0</b>	<b>\$1,679</b>	<b>\$0</b>	<b>\$0</b>	<b>\$103,881</b>

**7.2 Develop Operating Procedures, Manuals & Documents**

**Memo: Based on prior discussions with ATR Plant Engineering**

	BEA	U.C. per EA	NM60	60	\$121.94	7316.4	0	25	0	0	7341.4
	Development of new Operating Procedures		6.00	EA	360	E32W1	\$43,898	\$0	\$150	\$0	\$44,048
	BEA	U.C. per EA	NM60	10	\$121.94	1219.4	0	25	0	0	1244.4
	Update & Revise Current Operating Procedures - OMM		12.00	EA	120	E32W1	\$14,633	\$0	\$300	\$0	\$14,933
	BEA	U.C. per EA	NM60	10	\$121.94	1219.4	0	25	0	0	1244.4
	Update & Revise Current Operating Procedures - DOP		6.00	EA	60	E32W1	\$7,316	\$0	\$150	\$0	\$7,466
	BEA	U.C. per EA	NM60	10	\$121.94	1219.4	0	25	0	0	1244.4
	Update & Revise Current Operating Procedures - AOP		8.00	EA	80	E32W1	\$9,755	\$0	\$200	\$0	\$9,955
	BEA	U.C. per EA	NM60	10	\$121.94	1219.4	0	25	0	0	1244.4
	Update & Revise Current Operating Procedures - RP		3.00	EA	30	E32W1	\$3,658	\$0	\$75	\$0	\$3,733

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>7.2 Develop Operating Procedures, Manuals &amp; Documents</b>												
<i>Memo: Based on prior discussions with ATR Plant Engineering</i>												
	Obtain and Review Operating Manuals	BEA	1.00	Allow	60	E32W1	\$7,316	\$0	\$0	\$0	\$0	\$7,316
		U.C. per Allow			60		\$121.94					7316.4
<b>Subtotal</b>							<b>\$86,577</b>	<b>\$0</b>	<b>\$875</b>	<b>\$0</b>	<b>\$0</b>	<b>\$87,452</b>
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$87,452</b>
Escalation							\$11,298	\$0	\$114	\$0	\$0	\$11,413
Management Reserve							\$34,257	\$0	\$346	\$0	\$0	\$34,603
<b>---Total 7.2 Develop Operating Procedures, Manuals &amp; Documents</b>					<b>710</b>		<b>\$132,132</b>	<b>\$0</b>	<b>\$1,335</b>	<b>\$0</b>	<b>\$0</b>	<b>\$133,468</b>

**7.3 Prepare Commissioning/SO Test Plan**

*Memo: Allowance is based on a group of SME's to develop the SO test plan, including comment and review cycle.*

E11W4	MECHANICAL ENGINEERING	BEA	30.00	Hrs	30	E11W1	\$3,579	\$0	\$0	\$0	\$0	\$3,579
		U.C. per Hrs			1		\$119.29					119.29
E27W4	OTHER ENGINEERING	BEA	30.00	Hrs	30	E27W4	\$3,605	\$0	\$0	\$0	\$0	\$3,605
		U.C. per Hrs			1		\$120.18					120.18
E06W4	ELECTRICAL ENGINEERING	BEA	30.00	Hrs	30	E06W1	\$3,562	\$0	\$0	\$0	\$0	\$3,562
		U.C. per Hrs			1		\$118.73					118.73
E32W1	SYSTEM/SSC ENGINEER	BEA	30.00	Hrs	30	E32W1	\$3,658	\$0	\$0	\$0	\$0	\$3,658
		U.C. per Hrs			1		\$121.94					121.94
E48W4	OPERATIONS ENGINEER, GENERAL	BEA	30.00	Hrs	30	E48W1	\$3,047	\$0	\$0	\$0	\$0	\$3,047
		U.C. per Hrs			1		\$101.57					101.57
E35W2	INSTRUMENTATION AND CONTROLS	BEA	30.00	Hrs	30	E35W1	\$3,951	\$0	\$0	\$0	\$0	\$3,951
		U.C. per Hrs			1		\$131.69					131.69
T04W2	ELECTROMECH TECHNICIAN	BEA	30.00	Hrs	30	T04W2	\$2,291	\$0	\$0	\$0	\$0	\$2,291
		U.C. per Hrs			1		\$76.38					76.38

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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DETAIL ITEM REPORT

Project Name: *RTC Waste Heat Recovery*

Client: *C. P. Ischay*  
 Prepared By: *A. W. Miller / S. N. Wasley*  
 Estimate Type: *Class-5*

Project Location: *ATR*  
 Estimate Number: *7B50*

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>7.3 Prepare Commissioning/SO Test Plan</b>												
<i>Memo: Allowance is based on a group of SME's to develop the SO test plan, including comment and review cycle.</i>												
Z04W4	MANAGER, SCI/ENG FUNCTION	BEA	15.00	Hrs	15	Z04W4	\$2,598	\$0	\$0	\$0	\$0	\$2,598
							<i>U.C. per Hrs</i>					
							<i>173.21</i>	<i>173.21</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>173.21</i>
Z04W4	MANAGER, SCI/ENG FUNCTION	BEA	15.00	Hrs	15	Z04W4	\$2,598	\$0	\$0	\$0	\$0	\$2,598
							<i>U.C. per Hrs</i>					
							<i>173.21</i>	<i>173.21</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>173.21</i>
Subtotal							\$28,890	\$0	\$0	\$0	\$0	\$28,890
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
Subtotal Estimate							\$3,770	\$0	\$0	\$0	\$0	\$3,770
Escalation							\$11,431	\$0	\$0	\$0	\$0	\$11,431
Management Reserve												
---Total 7.3 Prepare Commissioning/SO Test Plan					240		\$44,091	\$0	\$0	\$0	\$0	\$44,091

**8.0 SAR Update**

*Memo: Allowance only, at this time no information is available for what will be required for the SAR update to the existing facility SAR.*

	Safety Analysis Implementation Development	BEA	1.00	allow	0		\$250,000	\$0	\$0	\$0	\$0	\$250,000
							<i>U.C. per allow</i>					
							<i>250000</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>250000</i>
E63W3	NUCLEAR SAFETY ANALYSIS (Analyze & Study Facility SAR)	BEA	12.00	Months	1,800	E63W3	\$193,356	\$0	\$0	\$0	\$0	\$193,356
							<i>U.C. per Months</i>					
							<i>16113</i>	<i>16113</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>16113</i>
Subtotal							\$443,356	\$0	\$0	\$0	\$0	\$443,356
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
Subtotal Estimate							\$57,858	\$0	\$0	\$0	\$0	\$57,858
Escalation							\$175,425	\$0	\$0	\$0	\$0	\$175,425
Management Reserve												
---Total 8.0 SAR Update					1,800		\$676,639	\$0	\$0	\$0	\$0	\$676,639

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>		<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>9.0 New System SO Testing</b>													
<i>Memo: Allowance is based on a group of SME's to perform the SO test. This allowance was based on estimator's judgment.</i>													
U52J1	OPERATOR,UTILITY (Craft 1)	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$75.72 U52J1	3028.8 \$3,029	0 \$0	0 \$0	0 \$0	0 \$0	3028.8 \$3,029
U52J1	OPERATOR,UTILITY (Craft 2)	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$75.72 U52J1	3028.8 \$3,029	0 \$0	0 \$0	0 \$0	0 \$0	3028.8 \$3,029
E06W4	ELECTRICAL ENGINEERING	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$119.73 E06W1	4749.2 \$4,749	0 \$0	0 \$0	0 \$0	0 \$0	4749.2 \$4,749
E34W2	PROJECT ENGINEER	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$133.25 E34W2	5330 \$5,330	0 \$0	0 \$0	0 \$0	0 \$0	5330 \$5,330
E54W4	OPS SYSTEM ENGR, VITAL SAFETY SYSTEMS	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$119.49 E54W4	4779.6 \$4,780	0 \$0	0 \$0	0 \$0	0 \$0	4779.6 \$4,780
U11GB	ELECTRICIAN (Craft 1)	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$67.97 U11GB	2718.8 \$2,719	0 \$0	0 \$0	0 \$0	0 \$0	2718.8 \$2,719
U11GB	ELECTRICIAN (Craft 2)	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$67.97 U11GB	2718.8 \$2,719	0 \$0	0 \$0	0 \$0	0 \$0	2718.8 \$2,719
U16J1	FITTER (Craft 1)	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$67.21 U16J1	2688.4 \$2,688	0 \$0	0 \$0	0 \$0	0 \$0	2688.4 \$2,688
U16J1	FITTER (Craft 2)	BEA	<i>U.C. per Wks</i>	1.00	Wks	40	\$67.21 U16J1	2688.4 \$2,688	0 \$0	0 \$0	0 \$0	0 \$0	2688.4 \$2,688

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>9.0 New System SO Testing</b>												
<i>Memo: Allowance is based on a group of SME's to perform the SO test. This allowance was based on estimator's judgment.</i>												
T12W5	QUALITY INSPECT TECH	BEA	1.00	Wks	40	T12W5	\$2,722	\$0	\$0	\$0	\$0	\$2,722
	Subtotal						\$34,452	\$0	\$0	\$0	\$0	\$34,452
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups						\$0	\$0	\$0	\$0	\$0	\$0
											0.00%	
	Subtotal Estimate						\$4,496	\$0	\$0	\$0	\$0	\$4,496
	Escalation						\$13,632	\$0	\$0	\$0	\$0	\$13,632
	Management Reserve											
<b>---Total 9.0 New System SO Testing</b>					<b>400</b>		<b>\$52,580</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$52,580</b>

**10.1 MSA**

*Memo: Resources for developing the MSA plan are based on the estimator's judgment and concurred by the project team.*

**Develop MSA Plan**	BEA	U.C. per	1.00		0		\$0	\$0	\$0	\$0	\$0	\$0
									0.01			0.01
MANAGER, OPERATIONS	BEA	U.C. per Hrs	80.00	Hrs	80	Z03GB	\$11,284	\$0	\$0	\$0	\$0	\$11,284
					1		\$141.05					141.05
PROJECT ENGINEER	BEA	U.C. per Hrs	80.00	Hrs	80	E34W2	\$10,660	\$0	\$0	\$0	\$0	\$10,660
					1		\$133.25					133.25
PROJECT MANAGER	BEA	U.C. per Hrs	80.00	Hrs	80	F35P1	\$11,431	\$0	\$0	\$0	\$0	\$11,431
					1		\$142.89					142.89
**Conduct MSA**	BEA	U.C. per	1.00		0		\$0	\$0	\$0	\$0	\$0	\$0
									0.01			0.01
MANAGER, SCI/ENG FUNCTION	BEA	U.C. per Wks	2.00	Wks	40	Z04GD	\$6,470	\$0	\$0	\$0	\$0	\$6,470
					20		\$161.74					3234.8
MANAGER, FAC SUPPORT SERVICES	BEA	U.C. per Wks	2.00	Wks	40	Z02GB	\$4,962	\$0	\$0	\$0	\$0	\$4,962
					20		\$124.05					2481

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>10.1 MSA</b>												
<i>Memo: Resources for developing the MSA plan are based on the estimator's judgment and concurred by the project team.</i>												
	BEA	U.C. per Wks			20	\$160.27	3205.4	0	0	0	0	3205.4
	MANAGER, SCI/ENG FUNCTION (Quality Engineering)		2.00	Wks	40	Z04Q5	\$6,411	\$0	\$0	\$0	\$0	\$6,411
	BEA	U.C. per Wks			20	\$141.05	2821	0	0	0	0	2821
	MANAGER, OPERATIONS		2.00	Wks	40	Z03GB	\$5,642	\$0	\$0	\$0	\$0	\$5,642
	BEA	U.C. per Wks			20	\$142.89	2857.8	0	0	0	0	2857.8
	Project Manager		2.00	Wks	40	F35P1	\$5,716	\$0	\$0	\$0	\$0	\$5,716
	BEA	U.C. per Wks			20	\$118.73	2374.6	0	0	0	0	2374.6
	Electrical Engineering		2.00	Wks	40	E06W1	\$4,749	\$0	\$0	\$0	\$0	\$4,749
	BEA	U.C. per Wks			20	\$133.25	2665	0	0	0	0	2665
	PROJECT ENGINEER		2.00	Wks	40	E34W2	\$5,330	\$0	\$0	\$0	\$0	\$5,330
	BEA	U.C. per Wks			20	\$114.99	2299.8	0	0	0	0	2299.8
	Safety Engineering		2.00	Wks	40	E19H1	\$4,600	\$0	\$0	\$0	\$0	\$4,600
	BEA	U.C. per Wks			20	\$107.42	2148.4	0	0	0	0	2148.4
	NUCLEAR SAFETY ANALYSIS		2.00	Wks	40	E63W3	\$4,297	\$0	\$0	\$0	\$0	\$4,297
	BEA	U.C. per Wks			20	\$84.60	1692	0	0	0	0	1692
	NUCLEAR FACILITY OPERATOR		2.00	Wks	40	T44GC	\$3,384	\$0	\$0	\$0	\$0	\$3,384
	BEA	U.C. per					0	0	0.01	0	0	0.01
	**Develop MSA Report**		1.00		0		\$0	\$0	\$0	\$0	\$0	\$0
	BEA	U.C. per Hrs			1	\$141.05	141.05	0	0	0	0	141.05
	MANAGER, OPERATIONS		80.00	Hrs	80	Z03GB	\$11,284	\$0	\$0	\$0	\$0	\$11,284

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>10.1 MSA</b>												
<i>Memo: Resources for developing the MSA plan are based on the estimator's judgment and concurred by the project team.</i>												
	PROJECT ENGINEER	BEA	80.00	Hrs	80	E34W2	\$10,660	\$0	\$0	\$0	\$0	\$10,660
	Subtotal						\$106,879	\$0	\$0	\$0	\$0	\$106,879
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>											<b>\$106,879</b>
	Escalation						\$13,948	\$0	\$0	\$0	\$0	\$13,948
	Management Reserve						\$42,289	\$0	\$0	\$0	\$0	\$42,289
<b>---Total 10.1 MSA</b>					<b>800</b>		<b>\$163,116</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$163,116</b>

**11.1.1 Provide PM Oversight - Level of Effort (LOE) during Transition/Closeout Phase**

*Memo: Based on estimator judgment including consideration for the duration of the heat recovery system closeout phase.*

	Provide PM Oversight & Cost & Schedule Monitoring during the Closeout	BEA	10.00	weeks	100	F35P1	\$14,289	\$0	\$0	\$0	\$0	\$14,289
	Subtotal						\$14,289	\$0	\$250	\$0	\$0	\$14,539
	Sales Tax						\$0	\$0	\$15	\$0	\$0	\$15
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>											<b>\$14,554</b>
	Escalation						\$1,865	\$0	\$35	\$0	\$0	\$1,899
	Management Reserve						\$5,654	\$0	\$105	\$0	\$0	\$5,759
<b>---Total 11.1.1 Provide PM Oversight - Level of Effort (LOE) during Transition/Closeout Phase</b>					<b>100</b>		<b>\$21,808</b>	<b>\$0</b>	<b>\$404</b>	<b>\$0</b>	<b>\$0</b>	<b>\$22,212</b>

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>11.1.2 Closeout Project Files</b>												
<i>Memo: Based on estimator judgment including consideration for the closeout phase.</i>												
	BEA			<i>U.C. per weeks</i>	<i>4</i>	<i>\$43.03</i>	<i>172.12</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>172.12</i>
	Closeout Project Documents and Filing		10.00	weeks	40	A13K7	\$1,721	\$0	\$0	\$0	\$0	\$1,721
<b>Subtotal</b>							\$1,721	\$0	\$0	\$0	\$0	\$1,721
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$1,721
<b>Escalation</b>							\$225	\$0	\$0	\$0	\$0	\$225
<b>Management Reserve</b>							\$681	\$0	\$0	\$0	\$0	\$681
<b>---Total 11.1.2 Closeout Project Files</b>					<b>40</b>		<b>\$2,627</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,627</b>

**11.2.1 Prepare Master Facility As-Built Drawings and Incorporate into EDMS**

*Memo: Estimator judgment and concurrence with the project team.*

	BEA			<i>U.C. per drawings</i>	<i>10</i>	<i>\$68.02</i>	<i>680.2</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>680.2</i>
	Update Existing Facility Drawings and Upload into EDMS		30.00	drawngs	300	T03W1	\$20,406	\$0	\$0	\$0	\$0	\$20,406
<b>Subtotal</b>							\$20,406	\$0	\$0	\$0	\$0	\$20,406
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$20,406
<b>Escalation</b>							\$2,663	\$0	\$0	\$0	\$0	\$2,663
<b>Management Reserve</b>							\$8,074	\$0	\$0	\$0	\$0	\$8,074
<b>---Total 11.2.1 Prepare Master Facility As-Built Drawings and Incorporate into EDMS</b>					<b>300</b>		<b>\$31,143</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$31,143</b>

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>11.2.2 Prepare Project As-Built Drawings and Incorporate into EDMS</b>												
<i>Memo: Estimator judgment and concurrence with the project team.</i>												
	BEA	<i>U.C. per drawings</i>			10	\$68.02	680.2	0	0	0	0	680.2
	Update Existing Facility Drawings and Upload into EDMS		20.00	drawngs	200	T03W1	\$13,604	\$0	\$0	\$0	\$0	\$13,604
<b>Subtotal</b>							\$13,604	\$0	\$0	\$0	\$0	\$13,604
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>								\$13,604	\$0	\$0	\$0	\$13,604
<b>Escalation</b>							\$1,775	\$0	\$0	\$0	\$0	\$1,775
<b>Management Reserve</b>							\$5,383	\$0	\$0	\$0	\$0	\$5,383
<b>---Total 11.2.2 Prepare Project As-Built Drawings and Incorporate into EDMS</b>					<b>200</b>		<b>\$20,762</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$20,762</b>

**11.3.1.1 Complete Closeout PM Checklist**

*Memo: Estimator judgment and concurrence with the project team.*

	BEA	<i>U.C. per week</i>			20	\$142.89	2857.8	0	0	0	0	2857.8
	Prepare checklist of closeout activities		8.00	week	160	F35P1	\$22,862	\$0	\$0	\$0	\$0	\$22,862
	BEA	<i>U.C. per week</i>			10	\$142.89	1428.9	0	0	0	0	1428.9
	Complete closeout activities		8.00	week	80	F35P1	\$11,431	\$0	\$0	\$0	\$0	\$11,431

**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>11.3.1.1 Complete Closeout PM Checklist</b>												
<i>Memo: Estimator judgment and concurrence with the project team.</i>												
	BEA			<i>U.C. per week</i>		<i>10</i>	<i>\$142.89</i>					<i>1428.9</i>
	Prepare and issue Project Completion Report		8.00	week	80	F35P1	\$11,431	\$0	\$0	\$0	\$0	\$11,431
<b>Subtotal</b>							\$45,725	\$0	\$0	\$0	\$0	\$45,725
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$45,725
<b>Escalation</b>							\$5,967	\$0	\$0	\$0	\$0	\$5,967
<b>Management Reserve</b>							\$18,092	\$0	\$0	\$0	\$0	\$18,092
<b>---Total 11.3.1.1 Complete Closeout PM Checklist</b>					<b>320</b>		<b>\$69,784</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$69,784</b>

**11.3.1.2 Develop Lessons Learned**

*Memo: Estimator judgment and concurrence with the project team.*

E11W4	BEA			<i>U.C. per Hrs</i>		<i>1</i>	<i>\$119.29</i>					<i>119.29</i>
	MECHANICAL ENGINEERING		40.00	Hrs	40	E11W1	\$4,772	\$0	\$0	\$0	\$0	\$4,772
<b>Subtotal</b>							\$11,253	\$0	\$0	\$0	\$0	\$11,253
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
							0.00%					
<b>Subtotal Estimate</b>												\$11,253
<b>Escalation</b>							\$1,469	\$0	\$0	\$0	\$0	\$1,469
<b>Management Reserve</b>							\$4,452	\$0	\$0	\$0	\$0	\$4,452
<b>---Total 11.3.1.2 Develop Lessons Learned</b>					<b>90</b>		<b>\$17,174</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$17,174</b>

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>11.3.1.3 Prepare Final Project Closeout Report</b>												
<i>Memo: Estimator judgment and concurrence with the project team.</i>												
F35P1	PROJECT MANAGER	BEA	40.00	Hrs	40	F35P1	\$5,716	\$0	\$0	\$0	\$0	\$5,716
	Subtotal						\$5,716	\$0	\$0	\$0	\$0	\$5,716
	Sales Tax						\$0	\$0	\$0	\$0	\$0	\$0
	Markups	0.00%					\$0	\$0	\$0	\$0	\$0	\$0
	<b>Subtotal Estimate</b>											<b>\$5,716</b>
	Escalation						\$746	\$0	\$0	\$0	\$0	\$746
	Management Reserve						\$2,262	\$0	\$0	\$0	\$0	\$2,262
<b>---Total 11.3.1.3 Prepare Final Project Closeout Report</b>					<b>40</b>		<b>\$8,723</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$8,723</b>

**11.4.1 Provide Operational Training**

*Memo: Estimator judgment and concurrence with the project team.*

	Develop Training Plan & Written Test	BEA	1.00	Wk	40	P37Y5	\$3,304	\$0	\$0	\$0	\$0	\$3,304
	Trainer to Instruct the Below Identified Crew (Assume 10 Crew per Training Session)	BEA	1.00	Allow	45	P37Y5	\$3,717	\$0	\$0	\$0	\$0	\$3,717
U11GB	ELECTRICIAN	BEA	4.00	FTE	60	U11GB	\$4,078	\$0	\$0	\$0	\$0	\$4,078
F05GB	FAC OPERATIONS	BEA	8.00	FTE	120	F05GB	\$13,174	\$0	\$0	\$0	\$0	\$13,174

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>11.4.1 Provide Operational Training</b>												
<i>Memo: Estimator judgment and concurrence with the project team.</i>												
U16GB	FITTER	BEA			15	\$67.21	1008.15	0	0	0	0	1008.15
			6.00	FTE	90	U16J1	\$6,049	\$0	\$0	\$0	\$0	\$6,049
Subtotal							\$30,323	\$0	\$0	\$0	\$0	\$30,323
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							0.00%	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$30,323</b>
Escalation							\$3,957	\$0	\$0	\$0	\$0	\$3,957
Management Reserve							\$11,998	\$0	\$0	\$0	\$0	\$11,998
<b>---Total 11.4.1 Provide Operational Training</b>					<b>355</b>		<b>\$46,278</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$46,278</b>

<b>11.4.2 Provide Start-Up Coordination, Materials, &amp; Supplies</b>												
<i>Memo: Estimator judgment and concurrence with the project team.</i>												
Misc. Materials		BEA					0	0	1000	0	0	1000
			1.00	NM60 Allow			\$0	\$0	\$1,000	\$0	\$0	\$1,000
Subtotal							\$0	\$0	\$1,000	\$0	\$0	\$1,000
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0
Markups							0.00%	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												<b>\$1,000</b>
Escalation							\$0	\$0	\$131	\$0	\$0	\$131
Management Reserve							\$0	\$0	\$396	\$0	\$0	\$396
<b>---Total 11.4.2 Provide Start-Up Coordination, Materials, &amp; Supplies</b>					<b>0</b>		<b>\$0</b>	<b>\$0</b>	<b>\$1,526</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,526</b>

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>11.4.3 Provide Spares</b>												
<i>Memo: Estimator judgment and concurrence with the project team.</i>												
	BEA	U.C. per Allow		NM60			0		50000			50000
	Spare Parts Allowance for New Heat Recovery System		1.00	Allow			\$0	\$0	\$50,000	\$0	\$0	\$50,000
<i>Memo: Based on allowance only for spare parts.</i>												
	BEA	U.C. per Allow			20	\$101.57	2031.4		0			2031.4
	Incorporate New Spares into Warehouse		1.00	Allow	20	E48W1	\$2,031	\$0	\$0	\$0	\$0	\$2,031
<b>Subtotal</b>							\$2,031	\$0	\$50,000	\$0	\$0	\$52,031
<b>Sales Tax</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$52,031
<b>Escalation</b>							\$265	\$0	\$6,525	\$0	\$0	\$6,790
<b>Management Reserve</b>							\$804	\$0	\$19,784	\$0	\$0	\$20,588
<b>---Total 11.4.3 Provide Spares</b>					<b>20</b>		<b>\$3,100</b>	<b>\$0</b>	<b>\$76,309</b>	<b>\$0</b>	<b>\$0</b>	<b>\$79,409</b>

**12.1 System Maintenance (5 Years)**

*Memo: Estimated allowance is based on approximately 2% per year of the initial system installation costs. This allowance is to maintain the heat recovery system including system cleaning for corrosion, glycol solution changeout, and equipment repairs.*

	BEA	U.C. per Allow			300	\$68.47	20541		50000			70541
	Heat Recovery System Maintenance (Year 1)		1.00	Allow	300	U29GB	\$20,541	\$0	\$50,000	\$0	\$0	\$70,541
	BEA	U.C. per Allow			300	\$68.47	20541		50000			70541
	Heat Recovery System Maintenance (Year 2)		1.00	Allow	300	U29GB	\$20,541	\$0	\$50,000	\$0	\$0	\$70,541
	BEA	U.C. per Allow			300	\$68.47	20541		50000			70541
	Heat Recovery System Maintenance (Year 3)		1.00	Allow	300	U29GB	\$20,541	\$0	\$50,000	\$0	\$0	\$70,541
	BEA	U.C. per Allow			300	\$68.47	20541		50000			70541
	Heat Recovery System Maintenance (Year 4)		1.00	Allow	300	U29GB	\$20,541	\$0	\$50,000	\$0	\$0	\$70,541

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>
<b>12.1 System Maintenance (5 Years)</b>												
<i>Memo: Estimated allowance is based on approximately 2% per year of the initial system installation costs. This allowance is to maintain the heat recovery system including system cleaning for corrosion, glycol solution changeout, and equipment repairs.</i>												
	BEA	U.C. per Allow			300	\$68.47	20541	0	50000	0	0	70541
	Heat Recovery System Maintenance (Year 5)		1.00	Allow	300	U29GB	\$20,541	\$0	\$50,000	\$0	\$0	\$70,541
<b>Subtotal</b>							\$102,705	\$0	\$250,000	\$0	\$0	\$352,705
<b>Sales Tax</b>							\$0	\$0	\$15,000	\$0	\$0	\$15,000
<b>Markups</b>							\$0	\$0	\$0	\$0	\$0	\$0
<b>Subtotal Estimate</b>												\$367,705
<b>Escalation</b>							\$13,403	\$0	\$34,583	\$0	\$0	\$47,986
<b>Management Reserve</b>							\$40,638	\$0	\$104,854	\$0	\$0	\$145,492
<b>---Total 12.1 System Maintenance (5 Years)</b>					<b>1,500</b>		<b>\$156,746</b>	<b>\$0</b>	<b>\$404,436</b>	<b>\$0</b>	<b>\$0</b>	<b>\$561,182</b>

**12.2 System Operating Costs (5 Years)**

*Memo: Estimated allowance is based on estimator's judgment of the approximate number of identified yearly reactor outages when the system would be shut down and started back up. The identified unit hours would cover system operators, procedure records, and report development.*

	BEA	U.C. per Shut Dwn			20	\$68.47	1369.4	0	0	0	0	1369.4
	Heat System Shut Down for Reactor Shut Down (Year 1)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216
	BEA	U.C. per Shut Dwn			20	\$68.47	1369.4	0	0	0	0	1369.4
	Heat System Shut Down for Reactor Shut Down (Year 2)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216
	BEA	U.C. per Shut Dwn			20	\$68.47	1369.4	0	0	0	0	1369.4
	Heat System Shut Down for Reactor Shut Down (Year 3)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216
	BEA	U.C. per Shut Dwn			20	\$68.47	1369.4	0	0	0	0	1369.4
	Heat System Shut Down for Reactor Shut Down (Year 4)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216
	BEA	U.C. per Shut Dwn			20	\$68.47	1369.4	0	0	0	0	1369.4
	Heat System Shut Down for Reactor Shut Down (Year 5)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216

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Cost Estimating

Material Costs where applicable include Idaho State Sales Tax

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**DETAIL ITEM REPORT**

Project Name: **RTC Waste Heat Recovery**

Client: **C. P. Ischay**  
 Prepared By: **A. W. Miller / S. N. Wasley**  
 Estimate Type: **Class-5**

Project Location: **ATR**  
 Estimate Number: **7B50**

<u>Code</u>	<u>Description</u>	<u>Contractor</u>	<u>Qty</u>	<u>UOM</u>	<u>Hrs</u>	<u>Resource</u>	<u>Labor</u>	<u>Equipment</u>	<u>Material</u>	<u>Subcontractor</u>	<u>Other</u>	<u>TOTAL</u>	
<b>12.2 System Operating Costs (5 Years)</b>													
<i>Memo: Estimated allowance is based on estimator's judgment of the approximate number of identified yearly reactor outages when the system would be shut down and started back up. The identified unit hours would cover system operators, procedure records, and report development.</i>													
	BEA	<i>U.C. per Shut Dwn</i>			20	\$68.47	1369.4	0	0	0	0	1369.4	
	Heat System Start-up for Reactor Start-up (Year 1)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216	
	BEA	<i>U.C. per Shut Dwn</i>			20	\$68.47	1369.4	0	0	0	0	1369.4	
	Heat System Start-up for Reactor Start-up (Year 2)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216	
	BEA	<i>U.C. per Shut Dwn</i>			20	\$68.47	1369.4	0	0	0	0	1369.4	
	Heat System Start-up for Reactor Start-up (Year 3)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216	
	BEA	<i>U.C. per Shut Dwn</i>			20	\$68.47	1369.4	0	0	0	0	1369.4	
	Heat System Start-up for Reactor Start-up (Year 4)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216	
	BEA	<i>U.C. per Shut Dwn</i>			20	\$68.47	1369.4	0	0	0	0	1369.4	
	Heat System Start-up for Reactor Start-up (Year 5)		6.00	Shut Dwn	120	U29GB	\$8,216	\$0	\$0	\$0	\$0	\$8,216	
Subtotal							\$82,164	\$0	\$0	\$0	\$0	\$82,164	
Sales Tax							\$0	\$0	\$0	\$0	\$0	\$0	
Markups							0.00%	\$0	\$0	\$0	\$0	\$0	
<b>Subtotal Estimate</b>												<b>\$82,164</b>	
Escalation							\$10,722	\$0	\$0	\$0	\$0	\$0	\$10,722
Management Reserve							\$32,510	\$0	\$0	\$0	\$0	\$0	\$32,510
<b>---Total 12.2 System Operating Costs (5 Years)</b>					<b>1,200</b>		<b>\$125,397</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$125,397</b>	

<b>Subtotal</b>	<b>RTC Waste Heat Recovery - INDIRECT</b>						<b>\$3,828,740</b>	<b>\$174,671</b>	<b>\$1,036,951</b>	<b>\$448,739</b>	<b>\$0</b>	<b>\$5,489,101</b>	
Sales Tax							\$0	\$0	\$58,859	\$0	\$0	\$58,859	
Markups							\$327,725	\$81,023	\$379,734	\$210,878	\$0	\$999,361	
<b>Subtotal Estimate</b>												<b>\$6,547,320</b>	
Escalation							\$389,813	\$23,703	\$148,794	\$61,146	\$0	\$0	\$623,456
Management Reserve							\$1,591,197	\$97,789	\$568,518	\$252,267	\$0	\$0	\$2,509,772
<b>Total RTC Waste Heat Recovery - INDIRECT</b>					<b>41,457</b>		<b>\$6,137,475</b>	<b>\$377,186</b>	<b>\$2,192,856</b>	<b>\$973,030</b>	<b>\$0</b>	<b>\$9,680,547</b>	

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Material Costs where applicable include Idaho State Sales Tax

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