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FINAL
ENVIRONMENTAL MONITORING PLAN

DE-FC22-Q1PC 90544

HEALY CLEAN COAL PROJECT
HEALY, ALASKA

ALASKA INDUSTRIAL DEVELOPMENT
AND EXPORT AUTHORITY

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PREPARED BY
STONE & WEBSTER ENGINEERING CORPORATION

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TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	EXECUTIVE SUMMARY	1-1
2.0	INTRODUCTION	2-1
2.1	PURPOSE	2-1
2.2	BACKGROUND AND HISTORY OF THE PROJECT TECHNOLOGIES	2-1
2.2.1	TRW Combustor Technology	2-2
	2.2.1.1 Healy Coal Firing at TRW Cleveland Test Facility	2-2
	2.2.1.2 Design Verification Tests	2-2
2.2.2	Joy Spray Dryer Absorber (SDA) Technology	2-3
2.2.3	Integrated Combustion/Emission Control System	2-3
2.3	PROJECT SITE	2-4
2.4	PROJECT SCHEDULE	2-5
3.0	PROJECT/PROCESS DESCRIPTION	3-1
3.1	PROJECT SITE AND FACILITIES DESCRIPTION	3-1
3.1.1	Project Site Description	3-1
	3.1.1.1 Climatic Conditions	3-1
	3.1.1.2 Air Quality	3-2
	3.1.1.3 Scenic Resources	3-2
	3.1.1.4 Surface Water	3-2
	3.1.1.5 Ground Water	3-3
	3.1.1.6 Floodplains and Wetlands	3-4
	3.1.1.7 Ecological Resources	3-4
	3.1.1.8 Aquatic Resources	3-5
	3.1.1.9 Threatened and Endangered Species	3-5
3.1.2	Coal Resource Description	3-5
3.2	OPERATIONS PROCESS	3-6

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Title</u>	<u>Page</u>
3.3	EMISSIONS AND DISCHARGES	3-7
3.3.1	Atmospheric Emissions and Control System	3-7
3.3.1.1	Atmospheric Emissions	3-7
3.3.1.2	Atmospheric Emissions Control System	3-9
3.3.2	Aqueous Discharges and Control System	3-10
3.3.2.1	Effluent	3-10
3.3.2.2	Aqueous Discharge Control System	3-11
3.3.3	Solid Waste Discharges and Control System	3-12
3.3.3.1	Solid Wastes	3-12
3.3.3.2	Toxic/Hazardous Materials	3-13
4.0	COMPLIANCE MONITORING	4-1
4.1	WASTEWATER EFFLUENTS	4-1
4.1.1	Purpose	4-1
4.1.2	Regulatory Authority	4-1
4.1.3	Compliance Monitoring Objectives	4-1
4.1.4	Operating Characteristics During Compliance Monitoring	4-1
4.1.5	Wastewater Effluent Compliance Monitoring Program	4-1
4.1.5.1	Streams to be Monitored and Conditions which Appl	4-5
4.1.5.2	Sampling and Analytical Techniques	4-2
4.1.5.3	Quality Assurance Plan	4-4
4.2	AIR EMISSIONS	4-5
4.2.1	Purpose	4-5
4.2.2	Regulatory Authority	4-5
4.2.3	Compliance Monitoring Objectives	4-5
4.2.4	Operating Characteristics During Compliance Monitoring	4-5
4.2.5	Air Emissions Compliance Monitoring Program	4-6
4.2.5.1	Air Streams to be Monitored	4-6
4.2.5.3	Sampling and Analytical Techniques	4-6
4.3	VISIBILITY/AIR QUALITY MONITORING	4-7
4.3.1	Purpose	4-7
4.3.2	Regulatory Authority	4-8
4.3.3	Monitoring Objectives	4-8

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Title</u>	<u>Page</u>
5.0	SUPPLEMENTAL MONITORING	5-1
5.1	HCCP TEST PROGRAM	5-1
5.2	HAZARDOUS AIR POLLUTANTS (HAPs)	5-1
5.2.1	Purpose of Supplemental HAPs Monitoring	5-2
5.2.2	HAPs Monitoring Objectives	5-2
5.2.3	Operating Conditions During HAPs Monitoring	5-2
5.2.4	HAPs Monitoring Program	5-2
5.2.4.1	Parameters to be Monitored	5-2
5.2.4.2	Sampling and Analytical Techniques	5-3
5.2.4.3	Monitoring of Process Parameters	5-3
6.0	DATA MANAGEMENT AND REPORTING	6-1
6.1	DATA MANAGEMENT	6-1
6.1.1	Introduction	6-1
6.1.2	Data Entry	6-1
6.1.3	Data Verification	6-1
6.2	REPORTING	6-1
6.2.1	Report Format, Content, and Frequency	6-1
6.2.2	Monthly, Quarterly, and Annual Reports	6-1
7.0	REFERENCES	7-1
8.0	ABBREVIATIONS AND ACRONYMS	8-1

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
2-1	Site Plan	2-6

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
3-1	Existing Air Quality for the Healy Area as Measured at the Park Monitoring Station During the 12-month Period from September 1990 through August 1991	3-14
3-2	Historical Water Quality Data from the Nenana River	3-15
3-3	Range of On-Site Well Water Quality, Major Constituents (Dissolved)	3-16
3-4	Typical Analysis of the Composition of Run-of-Mine Coal, Waste Coal, and Blended Performance Coal for the Healy Clean Coal Project (Expected to be Received at the HCCP Site)	3-17
4-1	Compliance Monitoring Summary	4-9
5-1	Sampling Methods for Hazardous Air Pollutants (HAPs) Emissions	5-4
5-2	Analytical Methods for Hazardous Air Pollutants (HAPs) Emissions	5-5
6-1	Facility Operating Report	6-4

SECTION 1

EXECUTIVE SUMMARY

1.0 EXECUTIVE SUMMARY

This Environmental Monitoring Plan (EMP) provides the mechanism to evaluate the integrated coal combustion/emission control system being demonstrated by the Healy Clean Coal Project (HCCP) as part of the third solicitation of the U.S. Department of Energy (DOE) Clean Coal Technology Demonstration Program (CCT-III). The EMP monitoring is intended to satisfy two objectives: 1) to develop the information base necessary for identification, assessment, and mitigation of potential environmental problems arising from replication of the technology and 2) to identify and quantify project-specific and site-specific environmental impacts predicted in the National Environmental Policy Act (NEPA) documents (Environmental Impact Statement and Record of Decision).

The EMP contains a description of the background and history of development of the project technologies and defines the processes that will take place in the combustion and spray dryer absorber systems, including the formation of flash-calcined material (FCM) and its use in sulfur dioxide (SO₂) removal from the flue gases. It also contains a description of the existing environmental resources of the project area.

The EMP includes two types of environmental monitoring that are to be used to demonstrate the technologies of the HCCP: compliance monitoring and supplemental monitoring. Compliance monitoring activities include air emissions, wastewater effluents, and visibility. Monitoring of these resources provide the data necessary to demonstrate that the power plant can operate under the required state and federal statutes, regulations, and permit requirements.

To the extent the Phase III Demonstration Test Program requires collection of environmental emissions data as part of performance testing, these additional data will be reported as EMP supplemental monitoring data. In addition, to the extent funds are available, a hazardous air pollutants (HAPs) test plan will be developed and HAPs will be monitored with the results reported as EMP supplemental monitoring data.

The data generated from the compliance and supplemental monitoring activities will be reviewed for completeness and accuracy. Problem areas encountered during the reporting period; monitoring techniques/procedures; quality assurance/quality control; and actual, anticipated, or possible solutions to identified problem areas will be identified. Each EMP report will cover compliance and supplemental monitoring progress, defining whether tests have been completed or are in progress, and contain test reports and summaries. The reports will also describe the status of permit compliance.

SECTION 2

INTRODUCTION

2.0 INTRODUCTION

2.1 PURPOSE

The Department of Energy (DOE) views the identification of environmental areas of concern and the development of an information base for the assessment and mitigation of impacts associated with the replication of Clean Coal Technology projects to be a fundamental purpose of the demonstration project. As a result, DOE requires the development of an Environmental Monitoring Plan (EMP) as part of each Clean Coal Technology (CCT) Demonstration Program project. Monitoring is to be conducted which identifies the environmental constraints and/or advantages of potential commercialization of the demonstration technology. In addition, environmental monitoring may be necessary to quantify the project- and site-specific environmental impacts predicted in the National Environmental Policy Act (NEPA) documentation, to detect any environmental and health problems requiring remedial action, and to confirm the performance of environmental mitigation measures implemented as part of the project. This EMP provides the mechanism for DOE to evaluate the environmental aspects of the integrated coal combustion/emission control system being demonstrated by the Healy Clean Coal Project (HCCP) as part of the third solicitation of the Clean Coal Technology Demonstration Program (CCT-III). It includes two types of monitoring: compliance and supplemental.

The applicable compliance monitoring activities will provide the data necessary to demonstrate that the power plant can operate under the required state and federal statutes, regulations, and permit requirements. Supplemental monitoring activities will provide the environmental data necessary, in addition to the compliance monitoring, to evaluate the environmental effectiveness of the technologies integrated into the design of the HCCP.

The supplemental monitoring data will be gathered during the HCCP Phase III Demonstration Test Program. The Test Program will include the tests necessary to ensure that equipment operates to the standards and guarantees of equipment manufacturers and the tests used to evaluate the integrated combustion/emission control technologies at various operating conditions. The waste streams to be monitored during supplemental monitoring will be identified when the HCCP Phase III Demonstration Test Program is prepared. These streams will include, but not necessarily be limited to, gaseous emissions of nitrous oxides (NO_x), sulfur dioxide (SO_2), total suspended particulates (TSP), carbon monoxide (CO), and carbon dioxide (CO_2); thermal water discharges from the once-through cooling circulating water system; operational wastewater discharges from the HCCP wastewater treatment system; and solid waste from the slag, bottom ash, and flyash systems.

2.2 BACKGROUND AND HISTORY OF THE PROJECT TECHNOLOGIES

The background and history of the TRW and Joy technologies are presented separately, followed by a discussion of the integrated combustion/emission control system.

2.2.1 TRW Combustor Technology

The research and development of the TRW Entrained Combustion System was initiated in 1975. Small-scale coal injection experiments were initially conducted to establish fluidization and flow injection parameters. Coal-fired combustion tests followed, using both swirling and tangential preheated air injection at atmospheric and pressurized conditions. Acceptable mixing and combustion conditions were achieved with slag being centrifuged to the chamber wall.

2.2.1.1 Healy Coal Firing at TRW Cleveland Test Facility

TRW conducted a test burn of two Alaskan coals at the TRW Cleveland Test Facility in support of the HCCP, as part of the CCT-III Program. The tests were conducted to verify that the candidate HCCP coals could be successfully fired in the TRW coal combustor, to provide data required for scale-up to the utility size requirements, and to produce sufficient FCM for spray dryer tests to be conducted by Joy at Niro's Copenhagen, Denmark facility. The tests demonstrated that both Alaskan coals could be reliably burned, provided the data required for scale-up, and produced FCM material from Alaskan limestone.

During the test program, over 350 tons of Usibelli Coal Mine, Inc. (UCM) supplied Healy coal were handled at the test facility. Coal flow rates as high as 3,800 lb/hr were demonstrated using Healy performance coal. This corresponds to a heat input of 30 million British thermal units per hour (MMBtu/hr), assuming a coal higher heating value (HHV) of 7,932 Btu/lb.

The Healy coal test burns in the TRW Cleveland Test Facility demonstrated that the Healy performance coal and the Two Bull Ridge coal can be effectively burned in the TRW coal combustion system. Good to excellent combustion performance was achieved with both coal sources as inferred by carbon losses. Slag capture was excellent with the performance coal (85 percent). Slag capture with the Two Bull Ridge coal was less than for the performance coal (45 percent). This lower percentage is attributed directly to the higher T_{250} (2,900 vs. 2,750°F) of the Two Bull Ridge coal. The larger combustor size and higher preheat temperature (650 vs 400°F) that will be present at the HCCP is expected to accommodate the Two Bull Ridge coal. Low NO_x emissions were also demonstrated. Finally, the tests demonstrated that FCM for the Joy spray dryer SO_2 capture system can be produced by the TRW Coal Combustion System.

2.2.1.2 Design Verification Tests

The design verification tests (DVTs) were performed as part of the total design of the TRW Coal Combustion System for the HCCP, primarily to mitigate the uncertainties associated with two critical subsystems, the precombustor and the direct coal feed system. The risks associated with the operation and scalability of the slagging stage and the limestone feed system were considered by TRW to be significantly less, hence DVTs on these subsystems were not performed. The results of the DVTs verified the design and performance of the precombustor, and the concept and arrangement of the direct coal feed system were acceptable for the HCCP application (TRW 1993).

2.2.2 Joy Spray Dryer Absorber (SDA) Technology

The Joy Flue Gas Desulfurization (FGD) System consists of a spray dryer absorber (SDA), a pulse jet filter (PJF), a reagent recycle system, a dry injection system, and a product transport system. These technologies have been previously incorporated into power plants. However, the FGD technology utilizing FCM in the system had not been demonstrated on a commercial scale. The testing of FCM produced during the TRW combustor tests in Cleveland was conducted in the FGD system at the Niro pilot plant facility in Copenhagen, Denmark during September 1991.

The purpose of the tests was to investigate the ability of the FCM (collected from the TRW combustor tests of Alaskan coal) to remove SO_2 in the SDA System. More specifically, the purpose of the tests was to verify the projected limestone consumption and SO_2 removal from the HCCP emissions. Furthermore, the efficiencies of three FCM reactivation methods were evaluated. Those methods were to suspend the FCM in water followed by: 1) simple agitation, 2) heating, and 3) abrasive grinding.

The absorption tests were performed using simulated flue gas outlet conditions, determined during the test run at the TRW Cleveland Test Facility, at various operating modes for the FGD system. The findings of the tests were: 1) the FCM can be used as an absorbent in the Joy SDA system, 2) the utilization of the FCM depends on the SDA outlet temperature, with lower temperatures yielding better utilization, 3) the FCM can be activated by either grinding or heating, and 4) the efficiency with regard to SO_2 removal in the TRW combustor system and the Joy SDA system was found to be much better than expected.

2.2.3 Integrated Combustion/Emission Control System

As discussed in the preceding sections, each demonstration technology to be included in the integrated combustion/emission control system was independently tested under conditions proposed for the HCCP. The data collected from those preliminary tests indicate that the integration of these air pollution control systems will result in reduced emissions of SO_2 , NO_x , and particulate matter. It is the integration of these technologies that will be demonstrated at the HCCP.

The HCCP will be an integrated system for the combustion of coal and control of all emissions. The slagging combustor, furnace, SDA, and pulse jet fabric filter (baghouse) will all play a part in reducing emissions from the plant. The slagging combustor will inhibit NO_x production, generate FCM for capture of SO_2 , and reduce the potential amount of particulate matter by up to 80 percent. The furnace will further contribute to the NO_x reduction process and begin the SO_2 removal process. The SDA and the baghouse will complete the collection of particulate matter and SO_2 .

Removal of any single component in the integrated system would result in ramifications on other components. For example, removal of the slagging combustor and replacement with low NO_x burners would increase the ash loading out of the furnace by nearly 400 percent; elimination of the production of FCM would require the conversion of the SDA System to a conventional lime

spray dryer system and possibly increase NO_x emissions.

2.3 PROJECT SITE

The HCCP will be located on the southern edge of the Interior Basin of Alaska, approximately 80 miles southwest of Fairbanks and 250 miles north of Anchorage. The facility will be built adjacent to the existing 25-MW Healy Unit No. 1 conventional pulverized-coal-fired unit owned and operated by Golden Valley Electric Association, Inc. (GVEA). The project site is in a rural setting along the east bank of the Nenana River, about 2.5 miles east-southeast of the intersection of the Healy Spur Highway and the George Parks Highway. Healy Unit No. 1 has been operating as a baseload power plant since November 1967, and has an expected operating life until at least 2007. The 65-acre site is approximately 4 miles north of the nearest border of Denali National Park and Preserve (DNPP) and about 8 miles north of the entrance to that park. The Suntrana Spur of the Alaska Railroad passes at the south border of the HCCP site. Access to the site is provided by the Suntrana Spur and the Healy Spur Highway. Coal will be supplied from the UCM coal mine, located about 4 miles north of the HCCP site, using the existing haul road between the mine and Healy Unit No. 1.

The Anchorage-Healy portion of the Anchorage-Fairbanks Transmission Intertie terminates at the substation located on GVEA property. The present Healy Unit No. 1 is connected to this substation. Electricity from the HCCP will be purchased by GVEA and distributed to the Alaska Railbelt region through the existing substation to this intertie.

The land use classification for the HCCP site is industrial. The majority of the area immediately around the HCCP building site has sustained surface alteration in the construction and operation of the existing Healy Unit No. 1 generating plant, support buildings, coal and ash storage areas, cooling water intake/discharge structures, roads, electric substation, and transmission lines. A site plan for the HCCP is shown in Figure 2-1.

2.4 PROJECT SCHEDULE

The following presents the major HCCP scheduled activities.

PROJECT ACTIVITIES	DATE
<u>Milestones of HCCP</u>	
Began Technology Evaluation	March 1, 1989
Proposal Submitted to DOE	August 24, 1989
DOE Project Selection	December 27, 1989
DOE Cooperative Agreement	April 21, 1990
Initial Operation/Commence Two Year Demonstration Program	January 1, 1997
<u>Environmental Schedule for the HCCP</u>	
DOE Proposal Support	December 31, 1989
Permit & Environmental Plan	February 15, 1990
Special Studies	May 10, 1993
Environmental Information Volume (EIV)	
Draft	February 1, 1991
Second Draft/Final	September 15, 1991
Air Quality Permit to Operate Issued	March 15, 1993
<u>National Environmental Policy Act (NEPA)</u>	
Preliminary Draft Environmental Impact Statement	May 25, 1992
Draft Environmental Impact Statement (DEIS)	November 13, 1992
Final Environmental Impact Statement (EIS)	December 24, 1993
<u>Environmental Monitoring Plan (EMP)</u>	
Draft to DOE	November 30, 1993
DOE Review/Approval	February 15, 1994
Complete Phase III Demonstration Test Plan	July 1, 1996
Final EMP Submitted to DOE	August 1, 1996

NOTES:

1. FOR TRANSFORMER AREA FENCE DETAILS SEE EC-21 SERIES.
2. RAISE EXISTING HEALY ROAD TO EL 1271.0' (BY UCM).
3. THE FUEL OIL TANK AND SECONDARY CONTAMMENT WORK IS BY GOLDEN VALLEY ELEC. ASSN. (GVEA).

LEGEND:

- • • MCP SITE BOUNDARY (SIGNS MOUNTED ON POSTS STATING "PROPERTY OF GVEA NO TRESPASSING" PLACED AT 100' INTERVALS) BY THE CONTRACTOR.
- x - MCP SITE BOUNDARY CHAINLINK FENCE (SIGNS MOUNTED ON FENCE STATING "PROPERTY OF GVEA NO TRESPASSING" PLACED AT 300' INTERVALS ALONG HEALY SPUR HIGHWAY) FURNISHED AND INSTALLED BY THE CONTRACTOR.
- x x - SUBSTATION FENCE.
- - - - - BERM
- - - - - DITCH

HEALY CLEAN COAL PROJECT ALASKA INDUSTRIAL DEVELOPMENT AND EXPORT AUTHORITY	
SITE PLAN	
Stone & Webster Engineering Corporation	FIGURE 2-1

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SECTION 3
PROJECT/PROCESS DESCRIPTION

3.0 PROJECT/PROCESS DESCRIPTION

This section of the EMP provides information about the project site and facilities, the operations processes, and the emissions and discharges.

3.1 PROJECT SITE AND FACILITIES DESCRIPTION

3.1.1 Project Site Description

The HCCP site is near the confluence of Healy Creek and the Nenana River near the northern base of the Alaska Range. The topography surrounding the HCCP site is variable. West of the Nenana River, the terrain is gently rolling with vegetative cover consisting primarily of resin birch and immature quaking aspen communities. South of Healy Creek are shallow moraine and outwash gravel terraces, supporting low shrub and herbaceous tundra, which is backed up to the lower foothills of the Alaska Range. The dominant landform near the HCCP site is the high plateau to the northeast. Steep faces of this plateau rise above the Nenana River and Healy Creek and support coniferous and deciduous forest types alternating with large gravel slides. The top of the plateau has large areas that support low shrub and herbaceous vegetation.

3.1.1.1 Climatic Conditions

The climate at Healy, Alaska is characterized as cold and dry, with large differences between winter and summer air temperatures. The temperature changes are conditioned by the response of the land mass to the changes in the solar heat received during the year. The sun is above the horizon at Healy for 18 to 21 hours per day during the longer summer months, with associated daytime temperatures occasionally reaching highs in the 70s (°F). In contrast, daylight from November to early March ranges from 10 to less than 4 hours per day. The lack of solar heating during the winter results in very cold temperatures that regularly fall below 0°F. A major contributing factor to the cold temperatures is the persistent winter snow that reflects much of the solar energy during the sun's limited appearance. Average monthly high temperatures in the area range from 10°F in the winter to 65°F in the summer, and average monthly low temperatures range from -5°F in the winter to 45°F in the summer.

The area has low annual precipitation, most of which occurs during the warm summer months. Precipitation data, collected at the UCM Poker Flats Mine, reveal that the maximum precipitation recorded during a single month is 5.7 inches, and the maximum annual rainfall during any 1-year period is 19.3 inches. Unofficial records suggest that average annual precipitation is approximately 10.5 inches and that snowfall in the Healy area is about 60 inches. The maximum 10-year 24-hour rainfall event has been established to be 2.0 inches.

Because of the complex terrain (mountainous) features of the Alaska Range to the south of the HCCP site, substantial differences in wind speed and direction occurs between the HCCP and neighboring areas. Air masses separated by the high terrain frequently produce strong pressure gradients and consequent high wind episodes. High winds from the south-southeast frequently occur during winter; wind speed gusts in excess of 100 mph are known to occur in the Healy area. When the wind speed is light, local winds often flow along the drainage axes of Healy

Creek and the Nenana River.

3.1.1.2 Air Quality

Air quality in the vicinity of the HCCP site is classified as being very good, with ambient concentrations of all air pollutants being well below national ambient air quality standards (NAAQS). The Healy area is sparsely populated, and the only existing major industrial source of regulated atmospheric pollutants is the Healy Unit No. 1 coal-fired power plant. Concentrations of SO₂, NO_x, and PM₁₀ (particulate matter ≤ 10 μm, inhalable) monitored by Alaska Industrial Development and Export Authority (AIDEA) at the Park Monitoring Station indicated that all concentrations are well below the applicable NAAQS. Validated air quality data collected at the station are summarized in Table 3-1.

3.1.1.3 Scenic Resources

The HCCP will be constructed in a region of abundant scenic beauty. Situated along the northern base of the Alaska Range, the region is famous for scenic resources, geological formations, plants, and wildlife that attract tourists from all over the world. The scenic quality of the landscape in Denali National Park and Preserve (DNPP), the northern border of which is 4 miles south of the HCCP site, is outstanding. On days when it is not cloudy, Mount McKinley and the Mount McKinley Group's peaks are visually spectacular because they rise from the relative lowlands of the Interior Basin of Alaska rather than from a range of uniformly high mountains. However, neither Mount McKinley or the Mount McKinley Group's peaks are visible from Healy.

Another area of important scenic resources in the vicinity of the HCCP is the Nenana River Valley. The physical setting of the river, with sculptured glacial valley walls, provides distinct viewing opportunities. The Nenana River Valley itself is flat and U-shaped, with walls rising from 2,000 to 3,000 feet above the river. The river descends from 2,100 feet above mean sea level (msl) just north of Cantwell to about 1,250 feet msl at Healy. In the Nenana River Gorge, that part of the Nenana River Valley between DNPP and Healy, the river descends approximately 460 feet in about 5 miles. This descent provides some of the local area's most spectacular scenery.

3.1.1.4 Surface Water

Hydrologic Setting

The HCCP site is on a gravel terrace of the Nenana River immediately downstream from its confluence with Healy Creek. Therefore, the hydrologic characteristics that affect the surface water at the HCCP site are influenced by both the Nenana River and Healy Creek and their respective drainage areas. The Nenana River originates on the southern side of the Alaska Range at the Nenana Glacier. The river flows west from the glacier, then north through the Alaska Range for approximately 115 miles before entering the Tanana River at Nenana, Alaska. A major tributary of the Nenana River is the Yanert Fork (with its source at the Yanert Glacier), which enters the Nenana River near DNPP. Healy Creek, Jack River, Windy Creek, Riley

Creek, and several other smaller streams also contribute runoff to the Nenana River system. The drainage basin of the Nenana River upstream of the HCCP site is approximately 1,910 square miles.

The hydrological cycle of the Nenana River is best explained by discussing the source of the river and general climatological conditions. Maximum annual runoff from the Nenana and Yanert glaciers normally occurs during July and August. Each year, as temperatures in the mountains drop below freezing, glacial flows decrease. During October or November, the rivers generally freeze over and do not become free of ice again until late April or May. During that period of ice cover, glacial flow is at a minimum, so the primary source of water for the river is ground water. Because the groundwater flow is nearly constant, little variation in discharge occurs during the winter. When the ice break-up occurs in the spring, flow again increases due to surface runoff and glacial melt.

Surface Water Quantity and Quality

The mean annual flow of the Nenana River at the HCCP site, based on the U.S. Geological Survey (USGS) sampling period of record (1951-1979), is 3,500 cubic feet per second (cfs). The minimum flow of record is 190 cfs and the maximum flow of record is 46,800 cfs. Water temperatures in the Nenana River vary from a minimum of 32°F to a maximum of 55°F. The monthly summer mean water temperature varies from 47 to 51°F, while the winter monthly mean is approximately 32°F. Total suspended sediment (TSS) measurements in the Nenana River range from a maximum value of 3,060 to 3,800 milligrams per liter (mg/l) during June and July (corresponds to the period of maximum mean glacial water discharge), to a minimum value of about 17 mg/l during September. Water quality data for the Nenana River, as determined by the USGS, are presented in Table 3-2.

3.1.1.5 Ground Water

Hydrologic Setting

The gravel terrace where the HCCP will be sited is a depositional surface of alluvial deposits of rock and debris and outwash gravel that have filled the Nenana River Valley. The terrace is several feet above normal river level and exhibits relatively little relief, with elevations between about 1,255 and 1,265 feet. Bedrock at the HCCP site is unconsolidated sandstone, siltstone, and claystone interbedded with coal. The bedrock immediately below the building location is a gravelly sandstone. These strata dip steeply in a northerly direction.

The major difference between the alluvial gravels and the underlying formation is their relative density. The bedrock formations are noticeably more dense than the surficial deposits. The deposits forming the terrace are unconsolidated silts, sands, and gravels with some cobbles included. The terrace deposits and the bedrock are good base materials for supporting the project structures on spread footings or mats. The near-surface deposits at the HCCP site are relatively dense and mostly free-draining. As with most alluvial deposits, the mechanical properties and distribution of sands, gravels, and silts at the site are variable, both vertically and horizontally. This is also true of the underlying gravelly sandstone bedrock. As a result, there

are a number of "water bearing" zones. Ground water is relatively near to the ground surface and is typically above or approximates the elevation of the Nenana River. The general groundwater gradient is downstream.

Groundwater Quantity and Quality

According to recent findings of AIDEA's HCCP geotechnical investigation, the gravels of the surface alluvium constitute an extensive aquifer with generally good permeability and abundant water. The surface water, however, is less desirable for power plant operations than is the deep water or the river water. A combination of river water and deep well water will be used for HCCP and Healy Unit No. 1. Table 3-3 contains analytical data representative of the deep groundwater quality.

3.1.1.6 Floodplains and Wetlands

The National Wetlands Inventory has identified wetlands along the Nenana River and its tributary streams. No wetlands occur on the immediate construction site of the HCCP. The site is not within the 100-year floodplain of the Nenana River (Grey and Lehner 1983, AIDEA 1991). Fill was used during the construction of Healy Unit No. 1 to elevate the site above the floodplain, and the site no longer contains the vegetation, soil, or hydrologic characteristics of a wetland as defined in the Corps (1987) Wetlands Delineation Manual.

3.1.1.7 Ecological Resources

Vegetation

The vegetation of the Healy area occurs as a mosaic of boreal community types. These vegetative community types are related to the diverse topography, soils, geology, and microclimate of the area. The area can be divided into the following three ecological zones [based on more extensive descriptions in Woodward-Clyde (1978), Tarbox et al. (1979), and AIDEA (1991)]. The first zone is located immediately northeast of the site, a steep escarpment rises from the floodplain of the Nenana River to a high plateau. The plateau is dominated by natural mixed resin birch, spruce, and shrub tundra communities. The slopes facing south and west of the escarpment support diverse plant communities apparently because of variations in the slope, aspect, and soils and the occurrence of land slides. Vegetation ranges from a mixture of grasses and pioneer trees on recent slide areas, through a variety of shrub vegetation, to open forest on the higher slopes where the slope angle is shallower and the soils are deeper.

The second zone is high terraces of tundra located south of Healy Creek and east of the Nenana River. This zone includes low shrub and herbaceous tundra on the terrace surfaces with alder and white spruce woodlands on the intermediate slopes. The third zone, located west of the Nenana River, is an area of rolling topography with the community of Healy, railroads, roads, and other disturbances. Because of these disturbances and fires, much of this area is presently in scrub successional vegetation. Other parts of the area contain tundra-like vegetation and forest.

The HCCP site is a highly disturbed and devegetated area adjacent to the existing Healy Unit No. 1 power plant. The site vicinity includes a mixture of disturbed areas, formerly disturbed areas with recovering vegetation, and natural vegetation.

Wildlife

Mammals occurring in the vicinity of the site include grizzly bears, caribou, moose, Dall sheep, wolves, red foxes, marten, lynx, wolverines, and snowshoe hares (Woodward-Clyde 1978, Tarbox et al. 1979, Elliott 1984). Little habitat exists for shorebirds or waterfowl in the vicinity of the site, but mallard, American widgeon, green-winged teal, bufflehead, spotted sandpiper, and northern phalarope have been observed to nest in the area (AIDEA 1991). Many species of upland birds and raptors also occur in the area, including a relatively high density of golden eagles (Roseneau and Springer 1991).

3.1.1.8 Aquatic Resources

Five species of fish have been documented in the Nenana River near the HCCP site: round whitefish, longnose sucker, burbot, arctic grayling, and slimy sculpin. The density of aquatic macroinvertebrates (i.e., river bottom and other planktonic organisms) was found to be about 35 organisms per square meter and was the lowest of any fauna studied (Tarbox et al. 1979). No obvious effect of the thermal discharge from the Healy Unit No. 1 on river bottom fauna density, composition, or distribution is evident.

3.1.1.9 Threatened and Endangered Species

The U.S. Fish and Wildlife Service was concerned that two threatened or endangered species may exist in the HCCP area: the threatened arctic peregrine falcon, which could occur as a migrant, and the endangered American peregrine falcon, which could be a resident (USFWS 1991). An investigation conducted by AIDEA found neither of these threatened species presently nest or live in the area (Roseneau and Springer 1991). The U.S. Fish and Wildlife Service also reported that no listed or candidate threatened or endangered plant species were known to occur in the area of the HCCP site (USFWS 1991).

3.1.2 Coal Resource Description

The HCCP will be fueled with low-sulfur coal from the UCM coal mine. Run-of-mine UCM coal (coal that is currently used at Healy Unit No. 1) blended with waste coal will be the primary fuel. Waste coal, as defined in this EMP, will be either low-grade coal or overburden- or underburden-contaminated coal (uncovered during mining of run-of-mine coal) that is normally spoiled and not used as a fuel source. A typical blend of run-of-mine coal and waste coal is referred to as "blended performance coal" and consists of approximately equal amounts of both. A compositional analysis of typical run-of-mine coal, waste coal, and blended performance coal for the HCCP is shown in Table 3-4. The carbon content and, consequently, the heating value are greater for the run-of-mine coal, while the waste coal contains much more ash and consequently a lower heating value.

3.2 OPERATIONS PROCESS

The TRW Combustion System is designed to be installed on the boiler furnace to provide efficient combustion, maintain effective limestone calcination, and minimize the formation of NO_x emissions. The main system components will include a precombustor, main combustor, slag recovery section, pulverized coal and limestone feed system, and a combustion air system. The coal-fired precombustor will be used to increase the air inlet temperature to the slagging state for optimum slagging performance. It will burn approximately 25 to 50 percent of the total coal input to the combustor. Combustion will occur in several stages to minimize NO_x formation.

The slagging stage, or main slagging combustor, will consist of a water-cooled cylinder that will be sloped toward a slag opening. The remaining coal will be injected axially into the combustor, rapidly entrained by the swirling precombustor gases and additional air flow, and burned under substoichiometric (fuel-rich) conditions for NO_x control. The ash contained in the burning coal will form drops of molten slag and accumulate on the water-cooled walls as a result of the centrifugal force caused by the swirling gas flow. The molten slag will be driven by aerodynamic and gravity forces through a slot into the bottom of the slag recovery section where it will fall into a water-filled tank and will be removed by the slag removal system. Approximately 80 percent of the ash in the coal will be removed as molten slag.

NO_x emissions will be reduced in the coal combustion process by use of the fuel and air-staged combustor system and a boiler that controls fuel and thermal-related conditions that inhibit NO_x formation. The slagging combustor/boiler system will also function as a limestone calciner and first stage SO₂ removal device in addition to its heat recovery function. Secondary and tertiary SO₂ capture will be accomplished by a single SDA vessel and a baghouse, respectively. Ash collection in the process will be first achieved by the removal of molten slag in the coal combustors followed by particulate removal in the baghouse downstream of the SDA vessel. To ensure complete combustion in the furnace, additional air will be supplied to NO_x control ports and, if necessary, overfire air ports located in the furnace.

For SO₂ control, pulverized limestone (CaCO₃) will be fed into the combustor. While passing into the boiler, most of the limestone will be decomposed to flash-calcined lime by the following reaction:

The mixture of this lime and the ash not removed by the combustors is FCM. Some sulfur capture by the entrained calcium oxide (CaO) will also occur at this time, but the primary SO₂ removal mechanism will be through a multiple step process of spray drying the slurried and activated FCM solids.

The FCM that is produced in the furnace via equation (1) will be removed in the baghouse. A portion of the material will be transported to disposal. Some of the material, however, will be conveyed to a mixing tank, where it will be mixed with water to form a solids slurry. By grinding the slurry in a mill, the FCM will be activated by a mechanical process whereby the

overall surface area of available lime will be increased. The mill will enhance the slaking conditions of the FCM and will increase the surface area of the FCM for optimal SO₂ absorption. FCM slurry leaving the tower mill will be transported through the screen to the feed tank. Feed slurry will be pumped from the feed tank to the SDA, where it will be atomized via a Niro rotary atomizer (proven in lime SDA applications up to 860 MWe). After reacting with the SO₂ in the flue gas, the solid products and unreacted FCM will be removed in the SDA hopper or the baghouse. SO₂ will be further removed from the flue gas by reacting with the FCM on the baghouse filter bags.

As with any process involving the conversion of thermal energy to electrical energy, waste heat must be rejected. In the HCCP, water will be drawn from the Nenana River into the condenser. As the cool river water passes through the condenser, it will absorb heat from the turbine exhaust steam and condense the steam into water, which then will be recycled to the boiler. The warmed river water will be returned from the condenser back to the Nenana River. The estimated amount of water required for the once-through condenser will be approximately 28,000 gallons per minute (gpm), about 20 percent of the 1Q10 flow for the Nenana River during the winter and less than 1 percent of the 1Q10 flow during the summer.

Water for the plant operation will be supplied both from the Nenana River and from new wells. Potable water, process water for generating steam, and other HCCP high-quality water needs will be obtained from the wells. Service water and water for bottom ash quenching and conveying will be obtained from the Nenana River.

3.3 EMISSIONS AND DISCHARGES

3.3.1 Atmospheric Emissions and Control System

3.3.1.1 Atmospheric Emissions

NO_x BACT

The entrained combustor operating at a maximum controlled NO_x emission level of 0.35 lb/MMBtu (1010 tons per year [tpy]) has been established as Best Available Control Technology (BACT) for the HCCP.

Based on pilot-scale data, the Entrained Combustion System is expected to demonstrate an emission level equal to or less than 0.2 lb NO_x/MMBtu. However, an emission limit of 0.35 lb/MMBtu was permitted for this system for the following reasons:

1. Laboratory- and pilot-scale data have shown that NO_x emission levels below 0.2 lb/MMBtu can be achieved by the Entrained Combustion System while burning bituminous coal. The HCCP will burn a relatively low rank subbituminous/refuse coal that may result in somewhat higher NO_x emissions, ranging from 0.20 to approximately 0.35 lb/MMBtu. Actual NO_x emissions at the HCCP are expected to be in the lower end of this range, but due to uncertainties in the scale-up design process, 0.35 lb/MMBtu was used as the HCCP NO_x emission limit.

2. The emission limit of 0.35 lb/MMBtu is below the current EPA NSPS for subbituminous coal (0.5 lb NO_x/MMBtu).
3. The emission limit is below the emission level recommended for wall-fired, dry bottom utility boilers (0.5 lb NO_x/MMBtu) enacted by the Clean Air Act Amendments of 1990.
4. The emission limit is also the lowest NO_x emission rate at which it is believed possible to operate low NO_x burners retrofitted into the HCCP boiler.

SO₂ BACT

An Activated Recycle SDA System with an SO₂ control level of 80 percent is BACT for SO₂ emissions.

The HCCP was permitted for SO₂ emissions of 248 tpy (0.086 lb/MMBtu) on an annual basis and 0.10 lb/MMBtu averaged over 3 hours. The annual emission rate is based on an 80 percent removal efficiency when firing performance coal, while the 3-hour emission rate is based on a 76 percent removal efficiency. All of the emissions are at rates that are lower than NSPS and will not violate ambient air quality standards. The 3-hour emission rate is higher than the annual emission rate because operational excursions can result in higher emission rates in the short-term which can be compensated over a longer term.

The Activated Recycle SDA System is expected to operate at a removal efficiency greater than 80 percent (demonstration goal is 90 percent). However, the innovative nature of the technology and the range of coal qualities to be burned during demonstration prevents the development of absolute confidence levels when estimating actual performance. The Activated Recycle SDA System will be converted to a conventional lime-based spray dryer if the TRW entrained combustor or the SDA have irreparable technical, operational, or economic problems.

Particulate Matter (PM) BACT

A fabric filter system with pulse jet cleaning, a controlled PM emission level of 0.02 lb/MMBtu annual average (demonstration goal is 0.015 lb/MMBtu), and an allowable emission of 58 tpy is BACT for PM emissions from the steam generator stack. Control efficiency is estimated at 99.95 percent. Fabric filter systems with pulse jet cleaning and a controlled emission level of 0.02 grains per dry standard cubic foot (grains/dscf) or 9 tpy allowable emission are BACT for particulate emissions from the limestone storage silo, the primary crusher, the coal handling system dust collector, and the fly ash storage silo.

Water spray dust suppression during non-freezing weather is BACT to reduce particulate emissions from the coal haul road. Estimated control level for this process is approximately 75 percent. A wind fence is BACT to reduce particulate emissions from the coal pile. Estimated control level for this process is approximately 80 percent. Total allowable fugitive emissions are 1 tpy.

Carbon Monoxide (CO) BACT

The formation of CO from the combustion of fossil fuels is the result of incomplete combustion. Both proper burner and combustion chamber design at the HCCP, with a CO emission level of 0.20 lb/MMBtu and an allowable emission of 577 tpy, are BACT for CO emissions. A lower emission level is not technically and economically feasible with the entrained combustor that will be used for control of NO_x emissions.

Beryllium (Be) BACT

BACT for this pollutant is the HCCP fabric filter with a control efficiency of 99.3 percent for Be and an allowable emission of 0.0005 tpy. Uncontrolled emissions of beryllium were conservatively estimated by assuming that this constituent in the coal is discharged with the flue gas in the solid state. As Be compounds are almost entirely emitted as particulate, the BACT control technology for particulates (the fabric filter) is also BACT for Be.

3.3.1.2 Atmospheric Emissions Control System

Integrated System

The emission from the HCCP will be controlled during the coal combustion process and the flue gas will be conditioned prior to entering the stack. Monitoring of sulfur in the coal will be conducted monthly on coal samples taken at the start of Conveyor No. 1.

The HCCP will achieve the air pollution emission requirements of the Air Quality Control Permit to Operate. The control of the pollutants identified in the permit will be achieved by synergistically integrating the TRW slagging coal combustors with the specially designed bottom-fired Foster Wheeler boiler and a backend Joy SDA and fabric filter for SO₂ and PM removal. The control of the NO_x will be achieved by substoichiometric (fuel rich) combustion of coal in the coal combustors and by air staging in the Foster Wheeler boiler. This can be achieved by a combination of operating the combustor under fuel-rich conditions and delaying the addition of combustion air in the furnace while the products of combustion are continually cooled by radiation and convection to the water-walls in the furnace. The latter is accomplished by adding combustion air through NO_x ports and, if necessary, through over-fire air ports. Since the slagging combustor is operated under fuel-rich conditions, which makes oxygen atoms scarce, the formation of NO_x in the slagging combustor is minimized.

The integrated process is expected to demonstrate at least 90 percent SO₂ removal resulting in SO₂ emissions of no more than 0.043 lb/MMBtu, NO_x emissions of no more than 0.2 lb/MMBtu, PM₁₀ emissions of no more than 0.015 lb/MMBtu, and at least 99.5 percent combustion efficiency. It is anticipated that at least 20 percent of the total available SO₂ in the flue gas will be captured in the combustion process and at least 70 percent in the FGD System. Of the total ash generated, 60-90 percent will be removed from the combustors as slag and from the boiler hoppers as bottom ash. Most of the remaining ash will be removed in the baghouse. The integrated process is suitable for repowering or retrofitting existing facilities or for new facilities. If successfully demonstrated, the integrated technologies will provide an alternative

technology to conventional pulverized-coal boilers with conventional FGD controls, while lowering overall operating costs and reducing the volume of solid waste generated by conventional technology in current use.

Instrumentation and Controls

A computerized distributed plant control system (PCS) will be utilized to control the slagging combustor process. The system will control the fuel flow to the precombustor and the slagging combustion system to ensure a substoichiometric condition is present in the slagging combustor to control the NO_x emissions. It will also be used to control all of the balance of plant systems that support the combustor operations.

The digital control of the FGD system is based on a programmable logic controller (PLC) located locally. The PLC is intertied to the PCS via a data highway for operator control and monitoring from the HCCP main control room.

Stack SO₂, NO_x, and opacity emissions will be continuously monitored by a dedicated dilution-based, continuous emission monitoring system (CEMS). The CEMS is linked to a dedicated PC computer for reporting functions and is also tied to the PCS for control and monitoring by the plant operators.

3.3.2 Aqueous Discharges and Control System

3.3.2.1 Effluent

The HCCP will generate the following wastewater streams.

- Circulating (once-through) cooling water
- Boiler blowdown water
- Demineralizer regenerants
- Floor and equipment drain water
- Metal cleaning fluids
- Fire protection runoff water
- Plant site sanitary wastewater

Wastewater discharge to the Nenana River will occur at two locations (Outfall 001 and 002). These two outfalls will discharge the combined Healy Unit No. 1 and HCCP plant waste streams that include both the operational wastewater and the once-through circulating cooling water. A third outfall, Outfall 003, will discharge combined Healy Unit No. 1 and HCCP operational wastewater to the HCCP once-through circulating cooling water system. There will also be three temporary discharges of effluent to the Nenana River during construction of the HCCP, including discharge of construction excavation wastewater, storm water runoff, and construction camp wastewater.

In addition to the discharge of wastewater effluent into the Nenana River, various wastewater streams will be disposed of to the plant septic system, to the atmosphere, or with the ash.

3.3.2.2 Aqueous Discharge Control System

The control system for each wastewater stream that will be generated at the HCCP is discussed separately in the following subsections.

Once-Through Circulating Cooling Water System

The cooling water system will be a once-through design that takes in cool water from the Nenana River and discharges warmed water back to the river. The function of the cooling water system in the HCCP will be to dissipate heat from the turbine cycle and component cooling water heat exchangers. River water will enter the HCCP intake structure at the existing intake pond location. The intake channel will be modified to reduce the potential for accumulation of mud and debris in the pond. A trash rack, stop logs, and intake screens in the intake structure will filter large debris from the river water and prevent fish from entering the intake structure. The cleaned circulating water will then be pumped through an underground pipe to the HCCP condenser internal tubes, where it will absorb heat from the steam in the external compartment of the condenser.

Cold circulating water, taken from the header upstream of the condenser, will also be used to dissipate heat load from heat exchangers used to cool plant components and reject waste heat from the slag recovery system. The cold circulating water will flow on the tube side of these exchangers, absorbing heat from the warm component water flowing on the shell side. The warmed circulating water from these exchangers will then be discharged back into the once-through circulating cooling water header downstream from the condenser and subsequently discharged to the river.

Plant Operational Wastewater System

The design philosophy for the HCCP operational water/wastewater system is to maximize water reuse and minimize wastewater discharge. Therefore, operational wastewater from the plant, with the exclusion of the metal cleaning fluids subsystem and the sanitary wastewater subsystem, will be sent to the wastewater treatment system. There, the wastewater will be passed through an oil/water separator (if needed) and an equalization and pH adjustment (neutralization) tank equipped with metering pumps to input appropriate neutralizing reagents. After being processed to acceptable conditions, the effluent will be routed to the dirty water tank for precipitation of suspended impurities. The neutralized and treated effluent will be reused in the plant systems that can tolerate the wastewater quality. If there is any excess wastewater, it will be filtered and discharged to the circulating cooling water, where it will be commingled with the once-through cooling wastewater and transported to the Nenana River.

Continuous monitoring instruments will be installed upstream of the discharge at Outfall 003 to monitor the flow rate and pH of the effluent discharged to the once-through cooling system. Also, at this same location, samples of the discharge will be manually collected on a periodic basis to evaluate effluent contaminants.

Storm Water Runoff System

AIDEA has obtained an NPDES Storm Water Runoff from Construction Activities Permit for the HCCP period. Effluent limitations, monitoring requirements, and other conditions are outlined in the permit. After construction and demonstration activities are completed, storm water runoff to the Nenana River is not anticipated from the Healy Unit No. 1 and HCCP power plant site.

Coal Pile Runoff

Coal pile runoff will be directed to the existing ash pond where it will either evaporate or infiltrate.

Plant Site Sanitary Wastewater Treatment System

Wastewater from the plant sanitary waste treatment system will not be directly discharged to surface or ground waters of the area. A septic system will be sized to meet the needs for all personnel of both the HCCP and Healy Unit No. 1, increasing the existing Healy Unit No. 1 system. Water effluent from the septic tank will overflow by gravity into a subsurface drainage (leach) field. Accumulated sludge in the septic tank will be removed as needed (approximately every 2 to 3 years) by a commercial operator authorized to transport and deliver the wastes to a waste treatment plant for disposal.

3.3.3 Solid Waste Discharges and Control System

3.3.3.1 Solid Wastes

The combustor will produce a vitreous slag waste, while the SDA system will produce a dry powdery waste that will solidify into a high-strength, stable waste material. These materials can be easily disposed of in a conventional landfill operation. The HCCP is expected to produce approximately 80 percent of the total ash as slag/bottom ash. The remaining ash will be collected as fly ash. All ash materials will be conveyed to storage silos. The ash will be periodically removed from these silos and hauled to the UCM coal mine for placement with the mine spoils.

Solid wastes generated during the construction, demonstration, and operational phases of the HCCP will be stored and transported to a landfill. No toxic or hazardous materials will be included in these wastes.

3.3.3.2 Toxic/Hazardous Materials

A number of materials that are identified by EPA as either being toxic or hazardous will be used in the power plant. All these chemicals will be properly labelled and stored according to state and federal standards and codes.

TABLE 3-1. EXISTING AIR QUALITY FOR THE HEALY AREA AS MEASURED AT THE PARK MONITORING STATION DURING THE 12-MONTH PERIOD FROM SEPTEMBER 1990 THROUGH AUGUST 1991.

Pollutant	Averaging Time	Concentration ($\mu\text{g}/\text{m}^3$)	NAAQS ^a ($\mu\text{g}/\text{m}^3$)	Percent of Standard
SO ₂	3-hr	45 ^b	1300	4
	24-hr	26 ^b	365	7
	Annual	5	80	6
NO ₂	Annual	6	100	6
PM ₁₀	24-hr	86 ^b	150	57
	Annual	5	50	10

^a National Ambient Air Quality Standards.

^b Maximum measured concentration which resulted from forest fire smoke on July 1, 1991. The maximum 24-hr value that was not influenced by this exceptional event was 31 $\mu\text{g}/\text{m}^3$.

TABLE 3-2. HISTORICAL WATER QUALITY DATA FROM THE NENANA RIVER.

Constituent	Concentration (mg/l)
Total Hardness (as CaCO ₃)	86
Total Dissolved Solids (TDS)	108
Total Suspended Solids (TSS)	948
Calcium	25
Magnesium	6
Sodium	2.4
Potassium	1.3
Carbonate	0
Bicarbonate	71
Sulfate	32
Chloride	1.4
Nitrate	0.21
Silica	5
Manganese	0
Iron	0.05-0.1
pH	7.6-7.9

Source: USGS (1990)

TABLE 3-3. RANGE OF ON-SITE WELL WATER QUALITY, MAJOR CONSTITUENTS (DISSOLVED).

Parameter (in mg/l, unless stated otherwise)	Well			National Drinking Water Standards
	Healy Unit No. 1 (Site 5), Oligocene-Miocene Aquifer		MW2 (Site 7), Pleistocene- Holocene Aquifer	
	1967	9/90 - 7/91	11/90 - 7/91	
Depth of Screen (ft)	200	200	27	--
Total Dissolved Solids	301	257-293	1300-2350	500 ^c
Total Hardness as CaCO ₃	136	93-110	620-1100	--
Calcium	40	28-33	210-390	--
Magnesium	9	5-7	22-35	--
pH (pH units)	7.9	8.1-8.3	7.1-7.9	6.5-8.5 ^c
Specific Conductance (μS/cm)	--	460-508	2940	--
Bicarbonate	--	162-207	228-322	--
Fecal Coliform (colonies/100 ml)	--	0 ^a	--	1 ^b
Sodium	--	62-68	190-390	--
Chloride	--	29-52	530-1400	250 ^c
Sulfate	--	19-24	3-23	250 ^c
Fluoride	--	0.1 ^a	--	2 ^b
Nitrogen (total)	--	0.4-0.6	<0.7	10 ^b

Source: AIDEA (1990-1991)

^a Fall 1990.

^b CFR (Code of Federal Regulations) 1991. 40 CFR 265, Appendix III, "EPA Interim Primary Drinking Water Standards."

^c CFR (Code of Federal Regulations) 1991. 40 CFR 143, "National Secondary Drinking Water Regulations."

TABLE 3-4. TYPICAL ANALYSIS OF THE COMPOSITION OF RUN-OF-MINE COAL, WASTE COAL, AND BLENDED PERFORMANCE COAL FOR THE HEALY CLEAN COAL PROJECT (AS IS EXPECTED TO BE RECEIVED AT THE HCCP SITE).

Parameter	Run-of-Mine Coal	Blended Performance Coal	Waste Coal
Heating Value (Btu/lb)	7815	6960	6105
Analysis (percent by weight)			
Moisture	26.35	25.11	23.87
Carbon	45.55	40.57	35.59
Hydrogen	3.45	3.07	2.70
Nitrogen	0.59	0.53	0.46
Sulfur	0.17	0.15	0.13
Ash	8.20	16.60	25.00
Oxygen	15.66	13.90	12.23
Chlorine	0.03	0.03	0.02
Total	100.00	100.00	100.00

Source: AIDEA (1990)

SECTION 4
COMPLIANCE MONITORING

4.0 COMPLIANCE MONITORING

Compliance monitoring is required by federal and state government agencies to satisfy statutes, regulations, terms of leases, and permits. Wastewater effluents, air emissions, and visibility are the compliance monitoring data to be reported as part of the EMP during the two-year Test Demonstration Program. Table 4-1 summarizes the compliance monitoring described in the following sections.

4.1 WASTEWATER EFFLUENTS

4.1.1 Purpose

The purpose of the wastewater effluent compliance monitoring program is to monitor the wastewater discharges as required to ensure that they meet all applicable federal and state wastewater discharge standards and limits.

4.1.2 Regulatory Authority

Wastewater discharge from the HCCP is subject to the water quality regulations promulgated by the EPA and ADEC. The Clean Water Act (CWA) provides that wastewater discharges associated with industrial activities from a point source to waters of the United States is unlawful unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The HCCP wastewater effluent discharges will be monitored for compliance under NPDES Permit No. **Later**.

4.1.3 Compliance Monitoring Objectives

The objectives of wastewater effluent monitoring during the demonstration period is to illustrate that the HCCP can be operated within the requirements of the NPDES Permit.

4.1.4 Operating Characteristics During Compliance Monitoring

The operating characteristics will be established as part of the HCCP Phase III Demonstration Test Program.

4.1.5 Wastewater Effluents Compliance Monitoring Program

Wastewater effluent compliance monitoring will include the HCCP wastewater discharge monitoring requirements as set forth in Section 2.0, Monitoring, Recording, and Reporting Requirements of National Pollutant Discharge Elimination System (NPDES) Permit No. **Later**.

4.1.5.1 Streams to be Monitored and Parameters to be Analyzed

Outfalls 001 and 002

The commingled wastewater, representative of Outfalls 001 and 002, will be comprised of water

from the once-through circulating cooling water systems of the HCCP and Healy Unit No. 1 and the operational wastewater from both units. The monitoring location chosen to collect samples representative of the effluent quality discharged at both outfalls is the cross-connect where the wastestreams are commingled. Also, temperature will be monitored at a location in the river 600 feet downstream from Outfall 001 from May 1 through September 30 during the first year of HCCP operation. Section 1.1.1 of the NPDES Permit identifies the parameters that are to be analyzed to represent the discharges from Outfalls 001 and 002.

Outfall 003

A wastewater sampling line will be located immediately upstream of the wastewater discharge to the circulation water system. This sampling location is identified as Outfall 003 in the NPDES Permit. A small amount of the wastewater continuously flows through the sample line to the Water and Steam Sampling System. pH is continuously measured on the wastewater effluent, and the pH values are fed to the programmable logic controller (PLC). After the wastewater passes through the Water and Steam Sampling System it is discharged to a sink. At this point grab samples will be taken for analyses of the compliance monitoring parameters. Section 1.1.2 of the NPDES Permit identifies the parameters that will be analyzed on samples pulled to represent Outfall 003.

A flow meter is used to monitor the wastewater effluent discharge to the circulation water system. The data are fed to the PLC where it is recorded.

Outfalls 001, 002, and 003

Using fuel and limestone source analyses data, engineering calculations will be performed to determine if any priority pollutant will be in the wastewater effluent streams (per 40 CFR 121.11(b)) at levels that exceed the detection limit as specified in 40 CFR 136.

The conditions of the NPDES Permit also apply the wastewater effluent compliance monitoring of this EMP.

4.1.5.2 Sampling and Analytical Techniques

The sample monitoring requirements, including measurement frequency and sample type, are given in Sections 1.1.1 and 1.1.2 of the NPDES Permit. The method of sampling is specified in 40 CFR Part 136 along with the analytical methods. The laboratory contracted to analyze the samples will supply the description of the sampling methodology and analytical procedures that will be used to analyze the wastewater effluent compliance samples for parameters listed in Sections 1.1.1 and 1.1.2 of the NPDES Permit. That laboratory will also supply the sampling containers and appropriate chain-of custody forms to accompany the samples to the laboratory.

Whole effluent toxicity (WET) testing will be conducted on grab samples taken from the cross-connect sample ports representing Outfalls 001 and 002. Following are the chronic and acute WET testing that will be conducted.

Chronic Toxicity Tests

The chronic toxicity of each wastewater discharge will be determined by direct laboratory testing with aquatic organisms on a periodic basis, either at the power plants, or at a commercial laboratory. The test procedures will be conducted according to specified EPA protocols with appropriate quality control.

1. The following chronic toxicity tests will be conducted:
 - Pimephales promelas (fathead minnow) — 7-day static renewal, larval survival, and growth tests.
 - Ceriodaphnia dubia (daphnia) — 7-day static renewal, survival, and growth tests.
2. Dilution water and control water used in the tests will be formulated as described in the EPA protocols.
3. Effluent samples will be a 24-hour composite. All tests will be conducted on split samples from the same 24-hour composite effluent sample. The effluent water used in the tests will be renewed daily. Chronic toxicity testing requires a fresh effluent sample every other day (days 1, 3, 5, and 7). Fresh samples will be obtained to renew toxicity test dilutions.
4. Toxicity test samples used for WET testing will also be analyzed for alkalinity, ammonia, hardness, total residual chlorine, conductivity, dissolved oxygen, pH, total suspended solids, and temperature.
5. Chronic toxicity tests of the effluent will be conducted using EPA protocols. Chronic toxicity tests determine if the effluent affects the survival, reproduction, or growth of the test organisms. The chronic toxicity test will identify the no observable effect concentration (NOEC). The NOEC is the effluent concentration in control water at which there is no statistically significant difference in response between the control water and the test organisms.

Acute Toxicity Tests

1. Acute toxicity tests will be conducted using:
 - Oncorhynchus kisutch (coho salmon) — 96-hour LC₅₀, static renewal test.
2. Dilution water and control water used in the test will be formulated, as described in the EPA protocols.
3. Effluent samples will be a 24-hour composite. The effluent water used in the test will be renewed daily. Fresh samples will be obtained daily to renew toxicity test dilutions.
4. Toxicity test samples for days 1, 2, 3, and 4 will be analyzed for alkalinity, ammonia,

conductivity, hardness, total residual chlorine, dissolved oxygen, pH, total suspended solids, and temperature.

5. Acute toxicity tests of the effluent will be conducted using the EPA protocols. The endpoint for the acute toxicity test is the concentration at which 50 percent of the test organisms die in a 96-hour period.

Additional Toxicity Tests

If chronic or acute toxicity tests identify violations of the Alaska State Water Quality Standards, additional toxicity testing, a Toxicity Identification Evaluation (TIE), treatment of the wastewater, and/or modification of the NPDES Permit will be undertaken by EPA.

WET Quality Assurance Criteria

All quality assurance criteria used will be in accordance with "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms," EPA/600/4-85/013; "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms - Second Edition," EPA/600/4-89/001; "Quality Assurance Guidelines for Biological Testing," EPA/600/4-78/043; "Quality Assurance Bibliography," EPA/600/4-80/009; and other EPA Region 10 approved protocols.

4.1.5.3 Quality Assurance Plan

A quality assurance plan for wastewater effluent monitoring will be developed by the laboratory contracted to conduct the sampling and analytical determinations. The plan will be submitted for approval by EPA prior to operating the HCCP (within 90-days of the effective date of the NPDES Permit). The plan will include the following:

- Sampling techniques (field blanks, replicates, duplicates, control samples, etc.).
- Sample preservation methods.
- Sample shipment procedures.
- Instrument calibration procedures and preventive maintenance (frequency, standard, spare parts).
- Qualification and training of personnel.
- Analytical methods (including quality control checks, quantification/detection levels).

A copy of the quality assurance/quality control that is employed in the laboratory will be retained in the files with the analytical data. Copies of the results of EPA quality control samples will also be retained in the files.

Reports

Monitoring results will be summarized each month on the Discharge Monitoring Report (DMR) form (EPA No. 3320-1). The reports will be submitted monthly and will be postmarked by the 10th day of the month following sample analyses. Legible copies of these, and all other reports, will be signed and certified in accordance with the requirements of Section 4.10, Signatory Requirements, and submitted to EPA and to ADEC.

Records of monitoring information will include:

- Date, exact place, and time of sampling or measurements.
- Individual(s) who performed the sampling or measurements.
- Date(s) analyses were performed.
- Individual(s) who performed the analyses.
- Analytical techniques or methods used.
- Results of such analyses.

4.2 AIR EMISSIONS

4.2.1 Purpose

Air emissions from the HCCP are subject to the air quality regulations promulgated by the EPA and the Alaska Department of Environmental Conservation (ADEC). The State of Alaska has been delegated full authority by the EPA to administer the State Implementation Plan (SIP) and to issue permits for new and modified sources, and thereby satisfy the requirements of 40 CFR § 52.21 (1992), the Federal Prevention of Significant Deterioration (PSD) regulations. EPA's role in permitting the HCCP emission sources includes reviewing assessment protocols for compliance with federal PSD regulations and the SIP, and guiding policy decisions as needed. The purpose of the gaseous stream compliance monitoring program is to monitor the air emissions to ensure that they meet all applicable state and federal air pollution standards (NSPS, PSD, and NAAQS).

4.2.2 Regulatory Authority

The HCCP air emissions will be monitored for compliance with the HCCP Air Quality Control Permit to Operate No. 9231-AA007.

4.2.3 Compliance Monitoring Objectives

The objective of the compliance monitoring during the demonstration period is to illustrate compliance during the test program and to illustrate that the HCCP can be operated within the requirements of Air Quality Control Permit to Operate No. 9231-AA007.

4.2.4 Operating Characteristics During Compliance Monitoring

The operating characteristics will be established as part of the HCCP Phase III Demonstration Test Program.

4.2.5 Air Emissions Compliance Monitoring Program

Compliance monitoring will include the HCCP emission monitoring requirements of Exhibit D on Pages 20 and 21 of the Air Quality Control Permit to Operate. In addition, data collection under the permit conditions will be compiled as part of the compliance monitoring of this EMP.

4.2.5.1 Streams to be Monitored

The air emissions compliance monitoring will only be conducted on the emissions from the HCCP. Unit No. 1 emissions are not a part of this EMP.

4.2.5.2 Sampling and Analytical Techniques

Following is a brief description of the sampling; analytical techniques; data acquisition, processing, and storage; and reporting proposed for continuous emissions monitoring (CEMS).

Sampling

All sampling for the air emission chemical pollutants to be monitored will be accomplished in the HCCP stack using an Enviroplan CEMEX probe. The probe will be mounted on a variable length extension, provided to obtain optimum probe insertion in the middle third of the stack. The probe will have two filters to remove particulate from the sample being drawn into the probe tip. A coarse filter is located at the tip of the assembly. A secondary filter in the form of glass wool has been installed to capture any additional particulate present. Gas sampling is accomplished with the use of instrument-grade air that draws a sample into the probe and down the umbilical for analysis. The flue gases will be transported to the Enviroplan dilution-based emission monitoring systems for analyses.

Analytical Techniques

Detailed analytical techniques specific to the Enviroplan CEMEX dilution-based continuous emission monitoring systems installed on the HCCP will be established. The CEMS will be installed, calibrated, operated, and maintained as specified in Performance Specifications set out in 40 CFR, Part 60, Appendix B (see Conditions 10, 11, 13, 14, and 15 of Air Quality Permit to Operate No. 9231-AA007). The basic premise of the dilution technology used to determine the chemical constituents of the air emissions is that accurate sample representatives can be measured by diluting the sample gas by a fixed ratio in order to perform the analysis using more sensitive ambient analyzers. This dilution ratio is accomplished by drawing the sample and the dilution gas through a critical orifice. The ratio for the particular expected gas concentrations to be found at the HCCP stack will be customized. Probe dilution and support is controlled by a series of valves and flow meters located in a cabinet. Sample sequence (sample, purge, calibration) is controlled by a programmable logic controller (CEMCON system). Sample analysis will be accomplished using an UV Fluorescent SO₂ monitor, a Chemiluminescent NO_x monitor, and an IR Based CO₂ monitor.

Opacity will also be determined using a microprocessor-controlled opacity monitor (CEMOP 281 Optical Transmissometer). Opacity monitoring uses a two-beam alternating light sequence in

accordance with the autocollimation principle. The light beam travels twice across the measuring run, and the reduction in light due to dust content of the flue gas, chemical, or metallurgical dust is measured and evaluated.

Data Acquisition, Processing, and Storage

The CEMS signals are received from the monitoring devices and optional outputs are processed using a computer program (CEMDAS III). The CEMDAS program was developed in 1977 by Enviroplan for industrial and power plant use. The system continually samples the monitoring instruments' output for all measured parameters, converts the samples to millivolts and engineering units, and accumulates them for period averages. Typically CEMDAS III configurations provide one-minute or six-minute opacity averages; and three-hour, twenty-four hour, and thirty-day averages for emissions. CEMDAS III calculates hourly and multi-period SO₂ and NO_x emissions using different fuel factors, moisture, and default oxygen values.

All pertinent information is archived on disk for historical reference and quarterly report generation. CEMDAS III continually checks the monitoring instrument status signals for calibration and fault conditions. Monitor calibration cycles are used to correct the calculation of engineering units for monitor drift and to provide a check on monitor performance. Zero and span values are calculated, stored, and reported.

Quality Assurance

A quality assurance plan will be developed. The quality assurance plan will conform with 40 CFR, Part 60, Appendix F, The Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, (EPA/600/4-77-027b). The Quality Assurance Plan will be followed while operating the CEMS equipment to insure the quality of the data generated.

Reports

The system printer automatically prints: an hourly report, a summary of system activity that includes updated averages; emission standard violations; calibrations; a daily opacity averages log with all opacity averages for the previous day; and a daily emission summary with hourly, three-hour, and thirty-day averages for the previous day. On demand, the printer can produce: a daily opacity averages log; a daily emission summary, an excess opacity summary that lists opacity violations and downtime for the current day or any previous day; and a report in an accepted Quarterly Report format, with excess opacity and emission incidents, and monitor and system downtime, for any period of one or more days in length. The formats of all CEMDAS III reports will be customized to GVEA specifications. The CEMDAS III provides valuable information to the control room operators, the system operator, and management personnel.

4.3 VISIBILITY MONITORING

4.3.1 Purpose

The purpose of the visibility monitoring program will be monitor visibility as outlined in the Air Quality Control Permit to Operate-Visibility Monitoring Plan. This plan has not yet been

developed. In the development of the Plan, input from ADEC and the National Park Service (NPS) will be incorporated. The methodology developed will be followed to collect visibility monitoring data for this EMP.

4.3.2 Regulatory Authority

There are no regulatory requirements for compliance monitoring of visibility. However, there are regulatory requirements to determine the effect of any new emission source on the visibility of Class I areas. An analysis of the effect of a new emission source on the visibility of Class I areas such as the DNPP is required by the Air Quality Control Permit to Operate and by the visibility sections of the Code of Federal Regulations and Alaska Air Quality Regulations.

4.3.3 Monitoring Objectives

The compliance monitoring objective will be to meet the requirements of the visibility monitoring plan.

TABLE 4-1. COMPLIANCE MONITORING SUMMARY

RESOURCE AND MONITORING LOCATION	PERMIT WHICH REQUIRES THE MONITORING	DATA TO BE COLLECTED	REQUIRED FREQUENCY OF MONITORING	AGENCY ¹ REQUIRING MONITORING
Water Effluent				
Outfalls 001 and 002 (Sampled at Cross-Connect)	NPDES	Flow Temperature pH TSS Oil & Grease BTEX Chromium Copper Iron Lead Zinc WET	Calculated Monthly Monthly Monthly Monthly Monthly Monthly Monthly Monthly Monthly Monthly Spring, Summer, Fall	EPA
Outfall 001 (Sampled 600 feet downstream from Outfall 001 and more than 10 feet from river bank).	NPDES	Temperature	Weekly	EPA
Outfall 003	NPDES	Flow pH TSS BTEX Chromium Copper Iron Lead Zinc	Continuous Monthly Monthly Monthly Monthly Monthly Monthly Monthly Monthly	EPA

RESOURCE AND MONITORING LOCATION	PERMIT WHICH REQUIRES THE MONITORING	DATA TO BE COLLECTED	REQUIRED FREQUENCY OF MONITORING	AGENCY ¹ REQUIRING MONITORING
Air Emissions				
HCCP Stack	Air Quality Control Permit to Operate	CEMS	Permittee shall install, maintain, and operate a continuous emission monitoring system for monitoring and recording opacity, sulfur dioxide, and oxygen or carbon dioxide. Each system shall be installed, certified, and calibrated according to 40 CFR 60, Appendix B, Performance Specifications.	ADEC
		Opacity	Measure and record the 60 minute average opacity. Report the time, duration, and average opacity for any period exceeding 20% for three minutes or more per hour.	ADEC
		Oxides of Nitrogen	During any period for which the "as fired" coal contains less than 25% by weight of coal refuse, measure and record the 60 minute average emission rate of oxides of nitrogen. Report each operating date and the average daily oxides of nitrogen emission rate (lb/MMBtu).	ADEC
		Sulfur Dioxide	Measure and record the 60 minute average emission rate of sulfur dioxide. Report each operating date, the average daily sulfur dioxide emission rate (lb/MMBtu), and the percent reduction of the potential combustion concentration of sulfur dioxide.	ADEC
		Oxygen or CO ₂	Measure and record the 60 minute average stack gas concentration. Report daily average values to the nearest one-half percent.	ADEC
		Feed rate for coal and fuel oil	Measure and record the 60 minute average. Report all daily average rates and coal refuse average content.	ADEC

RESOURCE AND MONITORING LOCATION	PERMIT WHICH REQUIRES THE MONITORING	DATA TO BE COLLECTED	REQUIRED FREQUENCY OF MONITORING	AGENCY ¹ REQUIRING MONITORING
		Steam temperature and production rate	Measure and record every 60 minutes.	ADEC
Air Quality Monitoring	Air Quality Control Permit to Operate	Undetermined at date of Draft EMP	Undetermined at date of Draft EMP	ADEC
Visibility	Air Quality Control Permit to Operate	Undetermined at date of Draft EMP	Undetermined at date of Draft EMP	ADEC

¹ Agencies listed are in addition to reports submitted to DOE.

SECTION 5
SUPPLEMENTAL MONITORING

5.0 SUPPLEMENTAL MONITORING

Supplemental monitoring data will be obtained as part of the HCCP Test Program. These monitoring data will be used to supplement the compliance monitoring data in the development of the information base necessary to identify, assess, and mitigate environmental problems arising from the replication of the technology.

5.1 HCCP TEST PROGRAM

The HCCP Test Program has not yet been developed. However, it will include tests conducted to evaluate the TRW combustion technology, Joy/Niro SDA technology, and balance of plant performance testing. Data from these tests will be compiled with those data from the compliance monitoring data to determine the future commercialization potential of the technologies.

The performance testing will include the following phases:

- **Test Procedure Development Phase**
 - System Performance Procedures (SPPs)
 - Operational Test Procedures (OTPs)
 - Special Test Procedures (STPs)
- **Cold Mode Shakedown Phase**
 - Outline procedures to prepare for testing such as activation and calibration of instrumentation systems
- **Hot Mode Testing Phase**
 - Operational type tests to verify test instrumentation and techniques during actual boiler operation
- **Performance Testing Phase**
 - Utilize Test Program Procedures to obtain parametric and long-term test data
- **Acceptance Testing Phase**
 - Perform system and equipment acceptance tests as defined in the HCCP equipment and system contracts and purchase orders.
- **Final Report Preparation Phase**
 - Produce accurate and comprehensive reporting documentation throughout the testing period.

5.2 HAZARDOUS AIR POLLUTANTS (HAPs)

Hazardous Air Pollutants (HAPs) monitoring was not included in the DOE's Program Opportunity Notice (PON). AIDEA may demonstrate HAPs control in the HCCP to the extent funding is available and mutually agreed upon between AIDEA and DOE. If HAPs do become

a part of this EMP, the following supplemental monitoring could be included.

5.2.1 Purpose of Supplemental HAPs Monitoring

Title III of the 1990 Amendments to the Clean Air Act (CAA) identifies 189 air toxics, or HAPs, for which technology-based standards are to be set by EPA. There is also a provision requiring that EPA conduct a study of impacts of emissions of HAPs from electric utilities on public health. Based on this study, EPA is to determine whether such sources should be regulated under Title III of the CAA. DOE would like to direct these EPA studies, limiting the number of HAPs that must be monitored at CCT projects. DOE would also like to use the data collected from their CCT Demonstration Projects to determine which HAPs are most likely to be emitted from future power plants. In addition, DOE considers the determination of HAPs part of the information needed to adequately evaluate and substantiate commercial readiness of their CCT projects.

The HAPs to be monitored, the typical air streams of interest, and the sampling and analytical methods that are to be used to compile the data have been identified in this EMP, if HAPs monitoring is to be done. The HCCP site-specific monitoring would generate HAPs data compatible with those data obtained in other studies being conducted by the Pittsburgh Energy Technology Center, Office of Project Management (PETC/PM) and by the Electric Power Research Institute (EPRI) — the Power Plant Integrated Systems: Chemical Emissions Study (PISCES) project.

5.2.2 HAPs Monitoring Objectives

The primary objective of the HCCP supplemental HAPs monitoring would be to quantify the mass flow rate of HAPs emitted from the stack gases. A secondary objective would be to quantify the removal of HAPs from the gaseous streams across pollution control subsystems. Supplemental HAPs monitoring would provide input to the congressionally-mandated study by EPA on impacts of emissions of listed HAPs from electric utilities, as required in Title III of CAA Amendments of 1990. In addition, the data will provide a basis for evaluating the potential effects of air toxics regulation on the commercialization of technologies demonstrated on the HCCP.

5.2.3 Operating Conditions During HAPs Monitoring

HAPs data on stack emissions would only be obtained for the HCCP operating at full capacity. This would represent the worst case scenario and would supply data which could be used to calculate projected HAPs emissions at less than full capacity.

5.2.4 HAPs Monitoring Program

5.2.4.1 Parameters to be Monitored

In order to obtain data compatible with both the EPRI and PETC/PM studies, a list of HAPs to be monitored at the HCCP was developed by DOE (see Tables 5-1 and 5-2).

5.2.4.2 Sampling and Analytical Techniques

In order to ensure compatibility of results, sampling and analytical procedures that are being followed currently in the EPRI and PETC/PM air toxics studies would be used. These sampling and analytical methods are listed in Tables 5-1 and 5-2, respectively.

5.2.4.3 Monitoring of Process Parameters

Process parameter information would be collected to support the air pollutant data and provide a means for correlation of the supplemental HAPs monitoring data to those data collected as part of the HCCP Test Program.

TABLE 5-1. SAMPLING METHODS FOR HAZARDOUS AIR POLLUTANTS (HAPs) EMISSIONS.

Parameter	Sampling Method
Flow Rate	Flow Meter
Particulate Loading	EPA Method 5 or 17
Elements ¹	Impingers
Vapor Phase	EPA Method 5 or 17
Particulate	Impingers
Inorganics ² and Formaldehyde	EPA Method 0030
Volatile Organics ³	Modified EPA Method 5 with Sorbent Trap
Semi-Volatile Organics ⁴	Modified EPA Method 5 ⁵ with Sorbent Trap
Radionuclides	EPA Method 5 or 17

Source: DOE (1992)

¹ Elements include Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mn, Hg, Ni, Se, and V.

² Inorganics include Cl/HCl, cyanide compounds, F/HF, and phosphate.

³ Volatile organics include benzene and toluene.

⁴ Semi-volatile organics include polycyclic organic matter.

⁵ EPA Methods 5 and 17 are found in 40 CFR 60.

TABLE 5-2. ANALYTICAL METHODS FOR HAZARDOUS AIR POLLUTANTS (HAPs) EMISSIONS.

Analyte	Analytical Method
<u>Trace Elements</u> ¹	ICAPES ² or AAS ³
<u>Inorganics and Formaldehydes</u>	
Phosphate	Colorimetric
Hydrogen Fluoride (HF)	Specific Ion Electrode
Hydrogen Chloride (HCl)	Ion Chromatography
Cyanide Compounds	Distillation/Colorimetry
Formaldehyde	HPLC ⁵
<u>Volatile Organics</u>	
Benzene	GC/PID, FID ⁴
Toluene	GC/PID, FID
<u>Semi-Volatile Organics</u>	
Polycyclic Organic Matter	GC/MS ⁶
<u>Radionuclides</u>	Alpha Detector

Source: DOE (1992)

¹ Elements include Sb, As, Ba, Be, Cd, Cr, Co, Pb, Mn, Hg, Ni, Se, and V.

² Inductively Coupled Argon Plasma Emission Spectroscopy.

³ Atomic Absorption Spectroscopy.

⁴ Gas Chromatography with Photoionization and Flame Ionization Detectors.

⁵ High Performance Liquid Chromatography.

⁶ Gas Chromatography with Mass Spectroscopy.

SECTION 6

DATA MANAGEMENT AND REPORTING

6.0 DATA MANAGEMENT AND REPORTING

6.1 DATA MANAGEMENT

6.1.1 Introduction

The data and reporting program, including acquisition, storage, retrieval, analysis, and formal reporting for developed data, will be defined in detail in the HCCP Test Program. The purpose of the data management section of the Test Program will be to develop a data base management system (DBMS) that 1) has long-term information storage capacity, 2) is flexible enough for the user to access any required data, 3) can perform data processing functions, and 4) can reduce the data to a useful format so that the processes and/or emission control efficiency can be evaluated.

6.1.2 Data Entry

Wherever possible, data will be transmitted electronically to increase data entry efficiency and accuracy. AIDEA and GVEA will also rely on the DBMS to manually store process and emission data. Data transmittal forms will be designed for any manually recorded process, sampling, and analytical data and results. These forms will be compatible with the data entry format of the DBMS.

6.1.3 Data Verification

All data will be reviewed for completeness and accuracy as part of the data management and processing activities. Wherever applicable, data will be analyzed to determine mean, maximum, and minimum values, as well as standard deviations and other statistical parameters. Data correlations and relationships will be developed, evaluated, and/or plotted using the DBMS to provide insight and to evaluate/describe process performance.

6.2 REPORTING

6.2.1 Report Format, Content, and Frequency

Each EMP report will cover compliance and supplemental monitoring progress, defining whether tests have been completed or are in progress. These EMP reports will be submitted within 45 days of the end of the reporting period. The EMP reports will include the information outlined in the following subsections.

6.2.2 Monthly, Quarterly, and Annual Reports

The Monthly Environmental Monitoring Report will:

- Contain test reports.

- Contain summaries of all environmental and health monitoring data collected during the month.
- Contain copies of all compliance reports and analyses sent to regulatory agencies during the month.
- Describe the project's permit compliance status, including a description of any significant changes to the terms of permits and notices of violations issued.
- Identify problem areas encountered during the month; problems with monitoring techniques/procedures, sampling QA/QC, etc., and indicate actual, anticipated, or possible solution to identified problem areas.
- Recommend modification to or deletion of supplemental monitoring tasks not yielding useful data and include the basis for the recommendation.

The Quarterly Environmental Monitoring Report will:

- Contain summaries of all environmental and health monitoring data collected during the quarter.
- Identify and characterize the unregulated substances present at concentrations of significant environmental and health concern.
- Contain copies of all compliance reports and analyses sent to regulatory agencies during the quarter (e.g., Table 6-1).
- Describe the HCCP's permit compliance status, including a description of any significant changes to the terms of permits and notices of violations issued from regulatory agencies.
- Identify problem areas encountered during the quarter, i.e., problems with monitoring techniques/procedures, sampling, QA/QC, etc., and indicate actual, anticipated, or possible solutions.
- Recommend modifications or detection of supplemental monitoring tasks not yielding useful data, including the basis for the recommendation.

The Annual Environmental Report will:

- Summarize and analyze the monitoring information from all monthly and quarterly reports. The report shall: 1) identify trends and patterns in the data; 2) summarize and interpret relevant health data, and information issuing from supplemental monitoring; and 3) correlate the concentration of unregulated substances being monitored with the operating conditions of the project and the performance of environmental controls.

- Based on the monitoring data and the reports that have been submitted, indicate if there are any trends of environmental or health concern.
- Indicate whether any of the problem areas identified in previous quarterly or annual reports have been resolved, and, if any, what mitigation measures should be taken.

TABLE 6-1. FACILITY OPERATING REPORT.

A Facility Operating Report must be submitted to the Department of Environmental Conservation, Northern Regional Office, 1001 Noble Street, Suite 350, Fairbanks, Alaska 99701, quarterly, by the 30th day of January, April, July, and October each year. This report must include the following information:

NAME OF FIRM NAME OF FACILITY PERMIT NUMBER	
REPORT PERIOD _____ QUARTERLY TOTAL (When indicated, also report weekly or monthly data.)	
1. Days Operated	Number of hours or days/quarter for each source
Unit #1	Number of hours/day that MODEF is burned
Unit #2	
Aux #1 Oil-fired boiler	
Aux #2 Oil-fired boiler	
Diesel #1	
2. Fuel Consumption	
All Sources	For each source, indicate the type of fuel and the quantity burned per quarter in the appropriate units: gallons, tons
3. Fuel Quality	
Coal	Coal: sulfur analysis, monthly
Diesel fuel	Oil: sulfur content of each shipment received
MODEF	PCB concentration in ppm of each batch burned
4.	Attach three individual monthly opacity data summaries for the coal boilers listing daily by date: average opacity, high spike (exceeding 3 minutes per hour), average of all opacities above 20 percent, percent of operating time that 20 percent opacity is exceeded, duration of exceedence, and reason for exceedence.
5.	When MODEF containing more than 50 ppm PCB is burned in Unit #1, report the parameters (daily) as required in Exhibit D of this permit.
6.	Attach a listing of the excess emissions reports required by Condition 22 of this permit.
7.	Attach a summary document of perceptible events recorded during visibility monitoring.
8.	Signature of authorized agent preceded by the statement: "I am familiar with the information contained in this report and, to the best of my knowledge and belief, such information is true, complete, and accurate."

Source: Exhibit C of Draft Air Quality Control Permit to Operate No. 9231-AA007.

SECTION 7
REFERENCES

7.0 REFERENCES

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SECTION 8

ABBREVIATIONS AND ACRONYMS

SECTION 8
ABBREVIATIONS AND ACRONYMS

8.0 ABBREVIATIONS AND ACRONYMS

AAS	Atomic Absorption Spectroscopy
ADEC	Alaska Department of Environmental Conservation
AIDEA	Alaska Industrial Development and Export Authority
As	Arsenic
Ba	Barium
BACT	Best available control technology
Be	Beryllium
Btu/lb	British thermal units per pound
CAA	Clean Air Act
CaCO₃	Calcium carbonate (limestone)
CaO	Calcium oxide (quick lime)
CCT	Clean Coal Technology Program
CCT-III	Clean Coal Technology - Third Solicitation Program
Cd	Cadmium
CEMDAS III	Computer program for CEMS
CEMS	Continuous emission monitoring system
CFR	Code of Federal Regulations
Cl/HCl	Chloride/Hydrochloric Acid
CO	Carbon monoxide
Co	Cobalt
CO₂	Carbon dioxide
Corps	U.S. Department of the Army Corp of Engineers
Cr	Chromium
CWA	Clean Water Act
DBMS	Data base management system
DEIS	Draft Environmental Impact Statement
DNPP	Denali National Park and Preserve
DOE	U.S. Department of Energy
DVTs	Design verification tests
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Plan
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
F/HF	Fluoride/Hydrofluoric Acid
FCM	Flash-calcined material
FGD	Flue Gas Desulfurization
FID	Flame ionization detectors
GC/MS	Gas chromatography with mass spectroscopy

GC/PID	Gas chromatography with photoionization
GVEA	Golden Valley Electric Association, Inc.
HAPs	Hazardous air pollutants
HCCP	Healy Clean Coal Project
Hg	Mercury
HHV	Higher heating value
HPLC	High performance liquid chromatography
ICAPES	Inductively coupled argon plasma emission spectroscopy
Lb/MMBtu	Pounds per million British thermal units
LC ₅₀	Level of concentration at which 50 percent of a lifeform will survive
Mg/l	Milligrams per liter
MMBtu/hr	Million British thermal units per hour
Mn	Manganese
MODEF	Mineral oil di-electric fluid
msl	Mean sea level
MWe	Megawatt (electric)
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
Ni	Nickel
NPDES	National Pollutant Discharge Elimination System
NOEC	No observable effect concentration
NO _x	Oxides of Nitrogen
NSPS	New Source Performance Standards
OTPs	Operational test Procedures
Pb	Lead
PCB	Polychlorinated bi-phenyl
PCS	Plant control system
PETC/PM	Pittsburgh Energy Technology Center, Office of Project Management
pH	Hydrogen ion concentration
PISCES	Power Plant Integrated System: Chemical Emission Study Project
PJF	Pulse jet filter
PLC	Programmable logic controller
PM	Particulate matter
PM ₁₀	Particulate matter less than 10 microns in diameter
PON	Program Opportunity Notice
PSD	Prevention of Significant Deterioration
QA/AC	Quality assurance with quality control

Sb	Antimony
SDA	Spray dryer absorber
Se	Selenium
SIP	State Implementation Plan
SO₂	Sulfur dioxide
SPPs	System performance procedures
STPs	Special test procedures
TIE	Toxicity identification evaluation
tpy	Tons per year
TRW	TRW Applied Technologies Division
TSP	Total suspended particulate
TSS	Total suspended solids
UCM	Usibelli Coal Mine, Inc.
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V	Vanadium
WET	Whole effluent toxicity
μg/m³	Micrograms per cubic meter

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END