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July 1993

**ICPP ENVIRONMENTAL MONITORING
REPORT CY-1992**

J. K. Neff

**ICPP ENVIRONMENTAL
MONITORING REPORT
CY-1992****J. K. Neff****July 1993****DISCLAIMER**

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**Westinghouse Idaho
Nuclear Company, Inc.**

PREPARED FOR THE
DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
UNDER CONTRACT DE-AC07-84ID12435

MASTER

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DISTRIBUTION

WINCO STAFF:

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W. C. Moffitt

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J. K. Neff (10)
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ERC (2)

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ACRONYM LIST

BOD	Biological Oxygen Demand
CFSGF	Coal Fired Steam Generating Facility
DCG	Derived Concentration Guides
DO	Dissolved Oxygen
DOE	Department of Energy
EC	Environmental Compliance
EE	Environmental Engineering
EPA	Environmental Protection Agency
FAST	Fluorinel Dissolution Process & Fuel Storage Facility
FPR	Fuel Processing & Restoration
ICPP	Idaho Chemical Processing Plant
MPC	Maximum Permissible Concentrations
NO _x	Nitrogen Oxide
NWCF	New Waste Calcining Facility
PSD	Plant Safety Document
QA	Quality Assurance
RAL	Remote Analytical Laboratory
RCRA	Resource Conservation & Recovery Act
RESL	Radiological & Environmental Sciences Laboratory
SO ₂	Sulfur Dioxide
VOG	Ventilation Off-Gas
WINCO	Westinghouse Idaho Nuclear Company

ICPP ENVIRONMENTAL MONITORING REPORT 1992

I. INTRODUCTION

Summarized in this report are the data collected through Environmental Monitoring programs conducted at the Idaho Chemical Processing Plant (ICPP) by the Environmental Safety & Health (ES&H) Department. This report is published in response to DOE Order 5400.1. This report covers the period from December 21, 1991 through December 20, 1992.

The ICPP is responsible for complying with all applicable Federal, State, Local and DOE Rules, Regulations and Orders. Radiological effluent and emissions are regulated by the DOE in accordance with the Derived Concentration Guides (DCGs) as presented in DOE Order 5400.5. The State of Idaho regulates all nonradiological waste resulting from the ICPP operations including all airborne, liquid, and solid waste.

The ES&H Department completed a Quality Assurance (QA) Plan for Environmental Monitoring activities during the third quarter of 1992. QA activities have resulted in the ICPP's implementation of the Environmental Protection Agency rules and guidelines pertaining to the collection, analyses, and reporting of environmentally related samples. Where no EPA methods for analyses existed for radionuclides, WINCO methods were used.

Table 1-1 summarizes the volumes and activity released from ICPP stacks and liquid release points. The increase in activity for April (airborne) and May (liquid) is due to a tritium release, but this release did not exceed emission limits (DCGs). The tritium release from the Fast Stack was associated with calibration of the FAST Stack monitor. The increased activity in the Service Waste during May was associated with an increased frequency of operation of the PEW, relative to its operation in preceding months, because of LDR issues. The increase of radionuclides in the Service Waste did not exceed levels observed when the PEW, and ICPP, operated under normal routine conditions in previous years. The activity in the Service Waste decreased when the frequency of PEW operation was reduced. Figure 1-1 is a graphic representation of cumulative airborne releases and Figure 1-2 depicts cumulative liquid releases for the year. The graphs allow a comparison to be made of waste volume and activity released for the year. During 1992 the cumulative airborne and liquid release of radionuclides was $3.80\text{E}-01$ curies. Airborne releases to the atmosphere contributed $1.50\text{E}-1$ curies and liquid effluent released to the Percolation Pond contributed $2.3\text{E}-01$ curies. Table 2-5 provides an operations summary for the Coal Fired Steam Generating Facility. Table 3-2 provides information on the concentration of inorganic chemicals present in the service waste. The values are compared to regulatory limits where applicable.

TABLE 1-1
SUMMARY OF RELEASE DATA FOR 1992

AIRBORNE					LIQUID			
Volume (E+09 m3)			Activity (curies)		Volume (E+09 liters)		Activity (curies)	
MONTH	YTD		MONTH	YTD	MONTH	YTD	MONTH	YTD
JAN	0.343	0.343	1.22E-04	1.22E-04	0.214	0.214	1.01E-03	1.01E-03
FEB	0.373	0.716	3.90E-04	5.12E-04	0.226	0.44	5.20E-04	1.53E-03
MAR	0.334	1.05	3.06E-04	8.18E-04	0.205	0.645	8.60E-04	2.39E-03
APR	0.319	1.369	1.47E-01	1.48E-01	0.224	0.869	9.53E-04	3.34E-03
MAY	0.298	1.667	7.14E-04	1.49E-01	0.188	1.057	2.21E-01	2.24E-01
JUN	0.292	1.959	2.02E-04	1.49E-01	0.17	1.227	5.25E-04	2.25E-01
JUL	0.29	2.249	1.03E-04	1.49E-01	0.185	1.412	4.17E-04	2.25E-01
AUG	0.317	2.566	1.07E-04	1.49E-01	0.211	1.623	7.06E-04	2.26E-01
SEP	0.302	2.868	4.86E-04	1.49E-01	0.225	1.848	5.64E-04	2.27E-01
OCT	0.343	3.211	2.33E-04	1.50E-01	0.215	2.063	8.58E-04	2.27E-01
NOV	0.337	3.548	2.72E-04	1.50E-01	0.231	2.294	5.88E-04	2.28E-01
DEC	0.349	3.897	2.44E-04	1.50E-01	0.209	2.503	6.47E-04	2.29E-01

FIGURE 1-1
AIRBORNE RELEASES
CY-1992

FIGURE 1-2
LIQUID RELEASES
CY-1992

II. AIRBORNE MONITORING

1. INTRODUCTION

Airborne radioactive emissions are monitored from the Main Stack (CPP-708), the Fluorine Dissolution Process and Fuel Storage Facility (FAST) Stack (CPP-767), the New Waste Calcining Facility (NWCF) Stack (CPP-659), and the Remote Analytical Laboratory (RAL) Stack (CPP-684). The Main Stack and FAST Stack are equipped with particulate and gaseous monitoring systems. The airborne monitoring systems are based upon a proportional isokinetic sample. Particulate filters are collected and analyzed daily on all of the stacks and gaseous samples are collected and analyzed every two weeks on the Main Stack. Nitrogen oxide (NO_x) emissions are the only nonradioactive airborne contaminant that is monitored from the Main Stack. The NWCF Ventilation Off-Gas (VOG) and RAL VOG systems are continuously monitored for radioactive particulates and the sample filter is collected periodically. Due to the LDR mixed waste curtailments, several analyses for routine monthly samples were impacted. The particulate analyses impacted were Sr-90, Pu-239/240 and Pu-238 for Main, FAST, and RAL stacks. The analyses impacted were C-14 analysis for service waste, Main Stack, and FAST Stack samples. Pu-241 analysis for service waste, Cl-36 analysis, and Sr-89 analyses on service waste and final effluent was curtailed completely. The LDR mixed waste curtailments were in effect during reporting periods May through November, 1992. The Coal Fired Steam Generating Facility (CFSGF) is monitored for NO_x , SO_2 , and opacity in accordance with the State of Idaho, the EPA and the DOE-ID.

Quality assurance objectives for data measurement and laboratory performance are listed in the Quality Assurance Project Plan (QAPJP-001) for the Analysis of the Environmental Samples by both the WINCO Analytical Chemistry Section and Nuclear and Environmental Measurements Section. Final data reduction is performed by the Environmental Characterization section of the Environmental Safety & Health Department.

2. AIRBORNE RELEASES TO THE ENVIRONMENT

2.1 Main Stack

Airborne radioactive release data from the Main Stack for each month and the year are given in Table 2-1. This information is presented graphically in Figure 2-1. Graphic presentations for radionuclides which are most likely to be present (iodine-129, tritium (H-3), cesium-137, strontium-90, ruthenium-106, plutonium (total), antimony-125, and carbon-14) showing yearly trends are given in Figures 2-2 through 2-9, respectively.

Nitrogen oxide (NO_x) emission from the Main Stack is the only nonradioactive airborne contaminant continuously monitored. NO_x concentration levels, while they do not violate any ambient air quality standard, must not exceed limits imposed by the FPR PSD permit. The limits set for the Main Stack are 388 pounds per hour and 1700 tons per year. Figure 2-10 provides NO_x emissions for the last three years. The total NO_x released in 1992 was 14.4 tons, well below the allowable 1700 tons per year.

TABLE 2-1
AIRBORNE RELEASES FROM ICPP MAIN STACK CY-1992
(in curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
C-14			1.19E-09										1.19E-09
CO-57						4.09E-08							4.09E-08
CO-60	2.68E-08	1.36E-07				4.00E-08			1.66E-07		4.80E-08	2.43E-08	4.41E-07
CS-134	4.38E-07	4.05E-06	2.14E-06	4.68E-06	6.83E-08	2.40E-06	8.00E-07	1.06E-06	4.94E-06	1.52E-06	1.31E-06	1.68E-06	2.51E-05
CS-137	5.97E-05	2.42E-04	2.58E-04	3.46E-04	2.42E-05	1.57E-04	6.16E-05	7.78E-05	3.35E-04	1.40E-04	1.93E-04	1.86E-04	2.08E-03
EU-152													0.00E+00
EU-154		1.74E-07							5.34E-07	5.98E-08	1.42E-07		9.10E-07
H-3				3.72E-09									3.72E-09
I-129					6.12E-05								6.12E-05
KR-85													0.00E+00
PU-TOTAL				4.41E-07	3.71E-08	4.08E-08		5.65E-08	4.31E-08	3.69E-08	4.88E-08	3.93E-06	4.63E-06
RU-106	3.51E-05	5.58E-05	2.54E-05	8.16E-05	1.27E-06	9.68E-06	1.06E-05	4.37E-06	1.06E-04	1.38E-05	2.96E-05	2.18E-05	3.95E-04
SB-125	2.90E-06	4.93E-06	9.92E-07	5.86E-06		1.46E-06	1.02E-06	1.20E-06	1.93E-05	3.26E-06	1.62E-06	3.01E-06	4.56E-05
SR-90	1.82E-05	7.52E-05	1.69E-05	8.40E-05		2.69E-05	1.36E-05	1.66E-05	1.24E-05	6.09E-05	4.01E-05	2.42E-05	3.89E-04
TL-208													0.00E+00
TOTAL ACTIVITY	1.16E-04	3.82E-04	3.03E-04	5.23E-04	8.68E-05	1.98E-04	8.76E-05	1.01E-04	4.78E-04	2.20E-04	2.66E-04	2.41E-04	3.00E-03
TOTAL VOLUME (cubic meters)	1.24E+08	1.34E+08	1.24E+08	1.05E+08	7.94E+07	7.92E+07	7.79E+07	7.84E+07	9.50E+07	1.25E+08	1.21E+08	1.25E+08	1.27E+09

*BLANKS = NON-DETECTABLE

4/30/93

Figure 2-1
MAIN STACK EFFLUENT
 Total Activity

Figure 2-2
MAIN STACK EFFLUENT
I-129

No symbol = non-detectable release for the month

Figure 2-3 MAIN STACK EFFLUENT H-3

No symbol = non-detectable release for the month

Figure 2-4
MAIN STACK EFFLUENT
Cs-137

Figure 2-5
MAIN STACK EFFLUENT
Sr-90

No symbol = non-detectable release for the month

Figure 2-6
MAIN STACK EFFLUENT
Ru-106

No symbol = non-detectable release for the month

Figure 2-7
MAIN STACK EFFLUENT
Pu-Total

No symbol = non-detectable release for the month

Figure 2-8 MAIN STACK EFFLUENT Sb-125

Figure 2-9
MAIN STACK EFFLUENT
C-14

No symbol = non-detectable release for the month

Figure 2-10
NOx RELEASED FROM ICPP MAIN STACK

2.2 FAST Stack

Table 2-2 lists the total radionuclide releases in curies from the FAST Stack per month by radionuclide and Figure 2-11 depicts the total monthly activity. Graphic presentations for iodine-129, tritium (H-3), plutonium (Total), and antimony-125 showing yearly trends are given in Figures 2-12 through 2-15, respectively.

2.3 NWCF Stack

Table 2-3 presents the radioactive emissions from the NWCF VOG system. The radionuclides reported are those that have been identified in the ventilation stack emissions. Figure 2-16 depicts the total monthly activity.

2.4 RAL Stack

Table 2-4 presents the radioactive emissions from the RAL VOG system. The radionuclides reported are those that have been identified in the ventilation stack emissions. Figure 2-17 depicts the total monthly activity.

2.5 Coal Fired Steam Generating Facility (CFSGF)

The CFSGF stack is monitored for sulfur dioxide (SO₂), nitrogen oxide (NO_x), and opacity. Emission limits for the stack are set by the Environmental Protection Agency (EPA). Table 2-5 lists the releases per month for the CFSGF. The facility must provide a minimum removal efficiency of 70% for SO₂. The NO_x limit is 0.5 lbs/mm Btu at a steam load greater than or equal to 35,000 pounds per hour, and the opacity limit is 20%. As may be seen by the table, all requirements were met.

TABLE 2-2
AIRBORNE RELEASES FROM ICPP FAST STACK CY-1992
(in curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
C-14													0.00E+00
CO-60		4.95E-08			3.00E-08				3.11E-06				3.19E-06
CS-134		4.06E-08											4.06E-08
CS-137	1.60E-06	1.67E-06	1.17E-06	3.54E-08	4.68E-08	3.16E-07	4.73E-07	7.28E-07	1.05E-06	6.18E-07	4.63E-07	8.02E-07	8.97E-06
EU-152													0.00E+00
EU-154													0.00E+00
H-3				1.46E-01									1.46E-01
I-129													0.00E+00
**KR-85													0.00E+00
MN-54									1.98E-08				1.98E-08
PU-TOTAL					5.19E-08	4.06E-08	3.30E-08	3.18E-08	4.52E-08	3.82E-08	4.72E-08		2.88E-07
RU-106													0.00E+00
SB-125	4.70E-06	6.04E-06	1.91E-06	3.51E-06	3.26E-06	3.27E-06	1.50E-05	5.17E-06	3.89E-06	1.20E-05	5.68E-06	2.38E-06	6.68E-05
SR-90													0.00E+00
TL-208													0.00E+00
TOTAL ACTIVITY	6.30E-06	7.80E-06	3.08E-06	1.46E-01	3.39E-06	3.63E-06	1.55E-05	5.93E-06	8.12E-06	1.27E-05	6.19E-06	3.18E-06	1.46E-01
TOTAL VOLUME (cubic meters)	8.92E+07	8.72E+07	1.07E+08	1.09E+08	1.03E+08	1.07E+08	1.04E+08	1.13E+08	1.06E+08	1.05E+08	1.07E+08	1.06E+08	1.24E+09

*BLANKS = NON-DETECTABLE

4/19/93

Figure 2-11
FAST STACK EFFLUENT
 Total Activity

Figure 2-12 FAST STACK EFFLUENT I-129

MONTHLY TOTAL 1990 CUMULATIVE 1991 CUMULATIVE 1992 CUMULATIVE

No I-129 detected for 1990-1992

No symbol = non-detectable release for the month

Figure 2-13
FAST STACK EFFLUENT
H-3

No symbol = non-detectable release for the month

Figure 2-14
FAST STACK EFFLUENT
Pu-Total

No symbol = non-detectable release for the month

Figure 2-15
FAST STACK EFFLUENT
Sb-125

No symbol = non-detectable release for the month

TABLE 2-3
AIRBORNE RELEASES FROM ICPP NWCF STACK CY-1992
(in curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CS-137		2.08E-07											2.08E-07
PU-TOTAL				3.09E-09									3.09E-09
SR-90		2.67E-08		3.95E-08						3.33E-08			9.95E-08
TOTAL ACTIVITY	0.00E+00	2.35E-07	0.00E+00	4.26E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-08	0.00E+00	0.00E+00	3.11E-07
TOTAL VOLUME (cubic meters)	1.09E+08	1.31E+08	8.34E+07	8.37E+07	9.49E+07	8.51E+07	8.81E+07	1.05E+08	7.98E+07	9.23E+07	8.86E+07	9.73E+07	1.14E+09

Figure 2-16
NWCF STACK EFFLUENT
 Total Activity

TABLE 2-4
AIRBORNE RELEASES FROM ICPP RAL STACK CY-1992
(in curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
CS-137			3.36E-08	1.34E-07		7.07E-08					1.15E-07		3.53E-07
PU-TOTAL													0.00E+00
SR-90													0.00E+00
TOTAL ACTIVITY	0.00E+00	0.00E+00	3.36E-08	1.34E-07	0.00E+00	7.07E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-07	0.00E+00	3.53E-07
TOTAL VOLUME (cubic meters)	2.08E+07	2.08E+07	1.95E+07	2.08E+07	2.02E+07	2.08E+07	2.02E+07	2.08E+07	2.08E+07	2.02E+07	2.08E+07	2.02E+07	2.46E+08

Figure 2-17
RAL STACK EFFLUENT
Total Activity

Table 2-5

**COAL FIRED STEAM GENERATING FACILITY CY-1992
OPERATIONS SUMMARY (MONTHLY AVERAGES)**

<u>UNIT #1</u>					
	<u>% SO₂ Removed</u>	<u>lbs NO_x/ mm Btu</u>	<u>lbs SO₂/ mm Btu</u>	<u>Steam Load lbs of steam/hr</u>	<u>% Opacity</u>
Jan.	86	0.39	0.13	48269	1.5
Feb.	87	0.36	0.11	43866	1
Mar.	88	0.34	0.12	40657	2
Apr.	83	0.39	0.16	35653	2
May	83	0.50	0.17	24909	3
Jun.	88	0.53	0.13	21330	1
Jul.	86	0.54	0.09	18422	2
Aug.	84	0.61	0.10	18818	2
Sep. 01-15	82	0.60	0.12	20838	2
Oct. 29-31	84	0.62	0.10	32356	2
Nov. 01-20	76	0.51	0.11	36966	1
26-30					
Dec. 01-03	86	0.46	0.09	49909	1
18-31					
Requirements	>70	<0.5 (>35,000 lbs/hr steam load) <0.7 (<35,000 lbs/hr steam load)			<20

<u>UNIT #2</u>					
Sep. 12-28	88	0.62	0.08	25033	1
Oct. 07-28	82	0.64	0.11	26545	3
Nov. 21-25	89	0.50	0.07	50217	0
Dec. 04-17	87	0.48	0.08	43583	1
Requirements	>70	<0.5 (>35,000 lbs/hr steam load) <0.7 (<35,000 lbs/hr steam load)			<20

Coal Burned	12,464 tons
Avg. Btu/lb	0.07 (As received)
Avg. % Sulfur	0.50 (As received)

III. LIQUID MONITORING

1. INTRODUCTION

Liquid monitoring discussed in this report includes: 1) Service Waste System, 2) Sewage Treatment Plant, and 3) Production and Potable Water Wells. Quality Assurance objectives for measurement data and laboratory performance are listed in both the Quality Assurance Project Plan for the Analysis of Environmental Samples by the WINCO Analytical Chemistry Section and the Nuclear and Environmental Measurements Quality Assurance Project Plans for Work Subject to EPA QAMS-005/80.

2. LIQUID RELEASES TO THE ENVIRONMENT

2.1 Service Waste System

Liquid waste streams are generated from all areas of the ICPP. The Waste streams vary in volume and degree of contamination. Waste streams are disposed of through the Service Waste System to the Percolation Pond #2.

Isotopic release and inorganic chemicals data for the Service Waste System for each month and year totals are presented in Table 3-1 and 3-2. The radionuclides reported are those that have been found in the past. Listed radionuclides that do not have values shown were not observed during the reporting month. Note that for liquid releases to the environment, isotopic plutonium and uranium data is classified and thus will only be discussed as Pu-Total or U-Total. Figure 3-1 depicts the total monthly activity released to the active Percolation Pond at ICPP.

Figure 3-2 depicts total plutonium and total uranium found in the service waste stream. The quantity of plutonium and uranium released to the Pond remained relatively constant during 1992. Plutonium and uranium releases have remained relatively stable since the fourth quarter of 1985. Figures 3-3 through 3-6 present trend information for select radionuclides in the Service Waste. The increased activity in the Service Waste was associated with an increased frequency of operation of the PEW, relative to its operation in preceding months, because of LDR issues. The increase of radionuclides in the Service Waste during May did not exceed levels observed when the PEW, and ICPP, operated under normal routine conditions in previous years. The activity in the Service Waste decreased when the frequency of PEW operation was reduced.

Table 3-3 list the monthly DCG release ratios respectively for individual radionuclides. The ratio is calculated by dividing the detected radionuclide concentration by the established limit. Governmental regulations state that a corrected total ratio of 1.0 equals allowable radionuclide concentrations. WINCO has set an additional restriction on the allowable release of total radionuclides; i.e. WINCO will not exceed a DCG ratio of 1.0. The ICPP did not approach the total allowable release at any time during 1992. The ICPP did not exceed a ratio of 1.0 during any month in 1992.

TABLE 3-1
SERVICE WASTE RELEASES CY-1992
(in curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
C-14													0.00E+00
CE-144													0.00E+00
CO-60													0.00E+00
CS-134													0.00E+00
CS-137	3.08E-04	1.78E-05	2.68E-04	2.85E-04	1.58E-03		2.28E-05	2.27E-05	1.97E-05		2.15E-05		2.55E-03
EU-152													0.00E+00
EU-154													0.00E+00
H-3					2.18E-01								2.18E-01
I-129													0.00E+00
PU-TOTAL	2.40E-05	5.55E-06	3.98E-06	6.54E-06	7.28E-06	4.62E-06	1.15E-05		6.57E-06	6.21E-06	8.92E-06	1.02E-05	9.54E-05
RU-106										2.76E-04			2.76E-04
SB-125			7.14E-05										7.14E-05
SR-90	2.50E-04		1.59E-04	1.96E-04	9.46E-04	2.15E-04		1.64E-04				1.42E-04	2.07E-03
U-TOTAL	4.30E-04	4.97E-04	3.58E-04	4.65E-04	3.89E-04	3.05E-04	3.83E-04	5.19E-04	5.38E-04	5.76E-04	5.58E-04	4.95E-04	5.51E-03
TOTAL ACTIVITY	1.01E-03	5.20E-04	8.60E-04	9.53E-04	2.21E-01	5.25E-04	4.17E-04	7.06E-04	5.64E-04	8.58E-04	5.88E-04	6.47E-04	2.29E-01
TOTAL VOLUME (liters)	2.10E+08	2.22E+08	1.99E+08	2.18E+08	1.82E+08	1.65E+08	1.80E+08	2.05E+08	2.19E+08	2.07E+08	2.23E+08	2.03E+08	2.43E+09

*BLANKS = NON-DETECTABLE

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TABLE 3-2 SERVICE WASTE CY-1992
(in mg/L)

INORGANIC CHEMICALS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	EPA TOXICITY TOTAL
ARSENIC (As)								3.60E-03					5.00E+00
BARIUM (Ba)	8.80E-02	9.14E-02		8.79E-02	8.06E-02		9.11E-02	9.82E-02	1.00E-01	9.37E-02	9.31E-02	9.60E-02	1.00E+02
CADMIUM (Cd)												3.80E-03	1.00E+02
CHROMIUM (Cr)						2.02E-02	1.92E-02					9.00E-03	5.00E+00
SELENIUM (Se)										9.10E-03			1.00E+00
SILVER (Ag)													5.00E+00
SODIUM (Na)	1.45E+02	1.60E+02	1.44E+02	1.40E+02	1.40E+02	1.40E+02	1.70E+02	1.60E+02	1.50E+02	1.50E+02	1.60E+02	1.60E+02	N/A
CHLORIDE ION	2.63E+02	2.57E+02	2.09E+02	2.31E+02	2.16E+02	2.25E+02	2.48E+02	2.55E+02	2.49E+02	2.39E+02	2.25E+02	2.47E+02	N/A
FLUORIDE ION	2.18E-01	2.05E-01	2.09E-01	2.11E-01	2.01E-01	2.07E-01	2.02E-01	2.15E-01	2.19E-01	2.24E-01	2.27E-01	2.28E-01	N/A
NITRATE ION	5.24E+00	1.05E+01	7.69E+00	6.02E+00	6.32E+00	7.67E+00	3.97E+00	4.10E+00	4.28E+00	4.21E+00	4.51E+00	6.20E+00	N/A
SULFATE ION	2.77E+01	2.74E+01	2.62E+01	2.75E+01	2.80E+01	2.63E+01	2.49E+01	2.66E+01	2.71E+01	2.65E+01	2.78E+01	2.68E+01	N/A
PHOSPHATE ION		6.10E-01											
WATER QUALITY PARAMETERS													AVERAGE
TDS(mg/l)	5.70E+02	5.66E+02	5.40E+02	5.10E+02	5.18E+02	6.20E+02	6.10E+02	5.90E+02	6.00E+02	6.50E+02	6.50E+02	6.70E+02	
CONDUCTIVITY (uMHOS)	1.20E+03	1.10E+03	1.10E+03	1.10E+03	1.05E+03	1.10E+03	1.20E+03	1.10E+03	1.10E+03	1.20E+03	1.50E+03	1.10E+03	
pH	8.5	8.4	8.4	8.5	8.4	8.5	8.1	8.1	8.5	8.4	8.4	8.7	

*BLANKS = NON-DETECTABLE

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Figure 3-1
SERVICE WASTE EFFLUENT
Total Activity

Figure 3-2
SERVICE WASTE EFFLUENT
Pu-Total

Figure 3-3
SERVICE WASTE EFFLUENT
H-3

No symbol = non-detectable release for the month

Figure 3-4 SERVICE WASTE EFFLUENT Ru-106

No symbol = non-detectable release for the month

Figure 3-5
SERVICE WASTE EFFLUENT
Sr-90

No symbol = non-detectable release for the month

Figure 3-6
SERVICE WASTE EFFLUENT
Cs-137

2.2 Production and Potable Water Wells

There are two production wells and one potable water well for influent at the ICPP. The production wells are operated alternately. Grab samples are collected monthly from the operating wells. Radiological analysis of the well water is done by the Department of Energy's Radiological and Environmental Sciences Laboratory (RESL).

Nonradiological analyses for arsenic, barium, cadmium, chloride, chromium, lead, mercury, nitrate, selenium, and silver are performed monthly by the Analytical Chemistry group. Periodically, grab samples are analyzed for the following organic contaminants: total organic carbon; Endrin; Lindane; Methoxychlor; Toxaphene; 2-4-D; and 2,4,5-TP Silex.

Tables 3-4 and 3-5 list the results of the analyses performed on the Production and Potable Water Wells. All results indicate that the ICPP well waters are below all applicable regulatory standards for trace metals and organics. The Industrial Safety section collects monthly samples of the wells to perform analyses for tritium and strontium, and sends the samples off-site to Acculab in Colorado.

2.3 Sewage Treatment Plant

Domestic waste water at the ICPP is pumped to the Waste Water Treatment Facility which is located outside the security fence. WINCO Power Plant Services is responsible for the operation and maintenance of the Waste Water Treatment Facility. The facility is sampled by EG&G personnel using grab samples taken five days per week (Monday through Friday). The WINCO Environmental Safety & Health Department monitors the operation and performance of the domestic Waste Water Treatment Plant. Table 3-6 lists the monthly Biological Oxygen Demand (BOD), Dissolved Oxygen (DO) and pH for 1992. Table 3-6 also lists the monthly strontium, quarterly plutonium (total), and DCG release limit values for 1992. DCGs are not release limits, but rather are screening values for considering Best Available Technology (BAT) for discharges and dose estimates. The BAT process shall be implemented if liquid wastes discharged into sanitary sewerage contain radionuclides at concentrations, averaged monthly would otherwise be greater than five times the DCG values. The ICPP did not exceed any release limits.

Monthly influent (raw) and effluent (final) Biological Oxygen Demand (BOD) concentrations are shown in Figure 3-8A. The difference in concentrations between influent BOD and effluent BOD represents the treatment efficiency (Figure 3-8B).

Since the facility has been operational, treatment efficiency has met design (80%) criteria except during algae blooms when excess algae overflows the effluent weir. Dissolved Oxygen (DO) levels in the influent and effluent are also indicators of proper operation. Values for influent and effluent DO are shown in Figure 3-8. Figure 3-8 shows peaks which may be high because of algae collected in the sample bottle continues to respire after the sample is collected. As a result, the algae in the sample bottle produces an erroneously high DO for the effluent.

2.4 ICPP Injection Well

The ICPP injection well was permanently sealed in November 1989.

TABLE 3-3
DCG RATIOS - DOE CY-1992
(in curies)

RADIONUCLIDES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
C-14												
CE-144												
CO-60												
CS-134												
CS-137	4.90E-04	2.67E-05	4.50E-04	4.37E-04	2.90E-03		4.23E-05	3.70E-05	3.00E-05		3.21E-05	
EU-152												
EU-154												
H-3					6.00E-04							
I-129												
PU-TOTAL	2.85E-03	6.25E-04	5.00E-04	7.50E-04	1.00E-03	7.00E-04	1.72E-03		7.50E-04	7.50E-04	1.00E-03	1.26E-03
RU-106										2.22E-04		
SB-125			7.18E-06									
SR-90	1.19E-03		8.00E-04	9.00E-04	5.20E-03	1.30E-03		8.00E-04				7.00E-04
U-TOTAL	3.82E-03	4.23E-03	9.98E-04	4.02E-03	4.04E-03	2.60E-03	4.02E-03	4.78E-03	4.63E-03	5.23E-03	4.70E-03	4.60E-03
TOTAL	8.35E-03	4.88E-03	2.76E-03	6.11E-03	1.37E-02	4.60E-03	5.78E-03	5.62E-03	5.41E-03	6.20E-03	5.73E-03	6.56E-03
TOTAL AFTER 10% EXCLUSION	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*BLANKS = NON-DETECTABLE

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TABLE 3-4
PRODUCTION WELL CY-1992
(in mg/L)

INORGANIC CHEMICALS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DRINKING WATER STANDARDS
ARSENIC (As)							2.00E-03		3.10E-03				5.00E-02
BARIUM (Ba)	6.40E-02	7.87E-02	8.25E-02	8.13E-02	8.25E-02	8.04E-02	8.29E-02	7.80E-02	7.95E-02	8.51E-02	7.60E-02	8.05E-02	1.50E+01
CADMIUM (Cd)										4.89E-03			1.00E-02
CHROMIUM (Cr)	6.50E-03	7.72E-03	5.59E-03	6.40E-03	5.59E-03	5.07E-03		4.90E-03	1.86E-03	1.05E-02	8.78E-03	5.90E-03	5.00E-02
LEAD (Pb)													5.00E-02
MERCURY (Hg)													2.00E-03
SELENIUM (Se)		3.30E-03	2.80E-03	2.42E-03	2.80E-03	2.50E-03				3.20E-03			1.00E-02
SILVER (Ag)													5.00E-02
SODIUM (Na)	6.82E+00	8.30E+00	7.20E+00	6.33E+00	7.20E+00	7.70E+00	8.40E+00	8.00E+00	6.90E+00	7.50E+00	7.80E+00	7.30E+00	N/A
CHLORIDE ION	1.83E+01	1.78E+01	1.77E+01	1.78E+01	1.77E+01	1.87E+01	1.74E+01	1.81E+01	1.71E+01	1.87E+01	1.70E+01	1.71E+01	2.50E+02
FLUORIDE ION	2.22E-01	2.01E-01	2.13E-01	2.12E-01	2.13E-01	1.99E-01	1.99E-01	2.05E-01	2.20E-01	2.04E-01	2.19E-01	2.10E-01	2.20E+00
NITRATE ION	4.07E+00	4.07E+00	4.03E+00	4.04E+00	4.03E+00	4.44E+00	5.22E+00	4.33E+00	4.43E+00	4.31E+00	4.32E+00	4.45E+00	4.50E+01
SULFATE ION	2.47E+01	2.52E+01	2.52E+01	2.52E+01	2.52E+01	2.50E+01	2.44E+01	2.57E+01	2.48E+01	2.74E+01	2.59E+01	2.67E+01	2.50E+02
PHOSPHATE ION													N/A

*BLANKS = NON-DETECTABLE

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TABLE 3-5
POTABLE WATER WELL CY-1992
(in mg/L)

INORGANIC CHEMICALS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DRINKING WATER STANDARDS
ARSENIC (As)													5.00E-02
BARIUM (Ba)	8.40E-02	8.64E-02	8.53E-02	8.92E-02	8.53E-02	8.41E-02	8.31E-02	8.08E-02	8.14E-02	9.69E-02	8.29E-02	8.83E-02	1.00E+01
CADMIUM (Cd)													1.00E-02
CHROMIUM (Cr)	9.10E-03	5.45E-02	5.32E-03	7.08E-03	5.32E-03	5.72E-03		5.10E-03		9.57E-03	7.70E-03	6.25E-03	5.00E-02
LEAD (Pb)													5.00E-02
MERCURY (Hg)													2.00E-03
SELENIUM (Se)		3.20E-03	2.80E-03	2.61E-03	2.80E-03	2.00E-03				3.20E-03			1.00E-02
SILVER (Ag)													5.00E-02
SODIUM (Na)	7.64E+00	8.50E+00	7.70E+00	6.51E+00	7.70E+00	7.40E+00	7.80E+00	8.60E+00	7.30E+00	7.70E+00	8.10E+00	7.30E+00	N/A
CHLORIDE ION	1.72E+01	1.72E+01	1.75E+01	1.74E+01	1.75E+01	1.71E+01	1.78E+01	1.73E+01	1.40E+01	1.91E+01	1.72E+01	1.71E+01	2.50E+02
FLUORIDE ION	2.14E+01	1.97E-01	2.08E-01	2.10E-01	2.08E-01	2.00E-01	2.02E-01	2.39E-01	2.19E-01	2.14E-01	2.24E-01	1.99E-01	2.20E+00
NITRATE ION	4.05E+00	4.12E+00	4.24E+00	3.88E+00	4.24E+00	4.61E+00	6.13E+00	4.91E+00	4.42E+00	4.30E+00	4.50E+00	4.34E+00	4.50E+01
SULFATE ION	2.48E+01	2.51E+01	2.43E+01	2.50E+01	2.43E+01	2.44E+01	2.44E+01	2.50E+01	3.12E+01	2.51E+01	2.59E+01	2.61E+01	2.50E+02
PHOSPHATE ION													N/A

*BLANKS = NON-DETECTABLE

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TABLE 3-6
SEWAGE TREATMENT PLANT ANALYSIS CY-1992

(mg/l)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DESIGN STANDARD
RAW BOD	202	198	163	269	298	194	218	171	169	154	131	196	150
FINAL BOD	18	30	33	34	15	12	16	26	20	22	16	17	30
EFFICIENCY	91	85	80	87	95	94	93	85	88	86	88	91	80%
RAW DO	2.20	1.20	0.60	0.70	0.40	0.30	0.30	0.30	0.40	0.40	0.50	1.40	<1E-01
FINAL DO	10.8	9.9	10.1	8.5	4.7	3.7	5.5	5.6	7	7.7	9.4	10.2	>3.0
RAW PH	8.7	8.8	9	8.7	8.6	8.4	8.3	8.2	8.4	8.5	8.5	8.4	<6.0
FINAL PH	8.2	8.3	8.8	8.6	8.1	7.9	8	7.9	8.1	8.3	8.5	8.1	>6.5
TOTAL VOL (LIT)	3.51E+06	4.24E+06	5.98E+06	5.72E+06	5.83E+06	4.77E+06	4.73E+06	6.13E+06	6.28E+06	7.61E+06	8.33E+06	6.28E+06	
RADIONUCLIDES (CURIES)													YTD
SR-89		3.29E-06											3.29E-06
SR-90	1.61E-06								3.14E-06	4.56E-06			9.31E-06
PU-TOTAL (QTR)									6.91E-06				6.91E-06
													DCG LIMIT (uCi/mL)
													2.00E-05
													1.00E-06
													3.00E-08

*BLANKS = NON-DETECTABLE

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Figure 3-7A
SEWAGE TREATMENT PLANT
BOD

Figure 3-7B
SEWAGE TREATMENT PLANT
BOD Efficiency

Figure 3-8
SEWAGE TREATMENT PLANT
DO

Figure 3-9
SEWAGE TREATMENT PLANT
pH

Figure 3-10
SEWAGE TREATMENT PLANT
Volume

**DATE
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