# 付　属　資　料

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1. 要請書

TECHNICAL COOPERATION
BY THE GOVERNMENT OF JAPAN

APPLICATION

By the Government of the Republic of Kazakhstan for the development study on the environmental management master plan for the Caspian Sea region Development Program in the Republic of Kazakhstan to the Government of Japan.

1. Project digest

( ) Project Title

Development of an environmental management master plan for the Caspian Sea offshore development program in the Republic of Kazakhstan

( ) Location

Coastal areas of Atyrau and Manghystau states and the northern western part of the Caspian shelf

( ) –1. Responsible Agency

Ministry of Environmental Protection

–2. Executing Agency

Ministry of Environmental Protection
Ministry of Energy and Natural Resources
Ministry of transport and communication
Ministry of agriculture
Agency of Emergency Situation
Atyrau state government
Manghystau state government

( ) Objectives of the study

The objective of this study is to develop an environmental management master plan to assess the environmental impacts of the Caspian Sea Development Program on adjacent areas and to minimize or to prevent the area from the negative impacts as well as to cope with present environmental problems in this area.

( ) Back ground of the request

a Natural resources in the northern western part of the Caspian shelf

The Caspian Sea is the largest inland sea in the world with the surface area of 420. 000 $Km^2$. The average depth in the northern western part of the Caspian shelf is less than 5m. The Volga delta and the Ural delta, where sea water mixes with inflowing freshwater, show a special biodiversity. These delta areas are important habitat for seasonal birds migration. It is reported that more than 10 million birds including pelicans and goose rest or nest in these areas.

The northern western part of the Caspian shelf is known as a natural habitat of a lot of fish including sturgeon and endangered fish such as Caspian salmon and Caspian eel. This area is also an important population of indigenous seals. The republic of Kazakhstan of the Soviet Socialist Republics registered this area a reserve for wild life in 1974.

The Caspian sea level has been continuing to rise. Its surface area in 2000, 418 thousand $Km^2$, is 10% larger than that in 1975, 378 thousand $Km^2$, which resulted in rise in the water level by 2.5 m.

b Environmental problems in the northern western part of the Caspian shelf

The northern western part of the Caspian shelf is rich in oil deposits. About 47% of the nation's oil reserves locates in this area. Intensive oil exploitation and production without considering environment caused the following environmental problems:

- Air pollution caused by dust, sulfur oxides and nitrogen oxides resulted from associated gas burning
- Marine pollution caused by wastewater containing oil discharged from oil production facilities
- Soil pollution caused by oil wastes from drilling
- Soil pollution caused by oil spillage or leakage from outdated pipelines

It was reported that more than 200 oil wells and oil fields were flooded because of rising sea water level. Some oil companies tried to prevent oil wells from flooding by building up the dykes. however, they did not efficiently work to stop the sea water coming into the wells and the oil may have a threat to flow into the ocean. Urgent measures are required to prevent water pollution by oil leaking from the abandoned oil wells under the sea.

Those air, water and soil pollutions have considerably given negative impacts on the natural environment such as decrease of the habitat for birds in the Ural and Volga delta areas, sudden

death in large number of seals and drop in catch of fish. Though it is difficult to refer to the relation between environmental conditions and human health problems, the number of patients suffering from cancer is 2 or 3 times higher than that of the national average.

c Caspian Sea Development Program

The government of Kazakhstan approved "the Caspian Sea Development Program" which was designed to exploit oil in the Caspian Sea shelf in March 2003. This program was developed based on the mid-term program up to 2010 in the nation's long-term development strategy, "Kazakhstan 2030". This program will be commenced in 2005 and aims at producing 100 million tons of oil and 63 billion m3 of gas in 2010.

The government of Kazakhstan gave the highest priority to minimize negative impacts on the environment and to prevent disasters accompanying the implementation of this program. Especially, the government decided to develop an environmental management program taking account of the following three points by the end of 2004.

- Creation of clear legal framework
- Preservation of biodiversity in the Caspian Sea shelf
- Environmental management by public participation

The government will be able to carry out its environmental protection work such as the evaluation of environmental impact assessments and environmental protection measures for the oil and gas exploitation projects on the basis of this new environmental preservation program.

( ) Expected outputs of the study

- Natural environment condition in the study area will be recognized
- Environmental pollution in the study area will be recognized
- A government organization, laws, institutions, norms required to cope with the present environmental problems as well as to prevent environmental pollutions accompanying the oil and gas exploitation will be prepared
- Measures to solve urgent environmental problems will be implemented
- Facilities and materials required for the government to prevent disasters accompanying the offshore oil and gas exploitation will be recognized and their arrangement plan will be developed
- Comprehensive environment information system enabling to assess the northern western part of the Caspian shelf and its coastal area will be developed.

2. Terms of Reference of the proposed study

( ) Scope of the study

a First step

) Review of present condition, database construction and complementary study

- Government system for environmental protection
  - Institution, organization, laws, norms
- Natural resources and socio-economic information
  - Evaluation of the natural resources inventory system under development by the Ministry of Environment Protection
  - Meteorological and ocean observation data
  - Topography in the Caspian Sea shelf and coastal area
  - Satellite pictures in the Caspian Sea shelf and coastal area
  - Socio-economic information
- Environmental pollutions
  - Environmental monitoring data
  - Pollution sources and amount of pollutants
  - Environmental damages including health problems
  - Environmental analysis (air, water, soil and sediment)
- Review of foreign environmental protection measures for offshore oil and gas exploitation
- Estimation of the amount of pollutants to be emitted during the implementation of "the Caspian Sea Development Program"

b Second step

- Identification of problems in the present measures for the environmental pollutions
  - Problems in the government system for the environmental protection
  - Assessment of environmental pollutions by the implementation of "the Caspian Sea Development Program" under the present government system
- Development of a geographical information system, GIS, for the natural environment
  - Development of a geographical information system on the natural environment and pollution sources based on the information and data collected in the first step

c Third step

- Development of the environmental management master plan
  - Reorganization of the government, institution and revisions of laws

- Facilities and materials required for the government to prevent disasters accompanying the offshore oil and gas exploitation
- Measures to deal with the present environmental pollutions

( ) Study term

18 months

( ) Other relevant information

The ministry of energy and natural resources requested the government of Japan of the study on " environmental management plan of the northern Caspian Sea region in the Republic of Kazakhstan" in 2001. The objective of this study is to develop a master plan for dealing with marine pollution caused by oil leakages from flooded abandoned oil wells. The ministry requests the same study this year.

The five nations, the Republic of Azerbaijan, the Islam Republic of Iran, the Republic of Kazakhstan, Russian Federation and Turkmenistan organized "the Coordination Committee on Hydrometeorology and Pollution Monitoring of the Caspian Sea (CASPCOM) for preserving the Caspian Sea environment by the assistance of the World Meteorological Organization. CASPCOM has been requesting possible assistance to international organization and companies exploiting oil and gas in the Caspian Sea for replacing outdated equipment and creating a database on the Caspian Sea.

3. Undertaking of the Government of the Republic of Kazakhstan

In order to facilitate a smooth and efficient conduct of the study, the government of the Republic of Kazakhstan shall take necessary measures;

( ) To secure the study team

( ) To permit the members of the study team to enter, leave and sojourn in Kazakhstan in connection with their assignment therein and exempt them from alien registration requirements and consular fees.

( ) To exempt the study team from taxes and any other charges on equipment, machinery and other materials brought into and out Kazakhstan for the conduct of the study.

( ) To exempt the study team from income tax and charges of any kind of imposed on or in connection with any emoluments or allowances paid to the members of the study team for their services in connection with the implementation of the study

( ) To provide necessary facilities to the study team for remittance as well as utilization of the

funds introduced in Kazakhstan from Japan in connection with the implementation of the study.

( ) To secure permission for entry into private properties or restricted areas for the conduct of the study.

( ) To secure permission for the study to take all data, documents and necessary materials related to the study out of Kazakhstan to Japan.

( ) To provide medical services as needed. Its expenses will be chargeable to members of the study team.

( ) The government of Kazakhstan shall bear claims if any arises against member(s) of the Japanese study team resulting from occurring in the course of or otherwise connected with the discharges of their duties in the implementation of the study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the study team.

( ) The Ministry of Environment Protection shall act as counterpart to the Japanese study team and also as coordination body in relation with other government and non-government organizations concerned for the smooth implementation of the study.

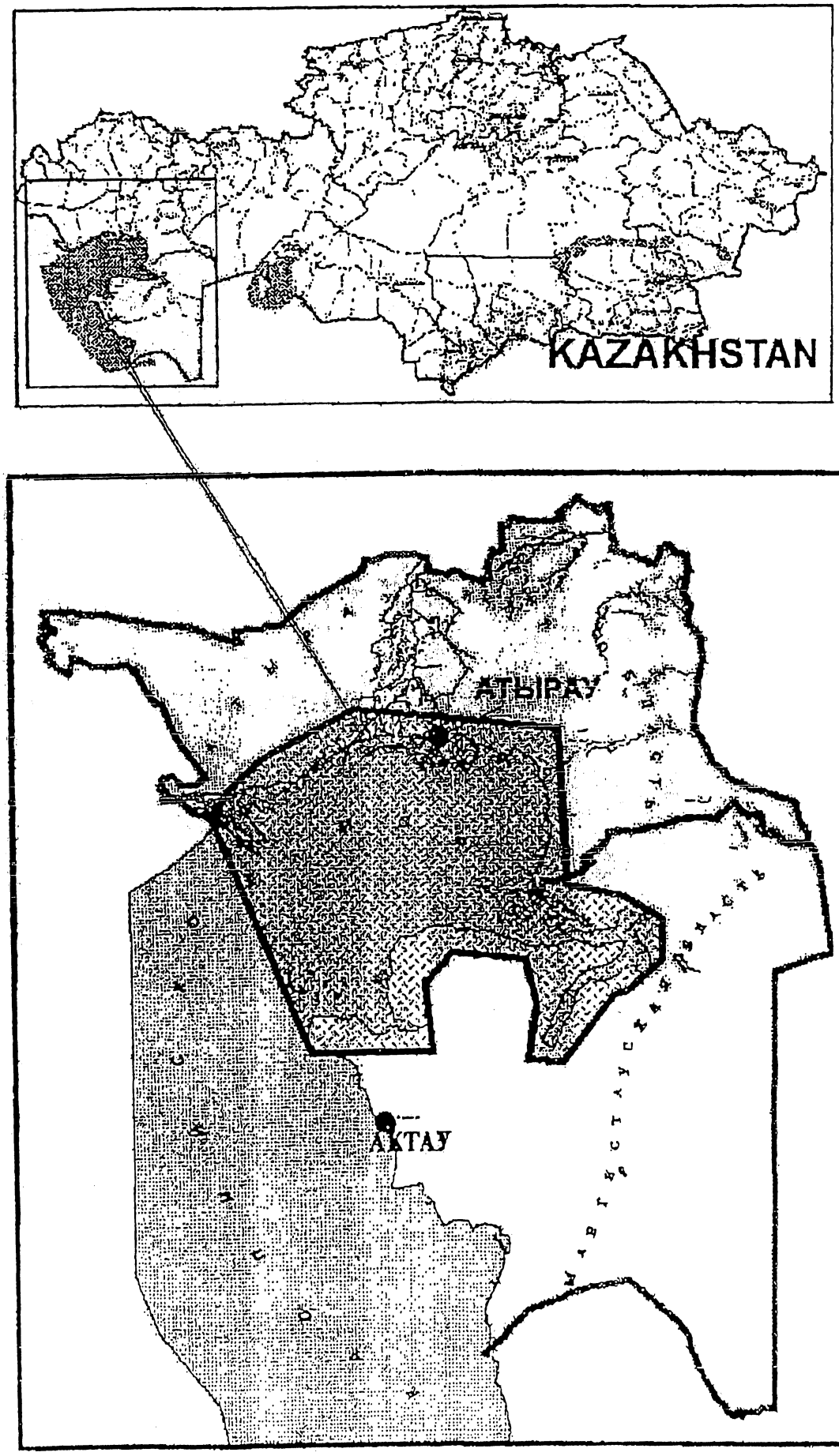
The Government of Kazakhstan assured the matters referred in this form will ensure for a smooth conduction of the development study by the Japanese study team.

Signed _____

Title _____

On behalf of the Government of Kazakhstan

Date _____




РАЙОН ПРОВЕДЕНИЯ ИССЛЕДОВАНИЯ

2. 署名した協議議事録（M/M）

# MINUTES OF MEETING
# OF
# PROJECT FORMULATION STUDY
# FOR ENVIRONMENTAL MANAGEMENT MASTER PLAN FOR
# THE CASPIAN SEA
# IN
# THE REPUBLIC OF KAZAKHSTAN

The Project Formulation Study Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Masato Koie, visited Kazakhstan from April 11, 2004 to April 22, 2004.

The Team had a series of discussions with Ministry of Environmental Protection (hereinafter referred to as "MOEP") and other related authorities.

Discussions were conducted in a cooperative atmosphere, and both sides agreed to record the following points as the summary conclusion of the discussions.

ASTANA, April 20, 2004

鯉江 雅人

**Mr. Masato Koie**
Leader
Project Formulation Study Team
Japan International Cooperation Agency

**Mr. Nurlan A. Iskakov**
Vice-Minister
Ministry of Environmental Protection
The Republic of Kazakhstan

**Mr. Rustem N. Khamzin**
Director of Department of International
Economical and Financial Relations
Ministry of Economy and Budget Planning
The Republic of Kazakhstan

**1. Confirmation of the facts**

The Team confirmed the following facts (see also attached table).

(1) Responsibility-identified facilities:

Responsibility-identified facilities such as operating oil well, refinery, transportation, waste from exploration and production stipulated with treatment by relevant laws and concession are fairly well managed. In this case owners of the facilities are responsible for management/treatment of pollutants (Polluter Pay Principle; P.P.P). Government/authority of environmental protection is responsible for monitoring and controlling in accordance with effluent/emission standards/ regulations. Laws and institutions are fairly well organized and oil companies observe the compliances with pollutant management in Kazakhstan.

(2)Responsibility-unidentified facilities: abandoned oil wells expired licenses represent this case. The Team understands that the responsibility has to be taken by the government (Ministry of Energy and Natural Resources/ Committee of Geology and Protection of Natural Resources), while the Team were unfortunately not able to conduct a extensive research on this case. The Study would not focus on handling the safe closure of the offshore abandoned oil wells which shall be treated by Ministry of Energy and Natural Resources/ Committee of Geology and Protection of Natural Resources. However if the work would require the assistance from Japan, a new project can be requested in another cooperation scheme.

(3)The environmental administration/enforcement is, however, not fully effective because of a constraint of out-of-date environmental standards/ regulations and pollution control management system.

(4) Therefore it is necessary to implement the following points:

1) to enhance the capacity of environmental protection administration by introducing a updated pollution control system,

2) to develop more appropriate environmental standards in accordance with the activities of modern oil industry,

3) to enhance the capacity of environmental management with the purpose to strengthen enforcement of administration, and

4) to install appropriate monitoring system.

**2. Outline of the Study**

The Team and Kazakhstan side discussed and drafted an outline of the Study. Both parties shared ideas on the tentative Scope of Work of the Study and agreed with following points.

(1)Title of the Study:

The Study for capacity building on pollution control in petroleum industries for protecting environment in the Caspian Sea in the Republic of Kazakhstan

(2)Objective of the Study:

The objective of the Study is to build capacity and capability in pollution control in the environmental protection administration to mitigate the Caspian Sea environmental degradation caused by petroleum industrial activities.

(3)Area to be covered by the Study:

Northeastern part of the Caspian Sea and its coastal area.

(4)Tentative scope of the Study:

In order to achieve the objective, the study will be composed of the following tasks:

1) assistance to the capacity- building for legal, institutional and managerial aspects

- review of existing laws, regulations and standards
- recommendation of more effective legal framework for establishing modernization of current law system

2) assistance to the capacity- building for human resources and technical aspect

- monitoring and analyzing various hydrocarbon contaminants, derivatives and other pollutants in northeastern part of the Caspian Sea and its coastal area
- guidance for establishing environmental protection measures based on the evaluation of data acquired

(5)Counterpart organization:

MOEP is the responsible ministry for the Study. MOEP will organize the Steering Committee and appoint the appropriate personnel for the Study by the commencement of the Study.

MOEP' Atyrau office is the implementing organization of the study.

(6)Experts provided by JICA:

1) leader/capacity building advisor

2) expert on pollution prevention administration

3) expert on contaminants analyses

4) expert on environmental pollution monitoring

5) coordinator/interpreter

(7)Tentative Study schedule:

18 months (shown in Appendix 1.)

(8)Expected outputs of the Study:

1) Master plan and recommendations to government policy of pollution control in petroleum industries

2) Development of hydrocarbon contaminants and other pollutants analyses/evaluations

3) Environmental monitoring map in the Caspian Sea

4) International conference on the environmental protection of the Caspian Sea

**3. Data and information required**

The Team requested that the necessary data and information for drafting the Scope of Work for the Study be provided to JICA before the commencement of the preparatory study.

**4. Undertakings of JICA**

For the Implementation of the Study, JICA shall take the following measures:

(1) to dispatch, at its own expense, study teams to Kazakhstan,

(2) to equip necessary instruments for analyses,

(3) to conduct field study for environmental monitoring in the Caspian Sea, and

(4) to pursue technology transfer to the counterpart personnel of MOEP in the course of the Study.

**5. Expected procedures and steps for the Study**

The Team explained that the final decision on the Study implementation would be subject to relevant reviews by JICA and consultation with concerned officials in the Government of Japan.

After the favorable decision made by GOJ, JICA will dispatch a preparatory study team to further discuss and decide the Scope of Work of the Study.

MOEP requested the Team to pursue the matter with GOJ so that the Study can be implemented in the earliest convenience.

**6. Otheres**

(1) MOEP requested the Team to provide counterpart training in Japan. The Team pledged to convey this request to JICA headquarters.

(2) MOEP requested the Team that the instruments equipped by JICA should be provided to Kazakhstan after the Study for continuing environmental administration. The Team pledged to convey this request to JICA headquarters.

(3) Concerning the registration and certification of the analytical instruments provided by JICA, MOEP and JICA agreed to cooperate prompt processing in official procedures in Kazakhstan.

Table. Outline of survey results

Oil & gas industrial activities causing environmental degradation and counter-measures/mitigation of air, water and soil/sediment pollution to affect the Caspian Sea environment.

| Activity | | Work/ phenomena | Pollutant | Protection measure | Results of survey and recommendation |
|---|---|---|---|---|---|
| Oil and Gas development | Exploration | drilling | drilling mud/ cuttings | banning of dumping at sea treatment on land | · Kashagan Project is treating them in Manghystau state |
| | | blowout | oil | oil spill contingency plan | · Establish oil spill contingency plan with the Caspian Sea countries |
| | Well development and production | lubricant, laboratory reagents, livelihood water | waste water effluent | injection | Not studied, however<br>· MOEP will prohibit any effluent discharge to the Sea and request to treat them on the land. |
| | | oil spill (offshore) | oil | oil spill contingency plan | · Establish Oil spill contingency plan with the Caspian Sea Countries |
| | | oil spill (onshore) | oil | treatment of oil contaminated soil/sediment | · National Oil Company (EmbaMunaiGaz) is ready to issue tender documents to treat oil sludge. Technologies for treating oil sludge are available in Kazakhstan.<br>· Tengizchevroil is treating them by bioremediation (compost method) using dry grass |
| | | tank | hydrocarbon | floating roof tan | Not studied |
| | | production water | waste water | waste water treatment | · Underground injection is used commonly for the secondary recovery. |
| | | flaring | air emission | injection | · Very large flares are observed and some of them are making black soot by incomplete burning.<br>· Environmental problem caused by gas flaring might be solved after completion of Sour Gas Injection that will be operated in 3rd quarter 2006. |
| | Site abandonment | closing well | oil | cementing | · Closing wells on the land were managed in the good level. Kazakhstan has technology to close wells.<br>· The only one but confronted problem is how to access to submerged wells. |
| | | abandonment platform | platform | dismantle | Not studied |
| Refining and marketing | Refinery and depot | onsite (refining process) | air emission | flue gas desulfurization, low sulfur fuel | · Reconstruction project of Atyrau Refinery will contribute the remarkable environmental improvement in Athyrau city and Kazakhstan. |
| | | tanks, delivery and shipping | hydrocarbon | floating roof tank | |
| | | process and rainfall | waste water | water treatment | Not studied |
| | | shipping facilities | hydrocarbon | hydrocarbon recovery | Not studied |
| Transportation / distribution and marketing | pipeline (crude and products) | leakage and oil spill (onshore) | oil | treatment of oil-contaminated soil/sediment | Not studied |
| | Tanker (crude and products) | accident | oil | oil spill contingency plan | · Establish oil spill contingency plan with the Caspian Sea countries |
| | | blast water | blast water | water treatment | Not studied |
| | | bilge | effluent (oil) | water treatment | Not studied |
| | rail, tank lorry | oil spill | oil | treatment of oil contaminated soil/sediment | Not studied |
| | gas station | receiving and sales | hydrocarbon | hydrocarbon recovery | Not studied |
| | | oil spill | oil | treatment of oil contaminated soil/sediment | Not studied |
| Management and remediation of polluted land | | site of oil-related facilities | solid waste, sludge, oil, hydrocarbon, hazardous substances | management and remediation of polluted land | · National Oil Company (EmbaMunaiGaz) is ready to issue tender documents to treat oil sludge. Technologies for treat oil sludge are available in Kazakhstan.<br>· Tengizchevroil is treating them by bioremediation (compost method) using dry grass |

Remarks: Excluding production management, operation and maintenance technologies, counter-measures to sabotage and terrorism.

Appendix 1

**The Tentative Study Schedule (JICA)**

| | Project month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Calendar month | ◄ | | | | | | | | | | | | | | | | | | |
| 1 | study on environmental legislation/ administration | | | | | | | | | | | | | | | | | | | |
| 2 | capacity building on pollution prevention | | | | | | | | | | | | | | | | | | | |
| 3 | field study ◄ | | | | | | | | | | | | | | | | | | | |
| 4 | capacity building on environmental analysis | | | | | | | | | | | | | | | | | | | |
| 5 | assistance to environmental assesment | | | | | | | | | | | | | | | | | | | |
| | Report presentation | * IC/R | | | | * PR/R | | | | | | * IT/R | | | | | | * DF/R | | * F/R |

IC/R=Inceptin Report
PR/R=Progress Report
IT/R=Interim Report
DF/R=Draft Final Report
F/R=Final Report

## 3. ウラル川サンプリング試料分析結果

Maxxam Analytics Inc • Driven by Service and Science •

Environmental Research Institute
Suite 4-1108/ 4-5-26 Kamiosaki
Shinagawa
Tokyo Japan, --
141-0021

**Attention: Komichi Ikeda** **Report Date: 2004/06/16**

Your Project #: ERI-05-2004-402
Site: JICA PROJECT NO.1
Your C.O.C. #: 245763

### ANALYTICAL REPORT

**MAXXAM JOB #: A426012**
**Received: 2004/06/07, 14:52**

Sample Matrix: SOLID
# Samples Received: 1

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Method Reference |
|---|---|---|---|---|---|
| Mercury | 1 | 2004/06/11 | 2004/06/11 | Ont SOP 0112 | EPA 7470 |
| Acid Extractable Metals by ICP | 1 | 2004/06/11 | 2004/06/11 | Ont SOP 0072 | EPA 6010 |
| MOISTURE | 1 | N/A | 2004/06/10 | | MOE HANDBOOK(1983) |
| Polycylclic Aromatic Hydrocarbons (PAH) | 1 | 2004/06/09 | 2004/06/09 | EPA 8270 | GC/MS |
| Polychlorinated Biphenyl (PCB) | 1 | 2004/06/10 | 2004/06/11 | Ont SOP 0127 | SW 846 3rd Edition |

**MAXXAM ANALYTICS INC.**

SAMI JAMOKHA, M.Sc., C.Chem.

SJA/lid
Incl.

Total cover pages: 1

Waterloo, 50 Bathurst Drive, Unit 12, N2V2C5 Telephone(519) 747-2575 FAX(519) 747-3806

This document is in electronic format, hard copy is available on request.

Maxxam Job #: A426012
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## RESULTS OF ANALYSES OF SOLID

| Maxxam ID | | C89208 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1247 : SOIL-1U** | **DL** | **QA Batch** |
| **CONVENTIONALS** | | | | |
| Moisture | % | 22 | 0.2 | 603397 |

QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426012
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

| Maxxam ID | | C89208 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | Units | ERI-1247 : SOIL-1U | DL | QA Batch |
| **METALS** | | | | |
| Acid Extractable Aluminum (Al) | ug/g | 8070 | 4 | 603956 |
| Acid Extractable Antimony (Sb) | ug/g | 30 | 10 | 603956 |
| Acid Extractable Arsenic (As) | ug/g | 23.3 | 4 | 603956 |
| Acid Extractable Barium (Ba) | ug/g | 90.0 | 0.1 | 603956 |
| Acid Extractable Beryllium (Be) | ug/g | 0.4 | 0.1 | 603956 |
| Acid Extractable Bismuth (Bi) | ug/g | ND | 2.3 | 603956 |
| Acid Extractable Boron (B) | ug/g | ND | 0.5 | 603956 |
| Acid Extractable Cadmium (Cd) | ug/g | ND | 0.3 | 603956 |
| Acid Extractable Calcium (Ca) | ug/g | 37600 | 4 | 603956 |
| Acid Extractable Chromium (Cr) | ug/g | 25.4 | 0.5 | 603956 |
| Acid Extractable Cobalt (Co) | ug/g | 7.2 | 0.5 | 603956 |
| Acid Extractable Copper (Cu) | ug/g | 21.2 | 0.4 | 603956 |
| Acid Extractable Iron (Fe) | ug/g | 13300 | 0.6 | 603956 |
| Acid Extractable Lead (Pb) | ug/g | 10.4 | 2.5 | 603956 |
| Acid Extractable Lithium (Li) | ug/g | 11.1 | 2 | 603956 |
| Acid Extractable Magnesium (Mg) | ug/g | 6230 | 0.3 | 603956 |
| Acid Extractable Manganese (Mn) | ug/g | 400 | 0.15 | 603956 |
| Acid Extractable Mercury (Hg) | ug/g | ND | 0.05 | 603733 |
| Acid Extractable Molybdenum (Mo) | ug/g | ND | 0.6 | 603956 |
| Acid Extractable Nickel (Ni) | ug/g | 37.1 | 1 | 603956 |
| Acid Extractable Phosphorus Total (P) | ug/g | 487 | 4 | 603956 |
| Acid Extractable Potassium (K) | ug/g | 1760 | 100 | 603956 |
| Acid Extractable Selenium (Se) | ug/g | ND | 3.3 | 603956 |
| Acid Extractable Silicon (Si) | ug/g | 105 | 2 | 603956 |
| Acid Extractable Silver (Ag) | ug/g | 1.4 | 0.7 | 603956 |
| Acid Extractable Sodium (Na) | ug/g | 372 | 9 | 603956 |
| Acid Extractable Strontium (Sr) | ug/g | 121 | 0.3 | 603956 |
| Acid Extractable Sulfur (S) | ug/g | 293 | 6.5 | 603956 |
| Acid Extractable Thallium (Tl) | ug/g | 5 | 5 | 603956 |
| Acid Extractable Tin (Sn) | ug/g | ND | 1.8 | 603956 |
| Acid Extractable Titanium (Ti) | ug/g | 9.9 | 0.3 | 603956 |
| Acid Extractable Tungsten (W) | ug/g | ND | 3 | 603956 |
| Acid Extractable Vanadium (V) | ug/g | 21.2 | 0.3 | 603956 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426012
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

| Maxxam ID | | C89208 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1247 : SOIL-1U** | **DL** | **QA Batch** |
| Acid Extractable Zinc (Zn) | ug/g | 78.3 | 0.3 | 603956 |

QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426012
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## SEMI-VOLATILE ORGANICS BY GC-MS (SOLID)

| Maxxam ID | | C89208 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1247 : SOIL-1U** | **DL** | **QA Batch** |
| **PAH'S** | | | | |
| Naphthalene | ug/Kg | ND | 5 | 602654 |
| Acenaphthylene | ug/Kg | ND | 5 | 602654 |
| Acenaphthene | ug/Kg | ND | 10 | 602654 |
| Fluorene | ug/Kg | ND | 5 | 602654 |
| Phenanthrene | ug/Kg | ND | 5 | 602654 |
| Anthracene | ug/Kg | ND | 5 | 602654 |
| Fluoranthene | ug/Kg | ND | 5 | 602654 |
| Pyrene | ug/Kg | ND | 5 | 602654 |
| Benzo(a)anthracene | ug/Kg | ND | 10 | 602654 |
| Chrysene | ug/Kg | ND | 10 | 602654 |
| Benzo(b)fluoranthene | ug/Kg | ND | 10 | 602654 |
| Benzo(k)fluoranthene | ug/Kg | ND | 10 | 602654 |
| Benzo(a)pyrene | ug/Kg | ND | 5 | 602654 |
| Indeno(1,2,3-cd)pyrene | ug/Kg | ND | 20 | 602654 |
| Dibenzo(a,h)anthracene | ug/Kg | ND | 20 | 602654 |
| Benzo(ghi)perylene | ug/Kg | ND | 20 | 602654 |
| **Surrogate Recovery (%)** | | | | |
| 2-Fluorobiphenyl | % | 119 | | 602654 |
| D14-Terphenyl | % | 87 | | 602654 |
| D5-Nitrobenzene | % | 59 | | 602654 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426012
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOLID)

| Maxxam ID | | C89208 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1247 : SOIL-1U** | **DL** | **QA Batch** |
| **PCB'S** | | | | |
| Aroclor 1262 | ug/g | ND | 0.01 | 603370 |
| Aroclor 1016 | ug/g | ND | 0.01 | 603370 |
| Aroclor 1221 | ug/g | ND | 0.02 | 603370 |
| Aroclor 1232 | ug/g | ND | 0.01 | 603370 |
| Aroclor 1242 | ug/g | ND | 0.02 | 603370 |
| Aroclor 1248 | ug/g | ND | 0.01 | 603370 |
| Aroclor 1254 | ug/g | ND | 0.01 | 603370 |
| Aroclor 1260 | ug/g | 0.06 | 0.01 | 603370 |
| Aroclor 1268 | ug/g | ND | 0.01 | 603370 |
| Total PCB | ug/g | 0.06 | 0.01 | 603370 |
| **Surrogate Recovery (%)** | | | | |
| 2,4,5,6-Tetrachloro-m-xylene | % | 52 | | 603370 |
| Decachlorobiphenyl | % | 85 | | 603370 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426012
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

**GENERAL COMMENTS**

Comments, A426012, pcb-solid:

Samples contained a large amount of rocks and pebbles. Due to the presence of these solvent impermeable entities in the extraction, we werer unable to bet the 30% RPD required.

**Results relate only to the items tested.**

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report

Maxxam Job Number: WA426012

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 602654 NMO | Spiked Blank | 2-Fluorobiphenyl | 2004/06/09 | | 81 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/09 | | 86 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/09 | | 68 | % | 40 - 130 |
| | | Naphthalene | 2004/06/09 | | 76 | % | 40 - 140 |
| | | Acenaphthylene | 2004/06/09 | | 86 | % | 40 - 140 |
| | | Acenaphthene | 2004/06/09 | | 86 | % | 40 - 140 |
| | | Fluorene | 2004/06/09 | | 90 | % | 40 - 140 |
| | | Phenanthrene | 2004/06/09 | | 96 | % | 40 - 140 |
| | | Anthracene | 2004/06/09 | | 93 | % | 40 - 140 |
| | | Fluoranthene | 2004/06/09 | | 96 | % | 40 - 140 |
| | | Pyrene | 2004/06/09 | | 97 | % | 40 - 140 |
| | | Benzo(a)anthracene | 2004/06/09 | | 103 | % | 40 - 140 |
| | | Chrysene | 2004/06/09 | | 98 | % | 40 - 140 |
| | | Benzo(b)fluoranthene | 2004/06/09 | | 99 | % | 40 - 140 |
| | | Benzo(k)fluoranthene | 2004/06/09 | | 99 | % | 40 - 140 |
| | | Benzo(a)pyrene | 2004/06/09 | | 100 | % | 40 - 140 |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/09 | | 93 | % | 40 - 140 |
| | | Dibenzo(a,h)anthracene | 2004/06/09 | | 83 | % | 40 - 140 |
| | | Benzo(ghi)perylene | 2004/06/09 | | 102 | % | 40 - 140 |
| | Method Blank | 2-Fluorobiphenyl | 2004/06/09 | | 64 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/09 | | 95 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/09 | | 46 | % | 40 - 130 |
| | | Naphthalene | 2004/06/09 | ND | | ug/Kg | |
| | | Acenaphthylene | 2004/06/09 | ND | | ug/Kg | |
| | | Acenaphthene | 2004/06/09 | ND | | ug/Kg | |
| | | Fluorene | 2004/06/09 | ND | | ug/Kg | |
| | | Phenanthrene | 2004/06/09 | ND | | ug/Kg | |
| | | Anthracene | 2004/06/09 | ND | | ug/Kg | |
| | | Fluoranthene | 2004/06/09 | ND | | ug/Kg | |
| | | Pyrene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(a)anthracene | 2004/06/09 | ND | | ug/Kg | |
| | | Chrysene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(b)fluoranthene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(k)fluoranthene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(a)pyrene | 2004/06/09 | ND | | ug/Kg | |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/09 | ND | | ug/Kg | |
| | | Dibenzo(a,h)anthracene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(ghi)perylene | 2004/06/09 | ND | | ug/Kg | |
| 603370 NGN | Spiked Blank | 2,4,5,6-Tetrachloro-m-xylene | 2004/06/11 | | 99 | % | 40 - 130 |
| | | Decachlorobiphenyl | 2004/06/11 | | 94 | % | 40 - 130 |
| | | Aroclor 1254 | 2004/06/11 | | 102 | % | 40 - 130 |
| | | Total PCB | 2004/06/11 | | 102 | % | 40 - 130 |
| | Method Blank | 2,4,5,6-Tetrachloro-m-xylene | 2004/06/11 | | 102 | % | 40 - 130 |
| | | Decachlorobiphenyl | 2004/06/11 | | 95 | % | 40 - 130 |
| | | Aroclor 1262 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1016 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1221 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1232 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1242 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1248 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1254 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1260 | 2004/06/11 | ND | | ug/g | |
| | | Aroclor 1268 | 2004/06/11 | ND | | ug/g | |
| | | Total PCB | 2004/06/11 | ND | | ug/g | |
| | RPD | Aroclor 1262 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1016 | 2004/06/11 | NC | | % | N/A |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426012

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603370 NGN | RPD | Aroclor 1221 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1232 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1242 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1248 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1254 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1260 | 2004/06/11 | NC | | % | N/A |
| | | Aroclor 1268 | 2004/06/11 | NC | | % | N/A |
| | | Total PCB | 2004/06/11 | NC | | % | N/A |
| 603733 MC | MATRIX SPIKE | Acid Extractable Mercury (Hg) | 2004/06/11 | | 98 | % | 75 - 125 |
| | QC STANDARD | Acid Extractable Mercury (Hg) | 2004/06/11 | | 98 | % | 85 - 115 |
| | Spiked Blank | Acid Extractable Mercury (Hg) | 2004/06/11 | | 102 | % | 75 - 125 |
| | Method Blank | Acid Extractable Mercury (Hg) | 2004/06/11 | ND | | ug/g | |
| | RPD | Acid Extractable Mercury (Hg) | 2004/06/11 | NC | | % | 20 |
| 603956 ISI | QC STANDARD | Acid Extractable Aluminum (Al) | 2004/06/11 | | 103 | % | 66 - 133 |
| | | Acid Extractable Antimony (Sb) | 2004/06/11 | | 92 | % | 67 - 133 |
| | | Acid Extractable Arsenic (As) | 2004/06/11 | | 103 | % | 80 - 126 |
| | | Acid Extractable Barium (Ba) | 2004/06/11 | | 99 | % | 83 - 119 |
| | | Acid Extractable Beryllium (Be) | 2004/06/11 | | 99 | % | 76 - 119 |
| | | Acid Extractable Bismuth (Bi) | 2004/06/11 | | 100 | % | 74 - 122 |
| | | Acid Extractable Boron (B) | 2004/06/11 | | 98 | % | 77 - 121 |
| | | Acid Extractable Cadmium (Cd) | 2004/06/11 | | 97 | % | 75 - 117 |
| | | Acid Extractable Calcium (Ca) | 2004/06/11 | | 102 | % | 90 - 110 |
| | | Acid Extractable Chromium (Cr) | 2004/06/11 | | 97 | % | 90 - 110 |
| | | Acid Extractable Cobalt (Co) | 2004/06/11 | | 96 | % | 77 - 119 |
| | | Acid Extractable Copper (Cu) | 2004/06/11 | | 95 | % | 73 - 120 |
| | | Acid Extractable Iron (Fe) | 2004/06/11 | | 110 | % | 80 - 136 |
| | | Acid Extractable Lead (Pb) | 2004/06/11 | | 97 | % | 76 - 119 |
| | | Acid Extractable Lithium (Li) | 2004/06/11 | | 99 | % | 76 - 123 |
| | | Acid Extractable Magnesium (Mg) | 2004/06/11 | | 107 | % | 93 - 114 |
| | | Acid Extractable Manganese (Mn) | 2004/06/11 | | 97 | % | 85 - 115 |
| | | Acid Extractable Molybdenum (Mo) | 2004/06/11 | | 99 | % | 76 - 120 |
| | | Acid Extractable Nickel (Ni) | 2004/06/11 | | 97 | % | 79 - 118 |
| | | Acid Extractable Phosphorus Total (P) | 2004/06/11 | | 101 | % | 90 - 110 |
| | | Acid Extractable Potassium (K) | 2004/06/11 | | 99 | % | 90 - 110 |
| | | Acid Extractable Selenium (Se) | 2004/06/11 | | 96 | % | 74 - 126 |
| | | Acid Extractable Silicon (Si) | 2004/06/11 | | 95 | % | 90 - 112 |
| | | Acid Extractable Silver (Ag) | 2004/06/11 | | 96 | % | 90 - 109 |
| | | Acid Extractable Sodium (Na) | 2004/06/11 | | 106 | % | 91 - 112 |
| | | Acid Extractable Strontium (Sr) | 2004/06/11 | | 98 | % | 80 - 116 |
| | | Acid Extractable Sulfur (S) | 2004/06/11 | | 101 | % | 90 - 111 |
| | | Acid Extractable Thallium (Tl) | 2004/06/11 | | 101 | % | 68 - 129 |
| | | Acid Extractable Tin (Sn) | 2004/06/11 | | 101 | % | 75 - 121 |
| | | Acid Extractable Titanium (Ti) | 2004/06/11 | | 99 | % | 80 - 116 |
| | | Acid Extractable Tungsten (W) | 2004/06/11 | | 95 | % | 84 - 121 |
| | | Acid Extractable Vanadium (V) | 2004/06/11 | | 98 | % | 90 - 110 |
| | | Acid Extractable Zinc (Zn) | 2004/06/11 | | 97 | % | 80 - 115 |
| | Method Blank | Acid Extractable Aluminum (Al) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Antimony (Sb) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Arsenic (As) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Barium (Ba) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Beryllium (Be) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Bismuth (Bi) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Boron (B) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Cadmium (Cd) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Calcium (Ca) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Chromium (Cr) | 2004/06/11 | ND | | ug/g | |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426012

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603956 ISI | Method Blank | Acid Extractable Cobalt (Co) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Copper (Cu) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Iron (Fe) | 2004/06/11 | 1.1 | | ug/g | |
| | | Acid Extractable Lead (Pb) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Lithium (Li) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Magnesium (Mg) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Manganese (Mn) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Molybdenum (Mo) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Nickel (Ni) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Phosphorus Total (P) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Potassium (K) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Selenium (Se) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Silicon (Si) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Silver (Ag) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Sodium (Na) | 2004/06/11 | 16.5 | | ug/g | |
| | | Acid Extractable Strontium (Sr) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Sulfur (S) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Thallium (Tl) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Tin (Sn) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Titanium (Ti) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Tungsten (W) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Vanadium (V) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Zinc (Zn) | 2004/06/11 | ND | | ug/g | |
| | RPD | Acid Extractable Barium (Ba) | 2004/06/11 | 0.2 | | % | 20 |
| | | Acid Extractable Beryllium (Be) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Cadmium (Cd) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Chromium (Cr) | 2004/06/11 | 2.6 | | % | 20 |
| | | Acid Extractable Cobalt (Co) | 2004/06/11 | 7.4 | | % | 20 |
| | | Acid Extractable Copper (Cu) | 2004/06/11 | 12.2 | | % | 20 |
| | | Acid Extractable Lead (Pb) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Molybdenum (Mo) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Nickel (Ni) | 2004/06/11 | 2.5 | | % | 20 |
| | | Acid Extractable Silver (Ag) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Vanadium (V) | 2004/06/11 | 2.9 | | % | 20 |
| | | Acid Extractable Zinc (Zn) | 2004/06/11 | 0.9 | | % | 20 |

D = Not detected
N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample



This document is in electronic format, hard copy is available on request.

Environmental Research Institute
Suite 4-1108/ 4-5-26 Kamiosaki
Shinagawa
Tokyo Japan, --
141-0021

Attention: Komichi Ikeda

**Report Date: 2004/06/16**

Your Project #: ERI-05-2004-402
Site: JICA PROJECT NO.1
Your C.O.C. #: 245763

## ANALYTICAL REPORT

**MAXXAM JOB #: A426020**
**Received: 2004/06/07, 15:14**

Sample Matrix: SOLID
# Samples Received: 1

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Method Reference |
|---|---|---|---|---|---|
| Mercury | 1 | 2004/06/11 | 2004/06/11 | Ont SOP 0112 | EPA 7470 |
| Acid Extractable Metals by ICP | 1 | 2004/06/11 | 2004/06/11 | Ont SOP 0072 | EPA 6010 |
| MOISTURE | 1 | N/A | 2004/06/12 | | MOE HANDBOOK(1983) |
| Polycyclic Aromatic Hydrocarbons (PAH) | 1 | 2004/06/09 | 2004/06/09 | EPA 8270 | GC/MS |
| Polychlorinated Biphenyl (PCB) | 1 | 2004/06/11 | 2004/06/12 | Ont SOP 0127 | SW 846 3rd Edition |

MAXXAM ANALYTICS INC.

SAMI JAMOKHA, M.Sc., C.Chem.

TROY CARRIERE, B.Sc.
Inorganics Supervisor, Environmental Division

SJA/lid
encl.

Total cover pages: 1

Maxxam Job #: A426020
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## RESULTS OF ANALYSES OF SOLID

| Maxxam ID | | C89225 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | Units | ERI-1248 : SOIL-2C | DL | QA Batch |
| **CONVENTIONALS** | | | | |
| Moisture | % | 65 | 0.2 | 604126 |

QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426020
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

| Maxxam ID | | C89225 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | Units | ERI-1248 : SOIL-2C | DL | QA Batch |
| **METALS** | | | | |
| Acid Extractable Aluminum (Al) | ug/g | 5540 | 4 | 603956 |
| Acid Extractable Antimony (Sb) | ug/g | 24 | 10 | 603956 |
| Acid Extractable Arsenic (As) | ug/g | 16.6 | 4 | 603956 |
| Acid Extractable Barium (Ba) | ug/g | 91.1 | 0.1 | 603956 |
| Acid Extractable Beryllium (Be) | ug/g | 0.2 | 0.1 | 603956 |
| Acid Extractable Bismuth (Bi) | ug/g | ND | 2.3 | 603956 |
| Acid Extractable Boron (B) | ug/g | 8.6 | 0.5 | 603956 |
| Acid Extractable Cadmium (Cd) | ug/g | 0.4 | 0.3 | 603956 |
| Acid Extractable Calcium (Ca) | ug/g | 150000 | 4 | 603956 |
| Acid Extractable Chromium (Cr) | ug/g | 20.2 | 0.5 | 603956 |
| Acid Extractable Cobalt (Co) | ug/g | 5.7 | 0.5 | 603956 |
| Acid Extractable Copper (Cu) | ug/g | 53.4 | 0.4 | 603956 |
| Acid Extractable Iron (Fe) | ug/g | 10100 | 0.6 | 603956 |
| Acid Extractable Lead (Pb) | ug/g | 49.8 | 2.5 | 603956 |
| Acid Extractable Lithium (Li) | ug/g | 4 | 2 | 603956 |
| Acid Extractable Magnesium (Mg) | ug/g | 6800 | 0.3 | 603956 |
| Acid Extractable Manganese (Mn) | ug/g | 563 | 0.15 | 603956 |
| Acid Extractable Mercury (Hg) | ug/g | 0.06 | 0.05 | 603733 |
| Acid Extractable Molybdenum (Mo) | ug/g | ND | 0.6 | 603956 |
| Acid Extractable Nickel (Ni) | ug/g | 12.9 | 1 | 603956 |
| Acid Extractable Phosphorus Total (P) | ug/g | 5200 | 4 | 603956 |
| Acid Extractable Potassium (K) | ug/g | 5590 | 100 | 603956 |
| Acid Extractable Selenium (Se) | ug/g | ND | 3.3 | 603956 |
| Acid Extractable Silicon (Si) | ug/g | 512 | 2 | 603956 |
| Acid Extractable Silver (Ag) | ug/g | ND | 0.7 | 603956 |
| Acid Extractable Sodium (Na) | ug/g | 417 | 9 | 603956 |
| Acid Extractable Strontium (Sr) | ug/g | 198 | 0.3 | 603956 |
| Acid Extractable Sulfur (S) | ug/g | 2810 | 6.5 | 603956 |
| Acid Extractable Thallium (Tl) | ug/g | 5 | 5 | 603956 |
| Acid Extractable Tin (Sn) | ug/g | ND | 1.8 | 603956 |
| Acid Extractable Titanium (Ti) | ug/g | 27.8 | 0.3 | 603956 |
| Acid Extractable Tungsten (W) | ug/g | ND | 3 | 603956 |
| Acid Extractable Vanadium (V) | ug/g | 22.4 | 0.3 | 603956 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426020
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

| | | | | |
|---|---|---|---|---|
| Maxxam ID | | C89225 | | |
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1248 : SOIL-2C** | **DL** | **QA Batch** |
| Acid Extractable Zinc (Zn) | ug/g | 151 | 0.3 | 603956 |

QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426020
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## SEMI-VOLATILE ORGANICS BY GC-MS (SOLID)

| Maxxam ID | | C89225 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | Units | ERI-1248 : SOIL-2C | DL | QA Batch |
| **PAH'S** | | | | |
| Naphthalene | ug/Kg | ND | 5 | 602654 |
| Acenaphthylene | ug/Kg | ND | 5 | 602654 |
| Acenaphthene | ug/Kg | ND | 10 | 602654 |
| Fluorene | ug/Kg | ND | 5 | 602654 |
| Phenanthrene | ug/Kg | ND | 5 | 602654 |
| Anthracene | ug/Kg | ND | 5 | 602654 |
| Fluoranthene | ug/Kg | ND | 5 | 602654 |
| Pyrene | ug/Kg | ND | 5 | 602654 |
| Benzo(a)anthracene | ug/Kg | ND | 10 | 602654 |
| Chrysene | ug/Kg | ND | 10 | 602654 |
| Benzo(b)fluoranthene | ug/Kg | ND | 10 | 602654 |
| Benzo(k)fluoranthene | ug/Kg | ND | 10 | 602654 |
| Benzo(a)pyrene | ug/Kg | ND | 5 | 602654 |
| Indeno(1,2,3-cd)pyrene | ug/Kg | ND | 20 | 602654 |
| Dibenzo(a,h)anthracene | ug/Kg | ND | 20 | 602654 |
| Benzo(ghi)perylene | ug/Kg | ND | 20 | 602654 |
| **Surrogate Recovery (%)** | | | | |
| 2-Fluorobiphenyl | % | 93 | | 602654 |
| D14-Terphenyl | % | 121 | | 602654 |
| D5-Nitrobenzene | % | 73 | | 602654 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426020
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## POLYCHLORINATED BIPHENYLS BY GC-ECD (SOLID)

| Maxxam ID | | C89225 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1248 : SOIL-2C** | **DL** | **QA Batch** |
| **PCB'S** | | | | |
| Aroclor 1262 | ug/g | ND | 0.01 | 604106 |
| Aroclor 1016 | ug/g | ND | 0.01 | 604106 |
| Aroclor 1221 | ug/g | ND | 0.02 | 604106 |
| Aroclor 1232 | ug/g | ND | 0.01 | 604106 |
| Aroclor 1242 | ug/g | ND | 0.02 | 604106 |
| Aroclor 1248 | ug/g | ND | 0.01 | 604106 |
| Aroclor 1254 | ug/g | ND | 0.01 | 604106 |
| Aroclor 1260 | ug/g | ND | 0.01 | 604106 |
| Aroclor 1268 | ug/g | ND | 0.01 | 604106 |
| Total PCB | ug/g | ND | 0.01 | 604106 |
| **Surrogate Recovery (%)** | | | | |
| 2,4,5,6-Tetrachloro-m-xylene | % | 107 | | 604106 |
| Decachlorobiphenyl | % | 79 | | 604106 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426020
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

**Results relate only to the items tested.**

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report

Maxxam Job Number: WA426020

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 602654 NMO | Spiked Blank | 2-Fluorobiphenyl | 2004/06/09 | | 81 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/09 | | 86 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/09 | | 68 | % | 40 - 130 |
| | | Naphthalene | 2004/06/09 | | 76 | % | 40 - 140 |
| | | Acenaphthylene | 2004/06/09 | | 86 | % | 40 - 140 |
| | | Acenaphthene | 2004/06/09 | | 86 | % | 40 - 140 |
| | | Fluorene | 2004/06/09 | | 90 | % | 40 - 140 |
| | | Phenanthrene | 2004/06/09 | | 96 | % | 40 - 140 |
| | | Anthracene | 2004/06/09 | | 93 | % | 40 - 140 |
| | | Fluoranthene | 2004/06/09 | | 96 | % | 40 - 140 |
| | | Pyrene | 2004/06/09 | | 97 | % | 40 - 140 |
| | | Benzo(a)anthracene | 2004/06/09 | | 103 | % | 40 - 140 |
| | | Chrysene | 2004/06/09 | | 98 | % | 40 - 140 |
| | | Benzo(b)fluoranthene | 2004/06/09 | | 99 | % | 40 - 140 |
| | | Benzo(k)fluoranthene | 2004/06/09 | | 99 | % | 40 - 140 |
| | | Benzo(a)pyrene | 2004/06/09 | | 100 | % | 40 - 140 |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/09 | | 93 | % | 40 - 140 |
| | | Dibenzo(a,h)anthracene | 2004/06/09 | | 83 | % | 40 - 140 |
| | | Benzo(ghi)perylene | 2004/06/09 | | 102 | % | 40 - 140 |
| | Method Blank | 2-Fluorobiphenyl | 2004/06/09 | | 64 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/09 | | 95 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/09 | | 46 | % | 40 - 130 |
| | | Naphthalene | 2004/06/09 | ND | | ug/Kg | |
| | | Acenaphthylene | 2004/06/09 | ND | | ug/Kg | |
| | | Acenaphthene | 2004/06/09 | ND | | ug/Kg | |
| | | Fluorene | 2004/06/09 | ND | | ug/Kg | |
| | | Phenanthrene | 2004/06/09 | ND | | ug/Kg | |
| | | Anthracene | 2004/06/09 | ND | | ug/Kg | |
| | | Fluoranthene | 2004/06/09 | ND | | ug/Kg | |
| | | Pyrene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(a)anthracene | 2004/06/09 | ND | | ug/Kg | |
| | | Chrysene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(b)fluoranthene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(k)fluoranthene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(a)pyrene | 2004/06/09 | ND | | ug/Kg | |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/09 | ND | | ug/Kg | |
| | | Dibenzo(a,h)anthracene | 2004/06/09 | ND | | ug/Kg | |
| | | Benzo(ghi)perylene | 2004/06/09 | ND | | ug/Kg | |
| 603733 MC | MATRIX SPIKE | Acid Extractable Mercury (Hg) | 2004/06/11 | | 98 | % | 75 - 125 |
| | QC STANDARD | Acid Extractable Mercury (Hg) | 2004/06/11 | | 98 | % | 85 - 115 |
| | Spiked Blank | Acid Extractable Mercury (Hg) | 2004/06/11 | | 102 | % | 75 - 125 |
| | Method Blank | Acid Extractable Mercury (Hg) | 2004/06/11 | ND | | ug/g | |
| | RPD | Acid Extractable Mercury (Hg) | 2004/06/11 | NC | | % | 20 |
| 603956 ISI | QC STANDARD | Acid Extractable Aluminum (Al) | 2004/06/11 | | 103 | % | 66 - 133 |
| | | Acid Extractable Antimony (Sb) | 2004/06/11 | | 92 | % | 67 - 133 |
| | | Acid Extractable Arsenic (As) | 2004/06/11 | | 103 | % | 80 - 126 |
| | | Acid Extractable Barium (Ba) | 2004/06/11 | | 99 | % | 83 - 119 |
| | | Acid Extractable Beryllium (Be) | 2004/06/11 | | 99 | % | 76 - 119 |
| | | Acid Extractable Bismuth (Bi) | 2004/06/11 | | 100 | % | 74 - 122 |
| | | Acid Extractable Boron (B) | 2004/06/11 | | 98 | % | 77 - 121 |
| | | Acid Extractable Cadmium (Cd) | 2004/06/11 | | 97 | % | 75 - 117 |
| | | Acid Extractable Calcium (Ca) | 2004/06/11 | | 102 | % | 90 - 110 |
| | | Acid Extractable Chromium (Cr) | 2004/06/11 | | 97 | % | 90 - 110 |
| | | Acid Extractable Cobalt (Co) | 2004/06/11 | | 96 | % | 77 - 119 |
| | | Acid Extractable Copper (Cu) | 2004/06/11 | | 95 | % | 73 - 120 |
| | | Acid Extractable Iron (Fe) | 2004/06/11 | | 110 | % | 80 - 136 |

Environmental Research Institute
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P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426020

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603956 ISI | QC STANDARD | Acid Extractable Lead (Pb) | 2004/06/11 | | 97 | % | 76 - 119 |
| | | Acid Extractable Lithium (Li) | 2004/06/11 | | 99 | % | 76 - 123 |
| | | Acid Extractable Magnesium (Mg) | 2004/06/11 | | 107 | % | 93 - 114 |
| | | Acid Extractable Manganese (Mn) | 2004/06/11 | | 97 | % | 85 - 115 |
| | | Acid Extractable Molybdenum (Mo) | 2004/06/11 | | 99 | % | 76 - 120 |
| | | Acid Extractable Nickel (Ni) | 2004/06/11 | | 97 | % | 79 - 118 |
| | | Acid Extractable Phosphorus Total (P) | 2004/06/11 | | 101 | % | 90 - 110 |
| | | Acid Extractable Potassium (K) | 2004/06/11 | | 99 | % | 90 - 110 |
| | | Acid Extractable Selenium (Se) | 2004/06/11 | | 96 | % | 74 - 126 |
| | | Acid Extractable Silicon (Si) | 2004/06/11 | | 95 | % | 90 - 112 |
| | | Acid Extractable Silver (Ag) | 2004/06/11 | | 96 | % | 90 - 109 |
| | | Acid Extractable Sodium (Na) | 2004/06/11 | | 106 | % | 91 - 112 |
| | | Acid Extractable Strontium (Sr) | 2004/06/11 | | 98 | % | 80 - 116 |
| | | Acid Extractable Sulfur (S) | 2004/06/11 | | 101 | % | 90 - 111 |
| | | Acid Extractable Thallium (Tl) | 2004/06/11 | | 101 | % | 68 - 129 |
| | | Acid Extractable Tin (Sn) | 2004/06/11 | | 101 | % | 75 - 121 |
| | | Acid Extractable Titanium (Ti) | 2004/06/11 | | 99 | % | 80 - 116 |
| | | Acid Extractable Tungsten (W) | 2004/06/11 | | 95 | % | 84 - 121 |
| | | Acid Extractable Vanadium (V) | 2004/06/11 | | 98 | % | 90 - 110 |
| | | Acid Extractable Zinc (Zn) | 2004/06/11 | | 97 | % | 80 - 115 |
| | Method Blank | Acid Extractable Aluminum (Al) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Antimony (Sb) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Arsenic (As) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Barium (Ba) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Beryllium (Be) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Bismuth (Bi) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Boron (B) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Cadmium (Cd) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Calcium (Ca) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Chromium (Cr) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Cobalt (Co) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Copper (Cu) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Iron (Fe) | 2004/06/11 | 1.1 | | ug/g | |
| | | Acid Extractable Lead (Pb) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Lithium (Li) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Magnesium (Mg) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Manganese (Mn) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Molybdenum (Mo) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Nickel (Ni) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Phosphorus Total (P) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Potassium (K) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Selenium (Se) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Silicon (Si) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Silver (Ag) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Sodium (Na) | 2004/06/11 | 16.5 | | ug/g | |
| | | Acid Extractable Strontium (Sr) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Sulfur (S) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Thallium (Tl) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Tin (Sn) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Titanium (Ti) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Tungsten (W) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Vanadium (V) | 2004/06/11 | ND | | ug/g | |
| | | Acid Extractable Zinc (Zn) | 2004/06/11 | ND | | ug/g | |
| | RPD | Acid Extractable Barium (Ba) | 2004/06/11 | 0.2 | | % | 20 |
| | | Acid Extractable Beryllium (Be) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Cadmium (Cd) | 2004/06/11 | NC | | % | 20 |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426020

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603956 ISI | RPD | Acid Extractable Chromium (Cr) | 2004/06/11 | 2.6 | | % | 20 |
| | | Acid Extractable Cobalt (Co) | 2004/06/11 | 7.4 | | % | 20 |
| | | Acid Extractable Copper (Cu) | 2004/06/11 | 12.2 | | % | 20 |
| | | Acid Extractable Lead (Pb) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Molybdenum (Mo) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Nickel (Ni) | 2004/06/11 | 2.5 | | % | 20 |
| | | Acid Extractable Silver (Ag) | 2004/06/11 | NC | | % | 20 |
| | | Acid Extractable Vanadium (V) | 2004/06/11 | 2.9 | | % | 20 |
| | | Acid Extractable Zinc (Zn) | 2004/06/11 | 0.9 | | % | 20 |
| 604106 NGN | Spiked Blank | 2,4,5,6-Tetrachloro-m-xylene | 2004/06/12 | | 89 | % | 40 - 130 |
| | | Decachlorobiphenyl | 2004/06/12 | | 72 | % | 40 - 130 |
| | | Aroclor 1254 | 2004/06/12 | | 117 | % | 40 - 130 |
| | RPD | Aroclor 1254 | 2004/06/12 | 8.9 | | % | N/A |
| | Spiked Blank | Total PCB | 2004/06/12 | | 117 | % | 40 - 130 |
| | RPD | Total PCB | 2004/06/12 | 8.9 | | % | N/A |
| | Method Blank | 2,4,5,6-Tetrachloro-m-xylene | 2004/06/12 | | 85 | % | 40 - 130 |
| | | Decachlorobiphenyl | 2004/06/12 | | 72 | % | 40 - 130 |
| | | Aroclor 1262 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1016 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1221 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1232 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1242 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1248 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1254 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1260 | 2004/06/12 | ND | | ug/g | |
| | | Aroclor 1268 | 2004/06/12 | ND | | ug/g | |
| | | Total PCB | 2004/06/12 | ND | | ug/g | |

ND = Not detected
N/A = Not Applicable
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample

Waterloo, 50 Bathurst Drive, Unit 12, N2V2C5 Telephone(519) 747-2575 FAX(519) 747-3806



This document is in electronic format, hard copy is available on request.

Environmental Research Institute
Suite 4-1108/ 4-5-26 Kamiosaki
Shinagawa
Tokyo Japan, --
141-0021

**Attention: Komichi Ikeda**

**Report Date: 2004/06/16**

Your Project #: ERI-05-2004-402
Site: JICA PROJECT NO.1
Your C.O.C. #: 245763

## ANALYTICAL REPORT

**MAXXAM JOB #: A426025**
**Received: 2004/06/07, 15:23**

Sample Matrix: LIQUID
# Samples Received: 1

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Method Reference |
|---|---|---|---|---|---|
| Mercury | 1 | 2004/06/10 | 2004/06/10 | Ont SOP 0112 | EPA 7470 |
| Total Metals Analysis of Water by ICP | 1 | 2004/06/11 | 2004/06/11 | Ont SOP 0072 | EPA 6010 |
| Polycyclic Aromatic Hydrocarbons (PAH) | 1 | 2004/06/10 | 2004/06/10 | EPA 8270 | GC/MS |

**MAXXAM ANALYTICS INC.**

SAMI JAMOKHA, M.Sc., C.Chem.

TROY CARRIERE, B.Sc.
Inorganics Supervisor, Environmental Division

SJA/lid
encl.

Total cover pages: 1

Maxxam Job #: A426025
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)

| Maxxam ID | | C89254 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | Units | ERI-1249 : KZ-2 | DL | QA Batch |
| **METALS** | | | | |
| Total Aluminum (Al) | mg/L | 15.9 | 0.04 | 603924 |
| Total Antimony (Sb) | mg/L | ND | 0.1 | 603924 |
| Total Arsenic (As) | mg/L | ND | 0.04 | 603924 |
| Total Barium (Ba) | mg/L | 0.150 | 0.001 | 603924 |
| Total Beryllium (Be) | mg/L | 0.001 | 0.001 | 603924 |
| Total Bismuth (Bi) | mg/L | 0.042 | 0.023 | 603924 |
| Total Boron (B) | mg/L | 0.055 | 0.005 | 603924 |
| Total Cadmium (Cd) | mg/L | ND | 0.003 | 603924 |
| Total Calcium (Ca) | mg/L | 80.0 | 0.04 | 603924 |
| Total Chromium (Cr) | mg/L | 0.052 | 0.005 | 603924 |
| Total Cobalt (Co) | mg/L | 0.015 | 0.005 | 603924 |
| Total Copper (Cu) | mg/L | 0.030 | 0.004 | 603924 |
| Total Iron (Fe) | mg/L | 23.0 | 0.006 | 603924 |
| Total Lead (Pb) | mg/L | 0.041 | 0.025 | 603924 |
| Total Lithium (Li) | mg/L | 0.03 | 0.02 | 603924 |
| Total Magnesium (Mg) | mg/L | 21.5 | 0.003 | 603924 |
| Total Manganese (Mn) | mg/L | 0.776 | 0.002 | 603924 |
| Total Mercury (Hg) | mg/L | ND | 0.0001 | 603143 |
| Total Molybdenum (Mo) | mg/L | 0.006 | 0.006 | 603924 |
| Total Nickel (Ni) | mg/L | 0.07 | 0.01 | 603924 |
| Total Phosphorus Total (P) | mg/L | 0.72 | 0.04 | 603924 |
| Total Potassium (K) | mg/L | 7 | 1 | 603924 |
| Total Selenium (Se) | mg/L | ND | 0.033 | 603924 |
| Total Silicon (Si) | mg/L | 34.4 | 0.2 | 603924 |
| Total Silver (Ag) | mg/L | ND | 0.007 | 603924 |
| Total Sodium (Na) | mg/L | 31.8 | 0.09 | 603924 |
| Total Strontium (Sr) | mg/L | 0.441 | 0.003 | 603924 |
| Total Sulfur (S) | mg/L | 11.1 | 0.065 | 603924 |
| Total Thallium (Tl) | mg/L | ND | 0.05 | 603924 |
| Total Tin (Sn) | mg/L | ND | 0.018 | 603924 |
| Total Titanium (Ti) | mg/L | 0.359 | 0.003 | 603924 |
| Total Tungsten (W) | mg/L | ND | 0.03 | 603924 |
| Total Vanadium (V) | mg/L | 0.056 | 0.003 | 603924 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426025
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)

| Maxxam ID | | C89254 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1249 : KZ-2** | **DL** | **QA Batch** |
| Total Zinc (Zn) | mg/L | 0.094 | 0.003 | 603924 |

QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426025
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## SEMI-VOLATILE ORGANICS BY GC-MS (LIQUID)

| Maxxam ID | | C89254 | | |
|---|---|---|---|---|
| Sampling Date | | 2004/05/31 | | |
| | **Units** | **ERI-1249 : KZ-2** | **DL** | **QA Batch** |
| **PAH'S** | | | | |
| Naphthalene | ug/L | ND | 0.1 | 603339 |
| Acenaphthylene | ug/L | ND | 0.1 | 603339 |
| Acenaphthene | ug/L | ND | 0.1 | 603339 |
| Fluorene | ug/L | ND | 0.1 | 603339 |
| Phenanthrene | ug/L | ND | 0.1 | 603339 |
| Anthracene | ug/L | ND | 0.1 | 603339 |
| Fluoranthene | ug/L | ND | 0.1 | 603339 |
| Pyrene | ug/L | ND | 0.1 | 603339 |
| Benzo(a)anthracene | ug/L | ND | 0.1 | 603339 |
| Chrysene | ug/L | ND | 0.1 | 603339 |
| Benzo(b)fluoranthene | ug/L | ND | 0.1 | 603339 |
| Benzo(k)fluoranthene | ug/L | ND | 0.1 | 603339 |
| Benzo(a)pyrene | ug/L | ND | 0.02 | 603339 |
| Indeno(1,2,3-cd)pyrene | ug/L | ND | 0.2 | 603339 |
| Dibenzo(a,h)anthracene | ug/L | ND | 0.2 | 603339 |
| Benzo(ghi)perylene | ug/L | ND | 0.2 | 603339 |
| **Surrogate Recovery (%)** | | | | |
| 2-Fluorobiphenyl | % | 81 | | 603339 |
| D14-Terphenyl | % | 104 | | 603339 |
| D5-Nitrobenzene | % | 72 | | 603339 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426025
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

**GENERAL COMMENTS**

Sample C89254-01: PAH-SIM-L Analysis:
The sample was diluted due to insufficient amount of sample. MDLs were adjusted accordingly.

**Results relate only to the items tested.**

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report

Maxxam Job Number: WA426025

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603143 MC | MATRIX SPIKE | Total Mercury (Hg) | 2004/06/10 | | 92 | % | 75 - 125 |
| | QC STANDARD | Total Mercury (Hg) | 2004/06/10 | | 93 | % | 88 - 115 |
| | Spiked Blank | Total Mercury (Hg) | 2004/06/10 | | 97 | % | 88 - 115 |
| | Method Blank | Total Mercury (Hg) | 2004/06/10 | ND | | mg/L | |
| | RPD | Total Mercury (Hg) | 2004/06/10 | NC | | % | 20 |
| 603339 NMO | Spiked Blank | 2-Fluorobiphenyl | 2004/06/10 | | 90 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/10 | | 102 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/10 | | 76 | % | 40 - 130 |
| | | Naphthalene | 2004/06/10 | | 99 | % | 40 - 140 |
| | | Acenaphthylene | 2004/06/10 | | 96 | % | 40 - 140 |
| | | Acenaphthene | 2004/06/10 | | 97 | % | 40 - 140 |
| | | Fluorene | 2004/06/10 | | 92 | % | 40 - 140 |
| | | Phenanthrene | 2004/06/10 | | 97 | % | 40 - 140 |
| | | Anthracene | 2004/06/10 | | 102 | % | 40 - 140 |
| | | Fluoranthene | 2004/06/10 | | 107 | % | 40 - 140 |
| | | Pyrene | 2004/06/10 | | 108 | % | 40 - 140 |
| | | Benzo(a)anthracene | 2004/06/10 | | 98 | % | 40 - 140 |
| | | Chrysene | 2004/06/10 | | 100 | % | 40 - 140 |
| | | Benzo(b)fluoranthene | 2004/06/10 | | 98 | % | 40 - 140 |
| | | Benzo(k)fluoranthene | 2004/06/10 | | 110 | % | 40 - 140 |
| | | Benzo(a)pyrene | 2004/06/10 | | 100 | % | 40 - 140 |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/10 | | 93 | % | 40 - 140 |
| | | Dibenzo(a,h)anthracene | 2004/06/10 | | 80 | % | 40 - 140 |
| | | Benzo(ghi)perylene | 2004/06/10 | | 94 | % | 40 - 140 |
| | Method Blank | 2-Fluorobiphenyl | 2004/06/10 | | 90 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/10 | | 114 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/10 | | 75 | % | 40 - 130 |
| | | Naphthalene | 2004/06/10 | ND | | ug/L | |
| | | Acenaphthylene | 2004/06/10 | ND | | ug/L | |
| | | Acenaphthene | 2004/06/10 | ND | | ug/L | |
| | | Fluorene | 2004/06/10 | ND | | ug/L | |
| | | Phenanthrene | 2004/06/10 | ND | | ug/L | |
| | | Anthracene | 2004/06/10 | ND | | ug/L | |
| | | Fluoranthene | 2004/06/10 | ND | | ug/L | |
| | | Pyrene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(a)anthracene | 2004/06/10 | ND | | ug/L | |
| | | Chrysene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(b)fluoranthene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(k)fluoranthene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(a)pyrene | 2004/06/10 | ND | | ug/L | |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/10 | ND | | ug/L | |
| | | Dibenzo(a,h)anthracene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(ghi)perylene | 2004/06/10 | ND | | ug/L | |
| 603924 ISI | MATRIX SPIKE | Total Aluminum (Al) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Antimony (Sb) | 2004/06/11 | | 100 | % | 75 - 125 |
| | | Total Arsenic (As) | 2004/06/11 | | 97 | % | 75 - 125 |
| | | Total Barium (Ba) | 2004/06/11 | | 95 | % | 75 - 125 |
| | | Total Beryllium (Be) | 2004/06/11 | | 98 | % | 75 - 125 |
| | | Total Bismuth (Bi) | 2004/06/11 | | 92 | % | 75 - 125 |
| | | Total Boron (B) | 2004/06/11 | | 96 | % | 75 - 125 |
| | | Total Cadmium (Cd) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Chromium (Cr) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Cobalt (Co) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Copper (Cu) | 2004/06/11 | | 89 | % | 75 - 125 |
| | | Total Lead (Pb) | 2004/06/11 | | 87 | % | 75 - 125 |
| | | Total Lithium (Li) | 2004/06/11 | | 99 | % | 75 - 125 |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426025

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603924 ISI | MATRIX SPIKE | Total Manganese (Mn) | 2004/06/11 | | 92 | % | 75 - 125 |
| | | Total Molybdenum (Mo) | 2004/06/11 | | 97 | % | 75 - 125 |
| | | Total Nickel (Ni) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Phosphorus Total (P) | 2004/06/11 | | 103 | % | 75 - 125 |
| | | Total Selenium (Se) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Strontium (Sr) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Thallium (Tl) | 2004/06/11 | | 99 | % | 75 - 125 |
| | | Total Tin (Sn) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Titanium (Ti) | 2004/06/11 | | 95 | % | 75 - 125 |
| | | Total Vanadium (V) | 2004/06/11 | | 96 | % | 75 - 125 |
| | | Total Zinc (Zn) | 2004/06/11 | | 97 | % | 75 - 125 |
| | QC STANDARD | Total Aluminum (Al) | 2004/06/11 | | 103 | % | 66 - 133 |
| | | Total Antimony (Sb) | 2004/06/11 | | 92 | % | 67 - 133 |
| | | Total Arsenic (As) | 2004/06/11 | | 103 | % | 80 - 126 |
| | | Total Barium (Ba) | 2004/06/11 | | 99 | % | 83 - 119 |
| | | Total Beryllium (Be) | 2004/06/11 | | 99 | % | 76 - 119 |
| | | Total Bismuth (Bi) | 2004/06/11 | | 100 | % | 74 - 122 |
| | | Total Boron (B) | 2004/06/11 | | 98 | % | 77 - 121 |
| | | Total Cadmium (Cd) | 2004/06/11 | | 97 | % | 75 - 117 |
| | | Total Calcium (Ca) | 2004/06/11 | | 102 | % | 90 - 110 |
| | | Total Chromium (Cr) | 2004/06/11 | | 97 | % | 90 - 110 |
| | | Total Cobalt (Co) | 2004/06/11 | | 96 | % | 77 - 119 |
| | | Total Copper (Cu) | 2004/06/11 | | 95 | % | 73 - 120 |
| | | Total Iron (Fe) | 2004/06/11 | | 110 | % | 80 - 136 |
| | | Total Lead (Pb) | 2004/06/11 | | 97 | % | 76 - 119 |
| | | Total Lithium (Li) | 2004/06/11 | | 99 | % | 76 - 123 |
| | | Total Magnesium (Mg) | 2004/06/11 | | 107 | % | 93 - 114 |
| | | Total Manganese (Mn) | 2004/06/11 | | 97 | % | 85 - 115 |
| | | Total Molybdenum (Mo) | 2004/06/11 | | 99 | % | 76 - 120 |
| | | Total Nickel (Ni) | 2004/06/11 | | 97 | % | 79 - 118 |
| | | Total Phosphorus Total (P) | 2004/06/11 | | 101 | % | 90 - 110 |
| | | Total Potassium (K) | 2004/06/11 | | 99 | % | 90 - 110 |
| | | Total Selenium (Se) | 2004/06/11 | | 96 | % | 74 - 126 |
| | | Total Silicon (Si) | 2004/06/11 | | 95 | % | 90 - 112 |
| | | Total Silver (Ag) | 2004/06/11 | | 96 | % | 90 - 109 |
| | | Total Sodium (Na) | 2004/06/11 | | 106 | % | 91 - 112 |
| | | Total Strontium (Sr) | 2004/06/11 | | 98 | % | 80 - 116 |
| | | Total Sulfur (S) | 2004/06/11 | | 98 | % | 90 - 111 |
| | | Total Thallium (Tl) | 2004/06/11 | | 101 | % | 68 - 129 |
| | | Total Tin (Sn) | 2004/06/11 | | 101 | % | 75 - 121 |
| | | Total Titanium (Ti) | 2004/06/11 | | 99 | % | 80 - 116 |
| | | Total Tungsten (W) | 2004/06/11 | | 95 | % | 84 - 121 |
| | | Total Vanadium (V) | 2004/06/11 | | 98 | % | 90 - 110 |
| | | Total Zinc (Zn) | 2004/06/11 | | 97 | % | 80 - 115 |
| | Spiked Blank | Total Aluminum (Al) | 2004/06/11 | | 100 | % | 76 - 133 |
| | | Total Antimony (Sb) | 2004/06/11 | | 72 | % | 67 - 133 |
| | | Total Arsenic (As) | 2004/06/11 | | 84 | % | 80 - 126 |
| | | Total Beryllium (Be) | 2004/06/11 | | 80 | % | 76 - 119 |
| | | Total Bismuth (Bi) | 2004/06/11 | | 79 | % | 74 - 122 |
| | | Total Boron (B) | 2004/06/11 | | 80 | % | 77 - 121 |
| | | Total Cadmium (Cd) | 2004/06/11 | | 79 | % | 75 - 117 |
| | | Total Chromium (Cr) | 2004/06/11 | | 79 | % | 75 - 125 |
| | | Total Cobalt (Co) | 2004/06/11 | | 80 | % | 77 - 119 |
| | | Total Copper (Cu) | 2004/06/11 | | 81 | % | 73 - 120 |
| | | Total Iron (Fe) | 2004/06/11 | | 90 | % | 80 - 136 |
| | | Total Lead (Pb) | 2004/06/11 | | 77 | % | 76 - 119 |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426025

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603924 ISI | Spiked Blank | Total Lithium (Li) | 2004/06/11 | | 86 | % | 76 - 123 |
| | | Total Manganese (Mn) | 2004/06/11 | | 80 | % | 75 - 125 |
| | | Total Molybdenum (Mo) | 2004/06/11 | | 80 | % | 76 - 120 |
| | | Total Nickel (Ni) | 2004/06/11 | | 82 | % | 79 - 118 |
| | | Total Phosphorus Total (P) | 2004/06/11 | | 90 | % | 90 - 110 |
| | | Total Selenium (Se) | 2004/06/11 | | 81 | % | 74 - 126 |
| | | Total Thallium (Tl) | 2004/06/11 | | 83 | % | 68 - 129 |
| | | Total Tin (Sn) | 2004/06/11 | | 82 | % | 75 - 121 |
| | | Total Vanadium (V) | 2004/06/11 | | 79 | % | 75 - 125 |
| | | Total Zinc (Zn) | 2004/06/11 | | 81 | % | 80 - 115 |
| | Method Blank | Total Aluminum (Al) | 2004/06/11 | 0.05 | | mg/L | |
| | | Total Antimony (Sb) | 2004/06/11 | ND | | mg/L | |
| | | Total Arsenic (As) | 2004/06/11 | ND | | mg/L | |
| | | Total Barium (Ba) | 2004/06/11 | 0.003 | | mg/L | |
| | | Total Beryllium (Be) | 2004/06/11 | ND | | mg/L | |
| | | Total Bismuth (Bi) | 2004/06/11 | ND | | mg/L | |
| | | Total Boron (B) | 2004/06/11 | ND | | mg/L | |
| | | Total Cadmium (Cd) | 2004/06/11 | ND | | mg/L | |
| | | Total Calcium (Ca) | 2004/06/11 | ND | | mg/L | |
| | | Total Chromium (Cr) | 2004/06/11 | 0.008 | | mg/L | |
| | | Total Cobalt (Co) | 2004/06/11 | ND | | mg/L | |
| | | Total Copper (Cu) | 2004/06/11 | 0.008 | | mg/L | |
| | | Total Iron (Fe) | 2004/06/11 | 0.011 | | mg/L | |
| | | Total Lead (Pb) | 2004/06/11 | ND | | mg/L | |
| | | Total Lithium (Li) | 2004/06/11 | ND | | mg/L | |
| | | Total Magnesium (Mg) | 2004/06/11 | 0.005 | | mg/L | |
| | | Total Manganese (Mn) | 2004/06/11 | ND | | mg/L | |
| | | Total Molybdenum (Mo) | 2004/06/11 | 0.006 | | mg/L | |
| | | Total Nickel (Ni) | 2004/06/11 | ND | | mg/L | |
| | | Total Phosphorus Total (P) | 2004/06/11 | 0.08 | | mg/L | |
| | | Total Potassium (K) | 2004/06/11 | ND | | mg/L | |
| | | Total Selenium (Se) | 2004/06/11 | ND | | mg/L | |
| | | Total Silicon (Si) | 2004/06/11 | ND | | mg/L | |
| | | Total Silver (Ag) | 2004/06/11 | 0.007 | | mg/L | |
| | | Total Sodium (Na) | 2004/06/11 | 0.18 | | mg/L | |
| | | Total Strontium (Sr) | 2004/06/11 | ND | | mg/L | |
| | | Total Sulfur (S) | 2004/06/11 | ND | | mg/L | |
| | | Total Thallium (Tl) | 2004/06/11 | ND | | mg/L | |
| | | Total Tin (Sn) | 2004/06/11 | ND | | mg/L | |
| | | Total Titanium (Ti) | 2004/06/11 | ND | | mg/L | |
| | | Total Tungsten (W) | 2004/06/11 | ND | | mg/L | |
| | | Total Vanadium (V) | 2004/06/11 | 0.005 | | mg/L | |
| | | Total Zinc (Zn) | 2004/06/11 | 0.004 | | mg/L | |
| | RPD | Total Aluminum (Al) | 2004/06/11 | 6.3 | | % | 20 |
| | | Total Barium (Ba) | 2004/06/11 | 1.5 | | % | 20 |
| | | Total Beryllium (Be) | 2004/06/11 | NC | | % | 20 |
| | | Total Bismuth (Bi) | 2004/06/11 | NC | | % | 20 |
| | | Total Boron (B) | 2004/06/11 | 9.4 | | % | 20 |
| | | Total Cadmium (Cd) | 2004/06/11 | NC | | % | 20 |
| | | Total Calcium (Ca) | 2004/06/11 | 1.1 | | % | 20 |
| | | Total Chromium (Cr) | 2004/06/11 | NC | | % | 20 |
| | | Total Cobalt (Co) | 2004/06/11 | NC | | % | 20 |
| | | Total Copper (Cu) | 2004/06/11 | NC | | % | 20 |
| | | Total Iron (Fe) | 2004/06/11 | 3.5 | | % | 20 |
| | | Total Magnesium (Mg) | 2004/06/11 | 1.1 | | % | 20 |
| | | Total Manganese (Mn) | 2004/06/11 | 2.1 | | % | 20 |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426025

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603924 ISI | RPD | Total Molybdenum (Mo) | 2004/06/11 | NC | | % | 20 |
| | | Total Nickel (Ni) | 2004/06/11 | NC | | % | 20 |
| | | Total Phosphorus Total (P) | 2004/06/11 | NC | | % | 20 |
| | | Total Potassium (K) | 2004/06/11 | NC | | % | 20 |
| | | Total Silicon (Si) | 2004/06/11 | NC | | % | 20 |
| | | Total Silver (Ag) | 2004/06/11 | NC | | % | 20 |
| | | Total Sodium (Na) | 2004/06/11 | 1.8 | | % | 20 |
| | | Total Strontium (Sr) | 2004/06/11 | 1.2 | | % | 20 |
| | | Total Thallium (Tl) | 2004/06/11 | NC | | % | 20 |
| | | Total Tin (Sn) | 2004/06/11 | NC | | % | 20 |
| | | Total Titanium (Ti) | 2004/06/11 | NC | | % | 20 |
| | | Total Vanadium (V) | 2004/06/11 | NC | | % | 20 |
| | | Total Zinc (Zn) | 2004/06/11 | NC | | % | 20 |

ND = Not detected
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample

Waterloo, 50 Bathurst Drive, Unit 12, N2V2C5 Telephone(519) 747-2575 FAX(519) 747-3806



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Environmental Research Institute
Suite 4-1108/ 4-5-26 Kamiosaki
Shinagawa
Tokyo Japan, --
141-0021

**Attention: Komichi Ikeda**

**Report Date: 2004/06/16**

Your Project #: ERI-05-2004-402
Site: JICA PROJECT NO.1
Your C.O.C. #: 245763

## ANALYTICAL REPORT

**MAXXAM JOB #: A426032**
**Received: 2004/06/07, 15:34**

Sample Matrix: LIQUID
# Samples Received: 1

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Method Reference |
|---|---|---|---|---|---|
| Mercury | 1 | 2004/06/10 | 2004/06/10 | Ont SOP 0112 | EPA 7470 |
| Total Metals Analysis of Water by ICP | 1 | 2004/06/11 | 2004/06/11 | Ont SOP 0072 | EPA 6010 |
| Polycyclic Aromatic Hydrocarbons (PAH) | 1 | 2004/06/10 | 2004/06/10 | EPA 8270 | GC/MS |

**MAXXAM ANALYTICS INC.**

Total cover pages: 1

Maxxam Job #: A426032
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)

| Maxxam ID | | C89290 | | |
|---|---|---|---|---|
| Sampling Date | | | | |
| | Units | ERI-1250 : KZ-3 | DL | QA Batch |
| **METALS** | | | | |
| Total Aluminum (Al) | mg/L | 14.6 | 0.04 | 603924 |
| Total Antimony (Sb) | mg/L | ND | 0.1 | 603924 |
| Total Arsenic (As) | mg/L | ND | 0.04 | 603924 |
| Total Barium (Ba) | mg/L | 0.137 | 0.001 | 603924 |
| Total Beryllium (Be) | mg/L | ND | 0.001 | 603924 |
| Total Bismuth (Bi) | mg/L | ND | 0.023 | 603924 |
| Total Boron (B) | mg/L | 0.050 | 0.005 | 603924 |
| Total Cadmium (Cd) | mg/L | ND | 0.003 | 603924 |
| Total Calcium (Ca) | mg/L | 75.9 | 0.04 | 603924 |
| Total Chromium (Cr) | mg/L | 0.042 | 0.005 | 603924 |
| Total Cobalt (Co) | mg/L | ND | 0.005 | 603924 |
| Total Copper (Cu) | mg/L | 0.022 | 0.004 | 603924 |
| Total Iron (Fe) | mg/L | 20.7 | 0.006 | 603924 |
| Total Lead (Pb) | mg/L | ND | 0.025 | 603924 |
| Total Lithium (Li) | mg/L | 0.03 | 0.02 | 603924 |
| Total Magnesium (Mg) | mg/L | 21.5 | 0.003 | 603924 |
| Total Manganese (Mn) | mg/L | 0.729 | 0.002 | 603924 |
| Total Mercury (Hg) | mg/L | ND | 0.0001 | 603143 |
| Total Molybdenum (Mo) | mg/L | ND | 0.006 | 603924 |
| Total Nickel (Ni) | mg/L | 0.06 | 0.01 | 603924 |
| Total Phosphorus Total (P) | mg/L | 0.61 | 0.04 | 603924 |
| Total Potassium (K) | mg/L | 5 | 1 | 603924 |
| Total Selenium (Se) | mg/L | ND | 0.033 | 603924 |
| Total Silicon (Si) | mg/L | 30.0 | 0.2 | 603924 |
| Total Silver (Ag) | mg/L | ND | 0.007 | 603924 |
| Total Sodium (Na) | mg/L | 34.3 | 0.09 | 603924 |
| Total Strontium (Sr) | mg/L | 0.443 | 0.003 | 603924 |
| Total Sulfur (S) | mg/L | 14.1 | 0.065 | 603924 |
| Total Thallium (Tl) | mg/L | ND | 0.05 | 603924 |
| Total Tin (Sn) | mg/L | ND | 0.018 | 603924 |
| Total Titanium (Ti) | mg/L | 0.310 | 0.003 | 603924 |
| Total Tungsten (W) | mg/L | ND | 0.03 | 603924 |
| Total Vanadium (V) | mg/L | 0.048 | 0.003 | 603924 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426032
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)

| Maxxam ID | | C89290 | | |
|---|---|---|---|---|
| Sampling Date | | | | |
| | **Units** | **ERI-1250 : KZ-3** | **DL** | **QA Batch** |
| Total Zinc (Zn) | mg/L | 0.094 | 0.003 | 603924 |

QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426032
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

## SEMI-VOLATILE ORGANICS BY GC-MS (LIQUID)

| Maxxam ID | | C89290 | | |
|---|---|---|---|---|
| Sampling Date | | | | |
| | Units | ERI-1250 : KZ-3 | DL | QA Batch |
| **PAH'S** | | | | |
| Naphthalene | ug/L | ND | 0.1 | 603339 |
| Acenaphthylene | ug/L | ND | 0.1 | 603339 |
| Acenaphthene | ug/L | ND | 0.1 | 603339 |
| Fluorene | ug/L | ND | 0.1 | 603339 |
| Phenanthrene | ug/L | ND | 0.1 | 603339 |
| Anthracene | ug/L | ND | 0.1 | 603339 |
| Fluoranthene | ug/L | ND | 0.1 | 603339 |
| Pyrene | ug/L | ND | 0.1 | 603339 |
| Benzo(a)anthracene | ug/L | ND | 0.1 | 603339 |
| Chrysene | ug/L | ND | 0.1 | 603339 |
| Benzo(b)fluoranthene | ug/L | ND | 0.1 | 603339 |
| Benzo(k)fluoranthene | ug/L | ND | 0.1 | 603339 |
| Benzo(a)pyrene | ug/L | ND | 0.02 | 603339 |
| Indeno(1,2,3-cd)pyrene | ug/L | ND | 0.2 | 603339 |
| Dibenzo(a,h)anthracene | ug/L | ND | 0.2 | 603339 |
| Benzo(ghi)perylene | ug/L | ND | 0.2 | 603339 |
| **Surrogate Recovery (%)** | | | | |
| 2-Fluorobiphenyl | % | 89 | | 603339 |
| D14-Terphenyl | % | 108 | | 603339 |
| D5-Nitrobenzene | % | 81 | | 603339 |

ND = Not detected
QC Batch = Quality Control Batch
Please check for attached comments

Maxxam Job #: A426032
Report Date: 2004/06/16

Environmental Research Institute
Client Project #: ERI-05-2004-402
Project name: JICA PROJECT NO.1
Sampler Initials:

**GENERAL COMMENTS**

Sample C89290-01: PAH-SIM-L Analysis:
The sample was diluted due to insufficient amount of sample. MDLs were adjusted accordingly.

**Results relate only to the items tested.**

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report

Maxxam Job Number: WA426032

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603143 MC | MATRIX SPIKE | Total Mercury (Hg) | 2004/06/10 | | 92 | % | 75 - 125 |
| | QC STANDARD | Total Mercury (Hg) | 2004/06/10 | | 93 | % | 88 - 115 |
| | Spiked Blank | Total Mercury (Hg) | 2004/06/10 | | 97 | % | 88 - 115 |
| | Method Blank | Total Mercury (Hg) | 2004/06/10 | ND | | mg/L | |
| | RPD | Total Mercury (Hg) | 2004/06/10 | NC | | % | 20 |
| 603339 NMO | Spiked Blank | 2-Fluorobiphenyl | 2004/06/10 | | 90 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/10 | | 102 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/10 | | 76 | % | 40 - 130 |
| | | Naphthalene | 2004/06/10 | | 99 | % | 40 - 140 |
| | | Acenaphthylene | 2004/06/10 | | 96 | % | 40 - 140 |
| | | Acenaphthene | 2004/06/10 | | 97 | % | 40 - 140 |
| | | Fluorene | 2004/06/10 | | 92 | % | 40 - 140 |
| | | Phenanthrene | 2004/06/10 | | 97 | % | 40 - 140 |
| | | Anthracene | 2004/06/10 | | 102 | % | 40 - 140 |
| | | Fluoranthene | 2004/06/10 | | 107 | % | 40 - 140 |
| | | Pyrene | 2004/06/10 | | 108 | % | 40 - 140 |
| | | Benzo(a)anthracene | 2004/06/10 | | 98 | % | 40 - 140 |
| | | Chrysene | 2004/06/10 | | 100 | % | 40 - 140 |
| | | Benzo(b)fluoranthene | 2004/06/10 | | 98 | % | 40 - 140 |
| | | Benzo(k)fluoranthene | 2004/06/10 | | 110 | % | 40 - 140 |
| | | Benzo(a)pyrene | 2004/06/10 | | 100 | % | 40 - 140 |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/10 | | 93 | % | 40 - 140 |
| | | Dibenzo(a,h)anthracene | 2004/06/10 | | 80 | % | 40 - 140 |
| | | Benzo(ghi)perylene | 2004/06/10 | | 94 | % | 40 - 140 |
| | Method Blank | 2-Fluorobiphenyl | 2004/06/10 | | 90 | % | 40 - 130 |
| | | D14-Terphenyl | 2004/06/10 | | 114 | % | 40 - 130 |
| | | D5-Nitrobenzene | 2004/06/10 | | 75 | % | 40 - 130 |
| | | Naphthalene | 2004/06/10 | ND | | ug/L | |
| | | Acenaphthylene | 2004/06/10 | ND | | ug/L | |
| | | Acenaphthene | 2004/06/10 | ND | | ug/L | |
| | | Fluorene | 2004/06/10 | ND | | ug/L | |
| | | Phenanthrene | 2004/06/10 | ND | | ug/L | |
| | | Anthracene | 2004/06/10 | ND | | ug/L | |
| | | Fluoranthene | 2004/06/10 | ND | | ug/L | |
| | | Pyrene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(a)anthracene | 2004/06/10 | ND | | ug/L | |
| | | Chrysene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(b)fluoranthene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(k)fluoranthene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(a)pyrene | 2004/06/10 | ND | | ug/L | |
| | | Indeno(1,2,3-cd)pyrene | 2004/06/10 | ND | | ug/L | |
| | | Dibenzo(a,h)anthracene | 2004/06/10 | ND | | ug/L | |
| | | Benzo(ghi)perylene | 2004/06/10 | ND | | ug/L | |
| 603924 ISI | MATRIX SPIKE | Total Aluminum (Al) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Antimony (Sb) | 2004/06/11 | | 100 | % | 75 - 125 |
| | | Total Arsenic (As) | 2004/06/11 | | 97 | % | 75 - 125 |
| | | Total Barium (Ba) | 2004/06/11 | | 95 | % | 75 - 125 |
| | | Total Beryllium (Be) | 2004/06/11 | | 98 | % | 75 - 125 |
| | | Total Bismuth (Bi) | 2004/06/11 | | 92 | % | 75 - 125 |
| | | Total Boron (B) | 2004/06/11 | | 96 | % | 75 - 125 |
| | | Total Cadmium (Cd) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Chromium (Cr) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Cobalt (Co) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Copper (Cu) | 2004/06/11 | | 89 | % | 75 - 125 |
| | | Total Lead (Pb) | 2004/06/11 | | 87 | % | 75 - 125 |
| | | Total Lithium (Li) | 2004/06/11 | | 99 | % | 75 - 125 |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426032

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603924 ISI | MATRIX SPIKE | Total Manganese (Mn) | 2004/06/11 | | 92 | % | 75 - 125 |
| | | Total Molybdenum (Mo) | 2004/06/11 | | 97 | % | 75 - 125 |
| | | Total Nickel (Ni) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Phosphorus Total (P) | 2004/06/11 | | 103 | % | 75 - 125 |
| | | Total Selenium (Se) | 2004/06/11 | | 93 | % | 75 - 125 |
| | | Total Strontium (Sr) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Thallium (Tl) | 2004/06/11 | | 99 | % | 75 - 125 |
| | | Total Tin (Sn) | 2004/06/11 | | 91 | % | 75 - 125 |
| | | Total Titanium (Ti) | 2004/06/11 | | 95 | % | 75 - 125 |
| | | Total Vanadium (V) | 2004/06/11 | | 96 | % | 75 - 125 |
| | | Total Zinc (Zn) | 2004/06/11 | | 97 | % | 75 - 125 |
| | QC STANDARD | Total Aluminum (Al) | 2004/06/11 | | 103 | % | 66 - 133 |
| | | Total Antimony (Sb) | 2004/06/11 | | 92 | % | 67 - 133 |
| | | Total Arsenic (As) | 2004/06/11 | | 103 | % | 80 - 126 |
| | | Total Barium (Ba) | 2004/06/11 | | 99 | % | 83 - 119 |
| | | Total Beryllium (Be) | 2004/06/11 | | 99 | % | 76 - 119 |
| | | Total Bismuth (Bi) | 2004/06/11 | | 100 | % | 74 - 122 |
| | | Total Boron (B) | 2004/06/11 | | 98 | % | 77 - 121 |
| | | Total Cadmium (Cd) | 2004/06/11 | | 97 | % | 75 - 117 |
| | | Total Calcium (Ca) | 2004/06/11 | | 102 | % | 90 - 110 |
| | | Total Chromium (Cr) | 2004/06/11 | | 97 | % | 90 - 110 |
| | | Total Cobalt (Co) | 2004/06/11 | | 96 | % | 77 - 119 |
| | | Total Copper (Cu) | 2004/06/11 | | 95 | % | 73 - 120 |
| | | Total Iron (Fe) | 2004/06/11 | | 110 | % | 80 - 136 |
| | | Total Lead (Pb) | 2004/06/11 | | 97 | % | 76 - 119 |
| | | Total Lithium (Li) | 2004/06/11 | | 99 | % | 76 - 123 |
| | | Total Magnesium (Mg) | 2004/06/11 | | 107 | % | 93 - 114 |
| | | Total Manganese (Mn) | 2004/06/11 | | 97 | % | 85 - 115 |
| | | Total Molybdenum (Mo) | 2004/06/11 | | 99 | % | 76 - 120 |
| | | Total Nickel (Ni) | 2004/06/11 | | 97 | % | 79 - 118 |
| | | Total Phosphorus Total (P) | 2004/06/11 | | 101 | % | 90 - 110 |
| | | Total Potassium (K) | 2004/06/11 | | 99 | % | 90 - 110 |
| | | Total Selenium (Se) | 2004/06/11 | | 96 | % | 74 - 126 |
| | | Total Silicon (Si) | 2004/06/11 | | 95 | % | 90 - 112 |
| | | Total Silver (Ag) | 2004/06/11 | | 96 | % | 90 - 109 |
| | | Total Sodium (Na) | 2004/06/11 | | 106 | % | 91 - 112 |
| | | Total Strontium (Sr) | 2004/06/11 | | 98 | % | 80 - 116 |
| | | Total Sulfur (S) | 2004/06/11 | | 98 | % | 90 - 111 |
| | | Total Thallium (Tl) | 2004/06/11 | | 101 | % | 68 - 129 |
| | | Total Tin (Sn) | 2004/06/11 | | 101 | % | 75 - 121 |
| | | Total Titanium (Ti) | 2004/06/11 | | 99 | % | 80 - 116 |
| | | Total Tungsten (W) | 2004/06/11 | | 95 | % | 84 - 121 |
| | | Total Vanadium (V) | 2004/06/11 | | 98 | % | 90 - 110 |
| | | Total Zinc (Zn) | 2004/06/11 | | 97 | % | 80 - 115 |
| | Spiked Blank | Total Aluminum (Al) | 2004/06/11 | | 100 | % | 76 - 133 |
| | | Total Antimony (Sb) | 2004/06/11 | | 72 | % | 67 - 133 |
| | | Total Arsenic (As) | 2004/06/11 | | 84 | % | 80 - 126 |
| | | Total Beryllium (Be) | 2004/06/11 | | 80 | % | 76 - 119 |
| | | Total Bismuth (Bi) | 2004/06/11 | | 79 | % | 74 - 122 |
| | | Total Boron (B) | 2004/06/11 | | 80 | % | 77 - 121 |
| | | Total Cadmium (Cd) | 2004/06/11 | | 79 | % | 75 - 117 |
| | | Total Chromium (Cr) | 2004/06/11 | | 79 | % | 75 - 125 |
| | | Total Cobalt (Co) | 2004/06/11 | | 80 | % | 77 - 119 |
| | | Total Copper (Cu) | 2004/06/11 | | 81 | % | 73 - 120 |
| | | Total Iron (Fe) | 2004/06/11 | | 90 | % | 80 - 136 |
| | | Total Lead (Pb) | 2004/06/11 | | 77 | % | 76 - 119 |

Environmental Research Institute
Attention: Komichi Ikeda
Client Project #: ERI-05-2004-402
P.O. #:
Project name: JICA PROJECT NO.1

## Quality Assurance Report (Continued)

Maxxam Job Number: WA426032

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603924 ISI | Spiked Blank | Total Lithium (Li) | 2004/06/11 | | 86 | % | 76 - 123 |
| | | Total Manganese (Mn) | 2004/06/11 | | 80 | % | 75 - 125 |
| | | Total Molybdenum (Mo) | 2004/06/11 | | 80 | % | 76 - 120 |
| | | Total Nickel (Ni) | 2004/06/11 | | 82 | % | 79 - 118 |
| | | Total Phosphorus Total (P) | 2004/06/11 | | 90 | % | 90 - 110 |
| | | Total Selenium (Se) | 2004/06/11 | | 81 | % | 74 - 126 |
| | | Total Thallium (Tl) | 2004/06/11 | | 83 | % | 68 - 129 |
| | | Total Tin (Sn) | 2004/06/11 | | 82 | % | 75 - 121 |
| | | Total Vanadium (V) | 2004/06/11 | | 79 | % | 75 - 125 |
| | | Total Zinc (Zn) | 2004/06/11 | | 81 | % | 80 - 115 |
| | Method Blank | Total Aluminum (Al) | 2004/06/11 | 0.05 | | mg/L | |
| | | Total Antimony (Sb) | 2004/06/11 | ND | | mg/L | |
| | | Total Arsenic (As) | 2004/06/11 | ND | | mg/L | |
| | | Total Barium (Ba) | 2004/06/11 | 0.003 | | mg/L | |
| | | Total Beryllium (Be) | 2004/06/11 | ND | | mg/L | |
| | | Total Bismuth (Bi) | 2004/06/11 | ND | | mg/L | |
| | | Total Boron (B) | 2004/06/11 | ND | | mg/L | |
| | | Total Cadmium (Cd) | 2004/06/11 | ND | | mg/L | |
| | | Total Calcium (Ca) | 2004/06/11 | ND | | mg/L | |
| | | Total Chromium (Cr) | 2004/06/11 | 0.008 | | mg/L | |
| | | Total Cobalt (Co) | 2004/06/11 | ND | | mg/L | |
| | | Total Copper (Cu) | 2004/06/11 | 0.008 | | mg/L | |
| | | Total Iron (Fe) | 2004/06/11 | 0.011 | | mg/L | |
| | | Total Lead (Pb) | 2004/06/11 | ND | | mg/L | |
| | | Total Lithium (Li) | 2004/06/11 | ND | | mg/L | |
| | | Total Magnesium (Mg) | 2004/06/11 | 0.005 | | mg/L | |
| | | Total Manganese (Mn) | 2004/06/11 | ND | | mg/L | |
| | | Total Molybdenum (Mo) | 2004/06/11 | 0.006 | | mg/L | |
| | | Total Nickel (Ni) | 2004/06/11 | ND | | mg/L | |
| | | Total Phosphorus Total (P) | 2004/06/11 | 0.08 | | mg/L | |
| | | Total Potassium (K) | 2004/06/11 | ND | | mg/L | |
| | | Total Selenium (Se) | 2004/06/11 | ND | | mg/L | |
| | | Total Silicon (Si) | 2004/06/11 | ND | | mg/L | |
| | | Total Silver (Ag) | 2004/06/11 | 0.007 | | mg/L | |
| | | Total Sodium (Na) | 2004/06/11 | 0.18 | | mg/L | |
| | | Total Strontium (Sr) | 2004/06/11 | ND | | mg/L | |
| | | Total Sulfur (S) | 2004/06/11 | ND | | mg/L | |
| | | Total Thallium (Tl) | 2004/06/11 | ND | | mg/L | |
| | | Total Tin (Sn) | 2004/06/11 | ND | | mg/L | |
| | | Total Titanium (Ti) | 2004/06/11 | ND | | mg/L | |
| | | Total Tungsten (W) | 2004/06/11 | ND | | mg/L | |
| | | Total Vanadium (V) | 2004/06/11 | 0.005 | | mg/L | |
| | | Total Zinc (Zn) | 2004/06/11 | 0.004 | | mg/L | |
| | RPD | Total Aluminum (Al) | 2004/06/11 | 6.3 | | % | 20 |
| | | Total Barium (Ba) | 2004/06/11 | 1.5 | | % | 20 |
| | | Total Beryllium (Be) | 2004/06/11 | NC | | % | 20 |
| | | Total Bismuth (Bi) | 2004/06/11 | NC | | % | 20 |
| | | Total Boron (B) | 2004/06/11 | 9.4 | | % | 20 |
| | | Total Cadmium (Cd) | 2004/06/11 | NC | | % | 20 |
| | | Total Calcium (Ca) | 2004/06/11 | 1.1 | | % | 20 |
| | | Total Chromium (Cr) | 2004/06/11 | NC | | % | 20 |
| | | Total Cobalt (Co) | 2004/06/11 | NC | | % | 20 |
| | | Total Copper (Cu) | 2004/06/11 | NC | | % | 20 |
| | | Total Iron (Fe) | 2004/06/11 | 3.5 | | % | 20 |
| | | Total Magnesium (Mg) | 2004/06/11 | 1.1 | | % | 20 |
| | | Total Manganese (Mn) | 2004/06/11 | 2.1 | | % | 20 |

Environmental Research Institute
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## Quality Assurance Report (Continued)

Maxxam Job Number: WA426032

| QA/QC Batch Num Init | QC Type | Parameter | Date Analyzed yyyy/mm/dd | Value | Recovery | Units | QC Limits |
|---|---|---|---|---|---|---|---|
| 603924 ISI | RPD | Total Molybdenum (Mo) | 2004/06/11 | NC | | % | 20 |
| | | Total Nickel (Ni) | 2004/06/11 | NC | | % | 20 |
| | | Total Phosphorus Total (P) | 2004/06/11 | NC | | % | 20 |
| | | Total Potassium (K) | 2004/06/11 | NC | | % | 20 |
| | | Total Silicon (Si) | 2004/06/11 | NC | | % | 20 |
| | | Total Silver (Ag) | 2004/06/11 | NC | | % | 20 |
| | | Total Sodium (Na) | 2004/06/11 | 1.8 | | % | 20 |
| | | Total Strontium (Sr) | 2004/06/11 | 1.2 | | % | 20 |
| | | Total Thallium (Tl) | 2004/06/11 | NC | | % | 20 |
| | | Total Tin (Sn) | 2004/06/11 | NC | | % | 20 |
| | | Total Titanium (Ti) | 2004/06/11 | NC | | % | 20 |
| | | Total Vanadium (V) | 2004/06/11 | NC | | % | 20 |
| | | Total Zinc (Zn) | 2004/06/11 | NC | | % | 20 |

ND = Not detected
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample



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