Landsvirkjun ALCOA

Sustainability Initiative

Measuring Alcoa and Landsvirkjun Performance
on the Fjardaál and Kárahnjúkar Projects

Phase III Report
Plan for Implementation

FEBRUARY 2006

Sustainability Initiative -
Measurement of the Economic, Social and Environmental Effects of the Kárahnjúkar and Fjardaál Projects

Phase III Report – Plan for Implementation

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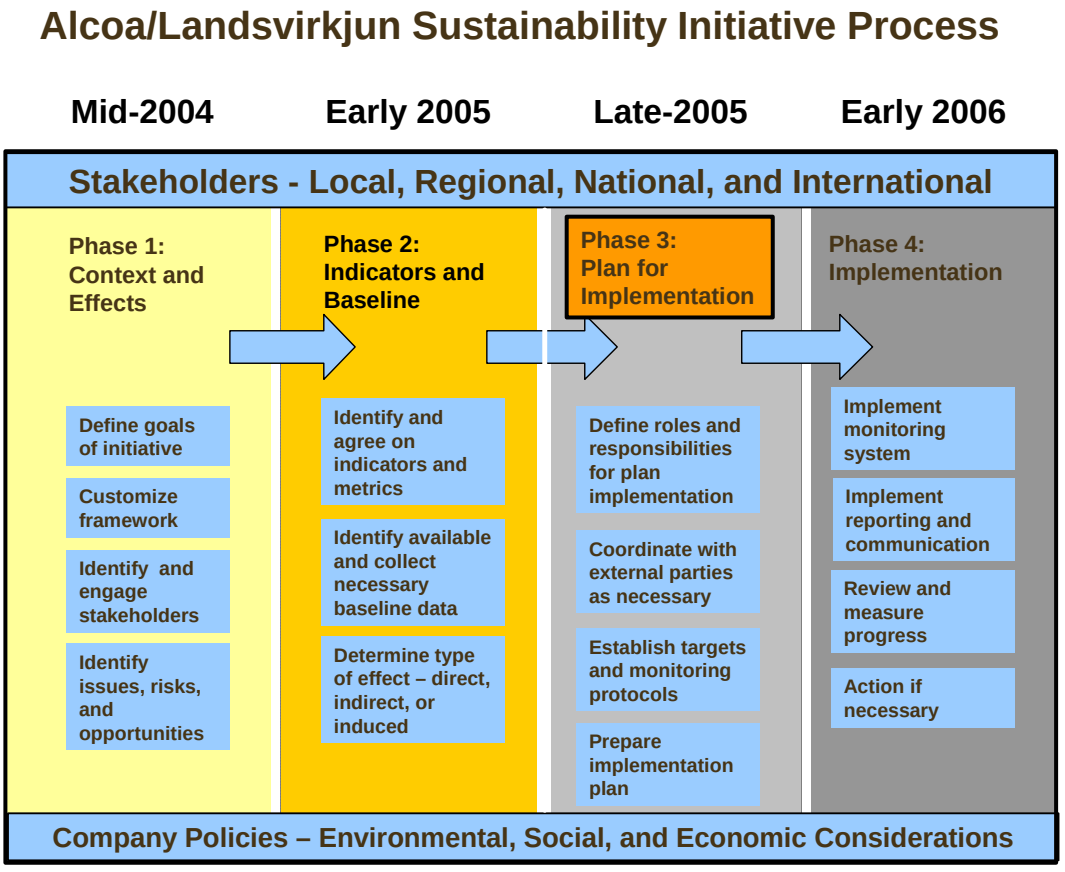
1.0 INTRODUCTION AND BACKGROUND

This report summarizes the results of Phase III of the Alcoa and Landsvirkjun East Iceland Sustainability Initiative – Plan for Implementation. This report was originally presented in draft form in November 2005 to allow interested stakeholders to comment on the proposed targets and monitoring protocols presented herein.

Phases I and II of the Sustainability Initiative were completed in April 2005, which resulted in the development of sustainability indicators and metrics for the Fjardaál and Karahnjukar projects and publication of the report entitled *Sustainability Initiative: Measuring Alcoa and Landsvirkjun Performance on the Fjardaál and Karahnjukar Projects – Phase I/II Report – Identification of Sustainability Indicators*. The current phase of the Sustainability Initiative, Phase III, involves the following steps:

- identifying the roles for persons and/or entities responsible for providing data related to the indicators and metrics;
- coordinating with external parties involved in developing performance targets and/or monitoring protocols, as applicable;
- establishing performance targets and monitoring protocols;
- hosting a meeting of interested parties to address comments and questions on the targets and monitoring protocols; and
- preparing this draft Implementation Plan to document the process and results of Phase III.

The figure below summarizes the actions and timing of the four phases of the Initiative.



2.0 PROCESS FOR ESTABLISHING TARGETS, BENCHMARKS, AND MONITORING PROTOCOLS

2.1 Process for Establishing Targets, Benchmarks, and Monitoring Protocols

The first step in developing targets, benchmarks, and monitoring protocols was to identify lead staff within Alcoa and Landsvirkjun that would assume responsibility for each metric. These individuals will be responsible for ensuring that future monitoring is conducted in accordance with the monitoring protocols presented herein (or some variance thereof if deemed necessary) and for reporting monitoring results each year, or as often as appropriate, to the editor of progress reports.

Targets and Benchmarks

In the context of this initiative, targets are defined as specific goals that are indicated by a numerical value or trend. Benchmarks are defined as reference points, existing accepted standards or best practices against which a target can be compared. Benchmarks also provide context for the targets and monitoring results. National (where available) and international standards and guidelines were selected as benchmarks for the metrics, as appropriate. In some cases, benchmarks were not available or applicable because the metrics are unique to the Fjardaál and Karahnjukar projects.

In some cases, different targets were established for the construction and operation phases of the projects. For example, different targets were established for the noise indicator since noise levels will be higher during construction than operation. Also, targets were sometimes different between the two companies since the targets need to be in line with the general targets of each company. The targets are presented in Appendix 1.

For direct metrics, targets were established by Alcoa and Landsvirkjun. For indirect and induced metrics, the lead Alcoa and Landsvirkjun staff and consultants coordinated with their construction contractors and external stakeholders and experts to develop appropriate targets and benchmarks. For eight metrics, targets were not developed (Table 1). These eight metrics will be monitored and the data reported as described in the monitoring protocols presented in Appendix 2. There are some metrics that only have targets for the operation phase of the projects, but these metrics will still be monitored during the construction phase and the monitoring results will be reported. This is because construction started before Phase III of the Initiative and if targets had not already been set before construction began, it was not considered appropriate to set targets after construction had started.

Table 1. Metrics for Which Targets Were Not Defined

Indicator	Metric	Rational for Omission of Target
5.1 Alcoa/ Landsvirkjun employee training and education level	Percent of hours Alcoa/ Landsvirkjun employees spend in work-related training per year	Training and educational opportunities are provided by both companies. However, the training and education is not a goal in itself but rather means to and end, with the primary goal of improving competences and performance. Accordingly, it was inappropriate to establish a target for this metric. Data will be collected and reported.
6.2 Housing prices	Average house price in East Iceland and nationally compared to average income	It is not appropriate for the companies to establish a target for housing prices. Data will be collected and reported.
11.1 Alcoa annual exports	Net exported products from Fjardaál as a percent of annual exports from Iceland (ISK/year)	It is not appropriate for Alcoa to establish a target for annual exports as a percentage of national exports because this percentage is dependent on other industries within Iceland. Data will be collected and reported.
12.1 Employment	Percentage of new Alcoa/Landsvirkjun employees who are: • East Iceland residents • East Iceland returnees • Other Iceland residents • Foreign nationals living outside Iceland	Target not appropriate
14.1 Retained Value Added	ISK retained in Iceland through Alcoa and Landsvirkjun salaries, payments to public authorities, supplies procured in Iceland, and profits that stay domestically.	Results depend on several macro factors that companies can not influence.
14.2 Quantity of goods and services procured in Iceland	Percent of total goods and services (value in ISK) procured by Alcoa and Landsvirkjun and subcontractors in Iceland	Alcoa, Landsvirkjun and contractors have a policy of taking best offers when buying supplies. Therefore a target is not appropriate but data will be collected and reported.
24.3 Birds at Uthérad	Feeding site use by Red-throated Divers at Lagarfljot and the ocean	Target is not appropriate because feeding site use is naturally dynamic and influenced by many non-project related factors. Baseline research in 2004 and 2005 indicates that the ocean is the primary feeding site for the Red-throated Diver
28.1 Marine benthic fauna	Grain size and distribution of sediment in selected sample plots	There is no single optimal condition for grain size and sediment deposition – the optimal condition varies by species and site conditions. Data will be collected and reported. This metric is directly related to another metric for Indicator 28.1 - *Diversity and density of benthic fauna at selected sampling spots*, which has a target.

Monitoring Protocols

Alcoa and Landsvirkjun consulted extensively with both internal and external experts to develop the monitoring protocols for the indicators. For direct metrics that involved only internal processes (e.g. lost time injury rates and employee satisfaction), consultants and lead staff worked with appropriate Alcoa and Landsvirkjun staff (e.g. Environmental, Health, and Safety and Human Resources managers) to develop standardized methods for monitoring and reporting data. This also involved coordinating with contractors working on the smelter and hydro projects, and collecting information from these contractors for metrics that cover both construction and operation. For direct, indirect, and induced metrics that involved external data collection or expertise (e.g. Karahnjukar environmental metrics and many of the socio-economic metrics), lead staff and consultants worked with appropriate external parties and experts to develop monitoring and data reporting protocols. External experts that were consulted regarding the development of monitoring protocols are listed below.

- East Iceland Association of Municipalities (Þorvaldur Jónsson & Soffía Lárusdóttir)
- East Iceland Development Center (Stefán Stefánsson)
- East Iceland Cultural Association
- Regional Development Institute (Halldór V. Kristjánsson)
- Gallup
- Námsmatsstofnun (independent research institute on educating and test results)
- Food and Environment Agency (Björn Stefánsson)
- Icelandic Institute of Natural History (Kristinn Haukur Skarphéðinsson and others)
- Icelandic Freshwater Fish Agency (Guðni Guðbergsson)
- Marine Research Institute (Karl Gunnarsson)
- The Agricultural University of Iceland (Hlynur Óskarsson)
- The National Land Survey Agency (Kolbeinn Árnason)
- The National Energy Authority (Kristinn Einarsson and Hákon Aðalsteinsson)
- Waste Agency in Egilsstadir (Anna Björk Hjaltadóttir)
- Cornell University (Dr. Len H. Weinstein)
- University of Newcastle (Professor Alan W. Davison)

In addition to this consultation, lead staff reviewed the Fjardaál Environmental Operating Permit (Environment and Food Agency, 2003) and the Fjardaál Environmental Monitoring Work Plan (Alcoa, 2005) for monitoring protocols and monitoring schedules required by the operating license for the Fjardaál smelter.

2.2 Changes to Indicators and Metrics

The process of developing targets and monitoring protocols, including consultation with experts, resulted in the following changes to the set of indicators and metrics selected in Phase I/II and documented in *Sustainability Initiative: Measuring Alcoa and Landsvirkjun Performance on the Fjardaál and Karahnjukar Projects – Phase I/II Report – Identification of Sustainability Indicators* (Table 2).

Table 2. Changes to Indicators and Metrics Since Phase I/II

Original Indicator	Original Metric	Change	Rationale for Change
6.2 Cost of Living	Average house price in East Iceland and Nationally compared to average income	Changed indicator name from "Cost of Living" to "Housing Prices"	Indicator name was changed to better reflect metric.
7.1 Levels of health care service provision in local communities	Survey regarding availability and quality of health care services in East Iceland	a) Name of indicator changed to: "Levels of public services in local communities" b) rewording of original metric: "Satisfaction of inhabitants with health care services in East Iceland" c) new metric added: "Satisfaction with public services in local municipalites"	a) To accommodate so that indicator name would be appropriate for both metrics (also the one added) b) change made by the East Iceland Health Instiute responsible for this metric c) Strong wish from participants at information meeting to add a metric like this
7.2 Quality of Schools	Results of standardized tests for primary students (10^{th} grade) in East Iceland vs. nationally	Added 4^{th} and 7^{th} grades to metric "Results for standardized tests for primary students (4^{th}, 7^{th}, and 10^{th} grade) in East Iceland vs. nationally"	Added grades 4 and 7 to provide additional information regarding quality of schools.
8.1 Safety in the community	No change in original metrics	Name of indicator changed to: "Community wellbeing" Metric from indicator 8.2 added to this indicator since 8.2 was deleted.	Trying to clarify relationship between indicators and metrics. Participants at information meeting felt that one metric on drug use only gave a limited view of the indicator social stress

Original Indicator	Original Metric	Change	Rationale for Change
8.2 Social Stress	Number of drug violations per capita in East Iceland compared with national average	Indicator deleted and metric moved to indicator 8.1 (Community wellbeing)	See above
14.2 Quantity of goods and services procured in East Iceland and Nationally	Percent of total goods and services (value in ISK) procured by Alcoa and Landsvirkjun and subcontractors in East Iceland and Iceland	Removed East Iceland from indicator and metric	Changed metric because it is impractical to categorize procurements by East Iceland and Iceland and difficult to track.
16. Noise in Reyðarfjörður	Average noise level at established monitoring stations at Fjardaál and in Reyðarfjörður	Change indicator name to: Noise at Fjardaál and in Reyðarfjörður Metric divided up into two metrics: "Average noise level at established monitoring stations at Fjardaál" "Average noise level at established monitoring stations in Reyðarfjörður"	Not a change in substance but a change to clarify that noise will be measured both at the smelter site and in Reyðarfjörður.
17.1 Dust pollution from Hálslón	Average monthly concentration and origin of air particulates measured at designated sample locations at Hálslón and Fljótsdalshérad	Removed origin of air particulates from metric	Origin of air particulates was removed from metric due to lack of standardized data collection method.
19.1 Sediment deposition in Hálslón Reservoir	Volume (m^3) of sedimentation in a 10 year period Grain size distribution of sediments in the reservoir bed.	Removed metric: "Grain size distribution of sediments in the reservoir bed."	Was not considered relevant to the issue this indicator is supposed to address (storage capacity of Hálslón Reservoir)
21.1 Fluoride in Vegetation	Concentration of F (µg/kg-DW) in vegetation (ruminant forage and berries) at designated sample plots within a specified radius of smelter	Changed metric to: "Concentration of F in vegetation (including ruminant forage) at designated sample plots within a specified radius of smelter"	Removed measuring unit and berries from metric based on expert consultation (Alan W. Davisson & Len H. Weinstein)

Original Indicator	Original Metric	Change	Rationale for Change
23.1 Quantity and treatment of solid waste from construction and operation	Total wastes landfilled annually Total amount of spent pot lining per ton of aluminum produced annually (kg/metric ton)	The old metric is still in for the smelter, but a new metric is added for the hydro: "Total wastes left/land-filled at hydro site" Changed metric to: "Spent pot lining (SPL) reused/ recycled annually (percent of total)"	Added metric to align with Landsvirkjun policy (not against landfills, but aims at minimum to utilize all venues the local municipality offers for recycling) Changed metric to better reflect the issue of quantity and treatment of solid waste.
26.2 Blowing sand from Hálslón Reservoir	Volume of soil in sand piles east of the reservoir Estimated volume of soil that deposits on vegetation	Removed metric "Estimated volume of soil that deposits on vegetation"	This metric was determined to be duplicative of metric 26.1 – Vegetation in Vesturoraefi.
26.3 Vegetation change caused by land reclamation	Area (ha) of reclaimed land at Nordur Hérad and Fljótsdal, recorded every five years.	Changed metric to: "Area (ha) of reclaimed land at Fljótsdalshérad and Fljótsdalshreppur recorded every five years."	Adjustment after Fellahreppur, Nordur Hérad and Austur Hérad were merged into one municipality - Fljótsdalshérad
27.1 Freshwater aquatic fauna in Jökulsá á dal and Lagarfljot	Two of the old metrics were removed and new ones designes, since the original metrics were proposed before consultation with experts had finished. The third orginal metric is unchanged: Fishing (no. of fish) in relevant rivers as registered by the Institute of Fresh Water Fisheries	"Species composition and condition of fish in Lagarfljot (arctic charr & trout)"	New metrics designed based on expert consultation with the Icelandic Freshwater Fish Agency and Hákon Aðalsteinsson, The National Energy Authority .
		"Species composition and distribution of fish in Jökulsá á dal, Lagarfljot and tributary systems (salmon)"	Same as above.
28.1 Marine benthic fauna	No change in metrics	Indicator changed to: "Marine benthic fauna in Héradsfloi Bay"	To avoid misunderstanding since there will also be some monitoring done on marine environment close to the smelter in Reyðarfjörður (indicator 22.1)

3.0 MONITORING PROTOCOLS, TARGETS, AND BENCHMARKS

The proposed targets, benchmarks, and monitoring protocols for the indicators and metrics are presented in Appendices 1 and 2. Additional details regarding the monitoring protocols can be obtained from Alcoa or Landsvirkjun.

4.0 NEXT STEPS

4.1 Phase IV - Implementation

Phase IV – Implementation involves measuring and reporting the status of the indicators and metrics and conducting necessary actions relative to changes in indicator conditions. Alcoa and Landsvirkjun are committed to implementing the initiative in 2006 and continuing the initiative throughout the life of the Fjardaál and Karahnjukar projects. To ensure full implementation and maintenance of the initiative, Alcoa and Landsvirkjun have assigned responsibility for implementing and managing the initiative to Tómas Sigurðsson, Managing Director of Alcoa Fjardaál, and to Friðrik Sophusson, CEO of Landsvirkjun, respectively. They are accountable for monitoring the status of the indicators and metrics relative to the established performance targets and conducting timely, appropriate actions if performance targets are not achieved. If, for any reason, they leave their posts, their successors would assume responsibility for the initiative.

4.2 Reporting

In 2006, Alcoa and Landsvirkjun will prepare and distribute the first Sustainability Initiative Progress Report to reflect 2005 performance in the Sustainability Initiative, including:

- monitoring results for construction-related indicators;
- status of performance relative to the indicators;
- descriptions of any actions to address trends; and
- other noteworthy project-related issues.

The Sustainability Initiative Progress Report will be provided to interested stakeholders and made available on the companies' websites, www.alcoa.is and www.lv.is.

From 2007 through the life of the projects, Alcoa and Landsvirkjun will prepare and distribute annual Sustainability Initiative Progress Reports, which will contain similar content to that described for the 2006 progress report except that operation-phase indicators will be measured and reported on as the projects become operational.

Throughout the life of the projects, the companies will periodically review and, if necessary, revise the indicators and metrics to ensure they are effective at measuring the projects' performance at meeting sustainability objectives.

APPENDIX 1: Alcoa and Landsvirkjun Sustainability Initiative - Target and Benchmark Summary Table

Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
1.1 Demographics in East Iceland	Gender and age distribution in East Iceland populations compared to the National population	Induced	Balanced age structure and sex ratio in East Iceland relative to National age distribution with a regression coefficient (r^2) = 1.0	National age and gender distribution baseline (2004) r^2 = 0.913	Iceland Statistics www. hagstofan.is Regional Development Institute
	Total population in East Iceland	Induced	Increase in population in East Iceland	National population	Iceland Statistics www. hagstofan.is
2.1 Gender balance in Alcoa/ Landsvirkjun workforce	Proportion of men and women employed by projects compared with the National workforce proportion in: • Management • Clerical/ administrative staff • Industrial/ manual workers • Engineering/ technical staff • Total employees	Direct	**Construction:** Target not applicable. Contractors will monitor and report data. **Operation:** Hydro, total employees: 67%M/33%F by 2010 Smelter, total employees: 50%M/50%F by 2015	Participation of men and women in the job market at national level	Iceland Statistics www. hagstofan.is
	Ratio of male to female employee salary by job classification	Direct	Hydro: equal Smelter: equal	Ratio of male to female salary by job classification at a national level	
3.1 Alcoa/ Landsvirkjun employee job satisfaction	Alcoa/ Landsvirkjun employee survey on workplace and job satisfaction	Direct	Hydro: 4,2 or higher on Gallup scale (In the blue color) Smelter: Consistently in top five in country in VR survey	Gallup international job satisfaction standards - scale 1-5 Blue (best): 4.2 or higher Green (medium) : 3.7-4.2 Red (low): 3.69 or less	

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
4.1 Alcoa/ Landsvirkjun employee safety	Number of reportable accidents at projects per year	Direct	**Construction:** Hydro: # of accidents will remain constant or decrease over time (target set from beginning of 2006) Smelter: Zero reportable accidents per year **Operation:** Hydro and smelter: zero reportable accidents per year	Industry average: 11 Reportable Accidents per million hours worked (IAI)	Construction of hydro: Strict safety requirements were made in bid documents for the hydro power station. However, zero targets were not established. Since construction has already started, targets can not be set for the past. http://www.world-aluminium.org/iai/publications/performance_graphs/img001.jpg IAI 2004. Sustainability Update 2004 Aluminum for Future Generations
	Lost time injury rates per year as reported by Alcoa/ Landsvirkjun and sub-contractors	Direct	**Construction:** Hydro – remain constant or decrease over time Smelter - zero lost workday injuries **Operation:** Hydro – zero lost workday injuries Smelter – zero lost workday injuries	Aluminium Industry average: 3 Lost workdays per million hours worked (IAI)	http://www.world-aluminium.org/iai/publications/performance_graphs/img001.jpg
5.1 Alcoa/ Landsvirkjun employee training and education level	Percent of hours Alcoa/ Landsvirkjun employees spend in work-related training per year	Direct	Hydro: Target not applicable. Will monitor and report data. Smelter: Target not applicable. Will monitor and report data.		Benchmarks for smelter perhaps avialable in ASTD´s annual report: "State of the industry report" and "International comparisons report".

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
	Education levels of employees within smelter (by gender) compared to rural Iceland (non-Reykjavik) and National level (5-yr survey): • Percent with university degree • Percent with vocational examination • Percent who have finished matriculation examination	Indirect	Employee education level (within metric categories) equal to or greater than national level	National education levels	Iceland Statistics: www.hagstofan.is
6.1 Income levels	Average salary levels in East Iceland compared to National average	Induced	Equal to or greater than the national average	National average	Iceland Statistics: www.hagstofan.is
	Average salary for Alcoa/ Landsvirkjun employees compared with other sources of employment in Iceland	Direct	Target to be determined	National average	Iceland Statistics: www.hagstofan.is
6.2 Housing prices	Average house price in East Iceland and nationally compared to average income	Indirect	Target not applicable	National trends	The Land Registry Agency: www.fmr.is Association of local municipalities in East Iceland (SSA)
7.1 Levels of public services in local communities	Satisfaction of inhabitants with health care services in East Iceland	Induced	Results remain stable or improve	Results from national survey	East Iceland Health Institute
	Satisfaction with public services in local municipalities	Induced	To be determined in cooperation with municipalities once results from first survey are available	Baseline from first year of survey	Gallup
7.2 Quality of schools	Results for standardized tests for primary students (4^{th} , 7^{th}, and 10^{th} grade) in East Iceland vs. nationally	Induced	Average grades in East Iceland greater than or equal to national average	National test scores	Namsmatsstofnun: www.namsmat.is
	Results of standardized tests for secondary schools in East Iceland vs. nationally	Induced	Average grades in East Iceland greater than or equal to national average	National test scores	Namsmatsstofnun: www.namsmat.is

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
	Percent of teachers without certification in primary schools in East Iceland vs. nationally	Induced	Percent of teachers without certification in east Iceland less than or equal to national average	National percentage	Iceland Statistics: www.hagstofan.is
8.1 Community wellbeing	Number of crimes for financial gains, assaults and vandalism per capita in East Iceland and nationally	Induced	East Iceland crime rate lower than the national per capita crime rate.	Baseline per capita rates for East Iceland and nationally	The national Commissioner of Police (www.logreglan.is)
	Number of accidents per km driven on selected roads: • Road between Egilsstadir and Reydarfjordur • Road between Faskrudsfjordur and Reydarfjordur • Road from Egilsstadir to Hallormsstadaskogur	Induced	Accident rate (per million km driven) less than or equal to the baseline Note: The accident rate is determined from number of accidents and km driven that are monitored Established by an automated system run by the Public Road Authority.	Current baseline accident rate	The Public Roads Authority www.vegagerdin.is
	Number of drug violations per capita in East Iceland compared with national average	Induced	Number of violations (per 10,000 inhabitants) less than or equal to the baseline	Current baseline drug violations	The national Commissioner of Police (www.logreglan.is)
9.1 Involvement in local community	Hours Alcoa employees participate in Alcoa foundation activities (Action and Bravo) per year	Direct	60 percent of employees volunteer for Alcoa Foundation programs (Action, Bravo, Week of Service)		
10.1 Cultural opportunities	Number of cultural events per year in East Iceland	Induced	Number of cultural events greater than or equal to the baseline	Baseline information	
11.1 Alcoa annual exports	Net exported products from Fjardaál as a percentage of annual exports from Iceland (ISK and USD/year)	Indirect	Target is not applicable. Will report data.		

APPENDIX 1: Alcoa and Landsvirkjun Sustainability Initiative - Target and Benchmark Summary Table

Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
12.1 Employment	Percentage of new Alcoa/Landsvirkjun employees who are: • East Iceland residents • East Iceland returnees • Other Iceland residents • Foreign nationals living outside Iceland	Direct	**Construction and operation:** Target not applicable. Will monitor and report data.		The metric might need to be changed slightly for construction time since Impregilo has only information on Icelanders/Europeans/non-Europeans). Unclear if this informatin will be available from other contractors working on the hydro project, but Bechtel will provide information.
	Number and proportion of jobs in key economic sectors in East Iceland and Nationally: • Agriculture • Fishing • Fish processing • Manufacturing • Electricity & water supply • Construction • Wholesale, retail trade, repairs • Hotels, restaurants • Transport, communication • Financial intermediation • Real estate & business activities • Public administration • Education • Health services, social work	Indirect	**Operation:** Preserve diversity in employment	National trends Use the Hachman Index to calculate diversity in East Iceland compared to national economic diversity. In 2003 the Hachman Index for East Iceland compared to Iceland was 0.64 (with 1.00 being equal diversity)	Iceland Statistics www.hagstofan.is Hachman Index: http://www.qualityinfo.org/olmisj/ArticleReader?itemid=00002037&segmentid=0002&tour=0&p_date=1

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
	Proportion of total Alcoa/Landsvirkjun project employment compared to total East Iceland employment	Indirect	**Operation:** Proportion will decrease over time	Not applicable	
12.2 Unemployment	Unemployment rate in East Iceland and nationally	Induced	Unemployment rate in East Iceland less than or equal to national rate	National unemployment rate	Directorate of Labour www.vinnumalastofnun.is
13.1 Tourism	Proportion of jobs per year in tourism industry in East Iceland vs. nationally	Induced	Proportion of tourism jobs in East Iceland greater than or equal to national proportion	Proportion of tourism jobs at national level	Iceland Statistics www.hagstofan.is
	Number of bed nights in hotels/guest houses in East Iceland	Induced	Increase in the number of bed nights in East Iceland proportionally greater than or equal to an increase at the national level.	National level	Iceland Statistics www.hagstofan.is
	Number of passengers on flights to Egilsstadir	Induced	Increase in the number of passengers from baseline	Changes in the Reykjavik-Akureyri-Reykjavik route (to figure out if the increase is due to general increase in tourism to Iceland or linked to the projects)	Air Iceland
	Number of visits to smelter and Karahnjukar projects	Direct	Number of visits to Fjardaál and Karahnjukar visitor centers to increase after initial spike	Not applicable	
14.1 Retained value added	ISK retained in Iceland through Alcoa and Landsvirkjun salaries, payments to public authorities, supplies procured in Iceland, and profits that stay domestically	Direct	Target not applicable. Will monitor and report data.	Not applicable	
14.2 Quantity of goods and services procured in Iceland	Percentage of total goods and services (value in ISK) procured by Alcoa and Landsvirkjun and subcontractors in Iceland	Direct	Target not appropriate. Will monitor and report data.	Not applicable	

APPENDIX 1: Alcoa and Landsvirkjun Sustainability Initiative - Target and Benchmark Summary Table

Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
15.1 Financial status of municipalities	Contribution of the projects to municipal revenues as a percentage of the total municipal revenue	Indirect	Percentage will decrease over time	Not applicable	
	Municipal revenue/ expenditure ratio	Induced	Balanced revenue/ Expenditure ratio	Not applicable	
16.1 Noise at Fjarðaal and in Reyðarfjörður	Average noise level at established monitoring stations at Fjardaál.	Direct	Day/Evening/Night Noise Levels (db(A)): Smelter: 70/70/70 Light Industry/Dwellings: 55/50/40 Dwellings Only: 50/45/40 Summer House: 40/35/35	**Fjardaál smelter** (Fjardaál Noise Model): Construction: Less than or equal to 82 db(A) Operation: Less than or equal to 82 db(A) 90 db(A) OSHA NIOSH standard for occupational noise exposure	Fjardaál Free Field Noise Model (Alcoa, 2005) predicts maximum noise exposure between 80-85. Used 82 db per Pat Grover. OSHA: 29 United States Code of Federal Regulation Number 1926.52 - Occupational Noise Exposure
	Average noise level at established monitoring stations in Reyðarfjörður	Indirect	Construction: Less than or equal to 65 db(A) Operation: Less than or equal to 55 db(A)	Icelandic regulation 65 db (Iceland regulation 933 – maximum allowable noise level in an existing town) 70 db World Bank standard for residential areas	
17.1 Dust pollution	Average monthly concentration of air particulates measured at designated sample locations at Hálslón and Fljótsdalshérad	Indirect	Dust will not increase over time (Hálslón and Fljótsdalshérad)	Baseline from 2005 to 2007 (will be collected by Landsvirkjun, no prior baseline exists).	

APPENDIX 1: Alcoa and Landsvirkjun Sustainability Initiative - Target and Benchmark Summary Table

Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
17.2 Air emissions	Dust, sulphur dioxide (SO_2), fluoride (F), and polycyclic aromatic hydrocarbons (PAH) emissions per metric ton of aluminum produced	Direct	Dust (EOP): • Annual average pothouse ventilation: 1 kg/metric ton Al produced • Monthly average pothouse ventilation: 1.3 kg/metric ton Al produced • Exhaust dust from point sources other than pothouse: <50 mg/Nm^3 Total Fluoride: • Annually pothouse exhaust: 0.25 kg/ metric ton Al produced • Monthly average for pothouse exhaust 0.8 kg/metric ton Al produced PAH (EIA Comparison Report, 2002; Earth Tech, 2003): 0.01 kg/metric ton Al produced SO_2 (EOP): To be determined after completion of EIA Need to re-evaluate all air emissions targets when new EIA is completed	Dust: Annual average 1 kg/metric ton Al produced (OSPAR) Total Fluoride: 0.5 kg/metric ton Al produced (OSPAR) • Total F 1.2 pds/ton Al produced (USEPA proposed rules) • Lowest Total F = 0.3 kg/metric ton Al produced, average 0.5 (IAI) Total Fluoride (EOP): • Annual pothouse exhaust: 0.30 kg/metric ton Al produced Gaseous F (HF): 0.4 kg/metric ton Al produced (OSPAR) PAH: 0.01 kg/metric ton Al produced (IAI). Typical air emission levels of PAH from pre-bake plants is 0.05 kg/metric ton Al produced (IAI)	www.ospar.org/documents/dbase/ decrecs/recommendations/pr94-01e.doc PARCOM Recommendation 94/1 on Best Available Techniques for New Aluminum Electrolysis Plants – incorporated into OSPAR in 1996 http://www.world-aluminium.org/ environment/challenges/emissions.html http://www.epa.gov/ttn/atw/hlthef/polycycl.html FR12645 Vol 68, No. 51, 17 March 2003. USEPA Proposed Rule-National Emission Standards for Hazardous Air Pollutants for Primary Aluminum Reduction USEPA National Air Quality Standards (NAAQS)

APPENDIX 1: Alcoa and Landsvirkjun Sustainability Initiative - Target and Benchmark Summary Table

Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
17.2 Air emissions	Concentrations of dust, SO_2, F, and PAH-16 at established monitoring stations in Reyðarfjörður	Indirect	Dust: < 50 mg/Nm3 (EOP) SO_2: Yearly average concentration < 20 µg/m3 (EOP) Gaseous F: average 0.3 mg/m3 from 1 April to 30 September each year. Possibly 0.2 mg/m3 after 48 months of operation (EOP). Need to re-evaluate all air emissions targets when new EIA is completed	Dust: 30 mg/ Nm3 (World Bank) SO_2: • Annual mean concentration < 20 µg/m^3 (EC guideline) • < 30 µg/m^3 (Icelandic standard) • Annual mean for sulfur oxides 0.03 ppm (USEPA NAAQS) Gaseous F: Growing season average concentration of F <0.3 µg/m^3 (Norwegian guideline) PAH (Benzo(a)Pyrene (BaP) used as surrogate): • Annual average concentration of BaP <0.01 µg/m3 (Norwegian guideline) • Annual average of B(a)P 5 ng/m^3 (Netherlands draft guideline) • Annual average of B(a)P 1 ng/m^3 (EC directive - target level in ambient air for member states enforceable in 2012)	Danish Environmental Protection Agency. www.mst.dk/udgiv/publications/1999/87-7909-281-0/html/kap01_eng.htm Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons in ambient air
18.1 Erosion of river bank at Jökulsá a Flotsdal and Lagarfljot	Location of riverbank in selected areas as measured by riverbank profiles	Indirect	Erosion rate will not increase from current situation.	Surveys performed 2005 and 2007	

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
19.1 Sediment deposition in Hálslón Reservoir	Volume (m^3) of sedimentation in a 5-10 year period	Direct	Usable storage will not decrease more than 20-25% during one century.	N/A	The useable storage capacity of Hálslón Reservoir is 2,100 million cubic meters. The EIA states that sediment deposition will fill the reservoir in 400 years.
20.1 Mine and spoil reclamation	Proportion of disturbed land that is reclaimed to pre-project conditions	Direct	Hydro: Full reclamation to community standard Smelter: Stabilize disturbed areas	Benchmarks that are spelled out in agreements with contractors	
21.1 Fluoride in vegetation	Concentration of F in vegetation (including ruminant forage) at designated sample plots within a specified radius of smelter	Direct	Coniferous leaves, broadleaves, and vegetables : >0.4 $\mu g/m^3$ Grasses: >3 $\mu g/m^3$ Lichens & Mosses: >0.3 $\mu g/m^3$ Source: AW Davidson and L. Weinstein; EIA, 2001	40 mg/kg (unofficial USEPA guidance for ruminant livestock)	Aluminum Plant in Reyðarfjörður Fjardabyggd: Environmental Impact Assessment (2001)
22.1 Contaminant levels in mollusks	Concentration of PAH-16 and heavy metals in mollusks at established survey points in the fjord of Reydarfjordur	Indirect	Target to be based on baseline	**PAHs (mg/kg dw) Mussel** Naphthalene 0,5-5 (p) Phenanthrene 5-50 (p) Anthracene 0,005-0,05 (p) Fluoranthene 1-10 (p) Pyrene 1-10 (p) Benzo[*a*]anthracene n.d. Chrysene n.d. Benzo[*k*]fluoranthene n.d. Benzo[*a*]pyrene 5-50 (p) Benzo[*ghi*]perylene n.d. Indeno[*123-c,d*]pyrene n.d. **Metals -** Standards being developed **Source: OSPAR, 2004**	See OSPAR/ICES workshop report on how to assess contaminants in water, sediment and biota (February 2004)

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
22.2 Groundwater and surface water quality at smelter	Concentrations of phosphorous (P), F, chlorine (Cl), and sulphate (SO_4) in groundwater and surface water at established sample locations at smelter site and near outfall	Indirect	Targets for constituents in surface water and groundwater to be based on baseline study results.	P: <2.5 µg/l (No US surface water standard for P, this is Scottish standard) F: 20 mg/l (World bank) Cl: Drinking H2O disinfectant goal- 4 mg/L, secondary maximum level 250 mg/L (USEPA drinking water standards - no surface water standard exists for Cl) SO_4: 250 mg/L secondary maximum level (USEPA). Note that secondary levels are not human health based, but rather taste/odor only. This is a drinking water standard - no surface water standard exists for SO_4. Al: 20 mg/l (Iceland standard) Suspended particles: 50 mg/l (PA, 2001)	Scottish surface water standard for ultra-oligotrophic waters http://www.sepa.org.uk/pdf/policies/16v1_1.pdf Iceland Surface Water Standards - Iceland Regualtion 796-29 October 1999 US EPA National Primary Drinking Water Standards
22.3 Project-related oil/chemical spills	Number of spills over 20 liters and 2,000 liters per year on land	Direct	**Hydro and smelter:** 0 spills over 20 liters 0 spills over 2,000 liters	Not applicable – data on oil spills not collected at national level. Companies voluntarily report oil spills to East Iceland Health Surveillance Authority (EIHSA) or Icelandic Coast Guard but data is not available to the public Alcoa Environmental Incident Rate (EIR) average 8 spills per location (20- and 2,000-liter spills combined)	

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
23.1 Quantity and treatment of solid waste from construction and operation	Total wastes left/landfilled at hydro site	Direct	Hydro: 0 metric tons of waste left/landfilled at hydro site per year (other than cement during construction)		
	Total wastes landfilled annually		Smelter: 0 metric tons of waste landfilled per year		
	Percent of wastes sold or recycled annually	Direct	Hydro: Recycling rate consistent with community rate Smelter: 100 percent of waste sold or recycled per year	74.8% total recycled material excluding pot lining (calculated from total landfilled materials plus total sold or recycled materials for Alcoa worldwide 2004/total recycled)	ALCOA Sustainability Report 2004 http://www.alcoa.com/global/en/about_alcoa/commitment_to_sustain/sustain_april_2004.asp
	Spent pot lining (SPL) reused/ recycled annually (percent of total)	Direct	100 percent of spent pot lining (SPL) reused/ recycled	20.67 kg/metric ton Al produced (ALCOA, 2004)	ALCOA Sustainability Report 2004 http://www.alcoa.com/global/en/about_alcoa/commitment_to_sustain/sustain_april_2004.asp
24.1 Pink-footed goose	Number of breeding birds in selected sample plots close to Jökulsá á dal and Fljótsdalur Valley	Direct	The number of breeding birds will not decrease bymore than 600 pairs	Trends in the Icelandic-Greenlandic stock	
	Number of geese in moulting in Snaefellsoraefi	Indirect	The number of geese in moulting in Snaefellsoraefi will not decrease from baseline information to be collected in 2005.	Trends in the Icelandic-Greenlandic stock	
24.2 Reindeer	The number of reindeer in Vesturoraefi, Muli, and Hraun east of Snaefell	Indirect	Not more than 15% decrease in the reindeer stock in Vesturoraefi, Muli, and Hraun east of Snaefell.	Baseline.	

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
24.3 Birds at Uthérad	Feeding site use (# feeds/hour) by Red-throated Divers at Lagafljot and the ocean	Indirect	Target not applicable		Baseline research in 2004 and 2005 indicates that the ocean is the primary feeding site for the Red-throated Diver. Thus, this indicator might drop out when inidactors will be reviewed.
	Distribution of Long-tailed Duck in Uthérad	Indirect	Distribution of Long-tailed Duck will not change		
	Number of moulting Greylag Goose in areas adjacent to Jökulsá á dal	Indirect	Number of moulting Greylag Goose in areas adjacent to Jökulsá á dal will remain stable .		
	Number of nesting Great Skuas in areas adjacent to Jökulsá á dal	Indirect	Number of nesting Great Skuas in areas adjacent to Jökulsá á dal will remain stable.		
25.1 Hydrology	Water levels and discharge at gauging stations in rivers	Indirect	Changes in water levels will not be more than what predicted in baseline models		
	Ground water levels in depressions located in Jökulsá a Fljótsdal and Jökulsá á dal basins	Indirect	Changes in water levels will not be more than what predicted in baseline models		
26.1 Vegetation in Vesturoraefi	Vegetation cover	Indirect	Vegetation cover will remain stable (NDVI and number of species will not decrease)	Baseline information about vegetation cover (satellite picture from 2002) and perhaps further back in time. Baseline research in vegetation plots (Agricultural University)	Information about NDVI (Normalized Difference vegetation Index): http://eobglossary.gsfc.nasa.gov//Library/MeasuringVegetation/measuring_vegetation_2.html
26.2 Blowing sand from Hálslón Reservoir	Volume of soil in sand piles east of the reservoir	Direct	Zero sandpiles east of reservoir		

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
26.3 Vegetation change caused by land reclamation	Area (ha) of reclaimed land at Fljótsdalshérad and Fljótsdalshreppur, recorded every five years	Direct	Fljótsdalshérad: Reclaim 32 km^2 of land Fljótsdalshreppur: Target needs to be developed in cooperation with municipality		
27.1 Freshwater aquatic fauna in Jökulsá á dal and Lagarfljot	Species composition and condition of fish in Lagarfljot (arctic charr & trout)	Indirect	Fish stocks remain stable		
	Species composition and distribution of fish in Jökulsá á Dal, Lagarfljot and tributary systems (salmon)	Indirect	Fish stock remains stable		
	Fishing (no. of fish) in relevant rivers as registered by the Institute of Fresh Water Fisheries	Indirect	Target not applicable. Will monitor and report data.		Institute of Freshwater Fisheries
28.1 Marine benthic fauna in Héradsfloi	Grain size and distribution of sediment in selected sample plots	Indirect	Target not applicable. Will monitor and report data.		Marine research institute
	Diversity and density of benthic fauna at selected sampling spots	Induced	No decrease in diversity or density of benthic fauna at sample locations.	Results from Héradsfloi compared with results from Vopnafjordur and Seydisfjardafloi to identify which changes could be caused by the hydro project.	Marine research institute
29.1 Movement of coastline and vegetation changes on delta	Location of shoreline as measured by aerial photographs and bathymetric profiles	Indirect	Location of shoreline will not change more than 200 m in 1 century as predicted by model		Marine research institute

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
	Vegetation cover on delta	Indirect	NDVI and number of species will not decrease Note: need more consultation about what could happen	Baseline information about vegetation cover (satelite picture from 2002)	Information about NDVI (Normalized Difference vegetation Index): http://eobglossary.gsfc.nasa.gov//Library/MeasuringVegetation/measuring_vegetation_2.html
30.1 Flow in waterfalls	Number of days specific waterfalls downstream of Hálslón reservoir are flowing with normal discharge (i.e. within the historic range)	Indirect	During average year normal discharge will be in waterfalls in Jökulsá in Fljótsdal from August 10th to October 1st.		
31.1 Extent of Wilderness	Total area (km^2) of wilderness, as defined by Icelandic law for nature conservation	Indirect	Area of wilderness will not decrease after construction period (in 2007)	The baseline year	
32.1 Greenhouse gas emissions	Total emissions of carbon dioxide (CO_2) and perfluorocarbon (PFCs) from smelter per metric ton of aluminum produced (CO_2 equivalents/metric ton of aluminum produced)	Direct	1.5 metric tons of total CO_2/metric ton Al produced (EIA Comparison Report) 0.05 anode effect minutes per pot day (=0.054 CO_2 equivalents/metric ton of aluminum produced) once operations and processes have stabilized post start-up.	Emission levels of 0.05 anode effect minutes per pot day (=0.054 ton CO_2 equivalents/ton Al produced) would rank the Fjardaál smelter among the top four aluminium smelters worldwide (<5th percentile).	Industry Average - http://www.world-aluminium.org/iai/publications/pfc.html Prebake minimums- AIA 2005. International Aluminum Institute Report on the Aluminum Industry's Global Perfluorocarbon Gas Emissions Reduction Programme- Results of the 2003 anode Effect Survey
	Total leakage of SF_6 from substations of transmission lines (total CO_2 equivalents)	Direct	Less than 0,5 % leakage per year.	International Electrotechnical Commission (IEC) standard: CEI IEC 62271-203:2003 (High voltage switchgear and control gear – Part 2003: Gas insulated metal-enclosed with gear for rated voltage above 52	

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
	CO_2 emissions (total CO_2 equivalents) calculated from the amount of gas and diesel fuel used by Alcoa and Landsvirkjun and contractors for transport vehicles	Direct	Hydro: Target not applicable. Will monitor and report data during construction. Smelter: Reduce consumption of gasoline and diesel by 10% of baseline (to be defined) every 2 years for 10 years (a total of 50% reduction over ten years). This target only applies to the operational phase, but emissions will be monitored also during construction.		
	Net carbon sequestration (total CO_2 equivalents) achieved by Alcoa/Landsvirkjun carbon sequestration projects in Iceland.	Direct	Hydro: Carbon sequestration equal or greater than what is lost from creation of the reservoir Smelter: A minimum of 450 trees planted in Iceland yearly through 2007. Target will be expanded in 2008 and contine through the life of the projects.		Net carbon sequestration means accounting for vegetation loss caused by creation of Hálslón NOTE: Alcoa has a corporate goal of planting 10 million trees worldwide by 2020 (starting in 2003)

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Indicator	Metric	Project Effect	Target/Goal	Benchmark	Comments/Source for Target or Benchmark
33.1 Community rating of Alcoa/ Landsvirkjun performance	Survey of community attitudes – percent of survey respondents rating company performance on community relations, communications, and presence of the projects as good or very good	Direct	Smelter: 75% of the East Iceland population respond positive or very positive towards Fjardaál's performance within three years of start-up. Hydro: 75% of East Icelanders responds positive towards Landsvirkjun .	Landsvirkjun: results from surveys 2002-2004 (6.2-7.2, that are positive on the scale from 1-10).	
34.1 Compliance with Icelandic Standards and Legislation	Number of non-compliances per year	Direct	Zero non-compliances		

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List of Abbreviations and Acronyms

Al	Aluminum
CO_2	Carbon dioxide
db(A)	Average day-night noise level in decibels
EOP	Fjardaál Environmental Operating License
F	Fluoride
kg	Kilogram
HF	Hydrogen fluoride (gaseous fluoride)
NAAQS	National Air Quality Standards
NIOSH	National Institute of Occupational Health and Safety
OSHA	Unites States Occupational Safety and Health Administration
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAH	Polycyclic aromatic hydrocarbon
PAH-16	Collection of 16 common PAHs
Pds	Pounds
PARCOM	Paris Convention for the Prevention of Marine Pollution from Land-Based Sources
PFC	Perfluorocarbon
POM	Polycyclic organic matter
SO_2	Sulphur dioxide
SO_4	Sulfate
SPL	Spent Pot Lining
USEPA	United States Environmental Protection Agency

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
1.1 Demographics in East Iceland						
Gender and age distribution in East Iceland populations compared to national population	Number of people living in East Iceland analyzed further by breaking it down according to age and sex	2005 - decommission	Information from Icelandic Statistics will be analyzed further by breaking it down according to age and sex in East Iceland (companies hire someone or get this information from Byggdastofnun, the Regional Development Institute)	Every five years	East Iceland and nationally	Regional Development Institute (Halldór V. Kristjánsson)
Total population in East Iceland	Number of people living in East Iceland, as defined by Icelandic Statistics	2005 - decommission.	Information from Icelandic Statistics	Every year	East Iceland and nationally	Iceland Statistics
2.1 Gender balance in Alcoa and Landsvirkjun workforce						
Proportion of men and women employed by projects compared with the National workforce proportion in: • Management • Clerical/ administrative staff • Industrial/ manual workers • Engineering/ technical staff • Total employees	Proportion of men and women employed by projects	2005 - decommission.	Information will be collected from monthly reports that contractors turn in to Landsvirkjun and and annual reports to Fjardaral for construction, but the human resources departments in Landsvirkjun and Fjardaral collect this information during operation.	Every year	From contractors working directly on the hydro and smelter and once operation starts then also within Fjardaál and the part of Landsvirkjun that relates to Karahnukar power station (people at the station, and managers in the production unit in Landsvirkjun headquarters).	Iceland Statistics

[1] Will both provide data and in many cases help interpret monitoring results and compare with targets

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Ratio of male to female employee salary by job classification	Ratio of male to female employee salary by job classificatin	2007 - decommission	Human resources department at Landsvirkjun and the financial department at Fjardaral will collect.	Every five years	Only within Fjardaál and Landsvirkjun (not from contractors)	
3.1 Alcoa/ Landsvirkjun employee job satisfaction						
Alcoa/Landsvirkjun employee survey on workplace and job satisfaction	Alcoa/Landsvirkjun employee survey on workplace and job satisfaction.	2007 - decommission	Gallup will conduct surveys within companies Fjardaál will also rely on VR surveys.	Yearly	Within Fjardaál and the part of Landsvirkjun related to the operation of the Karahnjukar power station.	Gallup and VR
4.1 Alcoa/ Landsvirkjun employee safety						
Number of reportable accidents at projects per year	Number of reportable accidents at projects per year	2005 – decommission	Statistics from contractors available in monthly reports to companies. EHS division will collect information for Fjardaral during operation and the director's office of Landsvirkjun for the operational phase of hydro.	Per incident	At site of accident occurrence	None
Lost time injury rates per year as reported by Alcoa/ Landsvirkjun and sub-contractors	Lost time injury rates per year as reported by Alcoa/ Landsvirkjun and sub-contractors	2005 - decommission	Statistics from contractors available in monthly reports to companies. EHS division will collect information for Fjardaral during operation and the directors office of Landsvirkjun for the operational phase of the hydro.	Per incident	Not applicable	None
5.1 Alcoa/ Landsvirkjun employee training and education level						

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Percent of hours Alcoa/ Landsvirkjun employees spend in work-related training per year	Information about hours Alcoa/Landsvirkjun employees spend in work-related training per year.	2007 – decommission (from 2009 in Smelter since initial training will be reported separately).	Hydro – Landvirkjun has a reporting system to registrer all time spent on orientation, but vocational training is not registered. This information would be collected at the power station. Smelter - Extracted from the Fjardaál HRMS.	Yearly	Within Fjardaál and the part of Landsvirkjun relating to the hydro.	None
Education levels of employees within smelter (by gender) compared to rural Iceland (non-Reykjavik) and national level (5-yr survey)	Information about education levels at the national level, at the smelter and among the employees working for the hydro station.	2007 – decommission	Fjardaál and Landsvirkjun human resources divisions collect information about educational level of employees. Iceland Statistics publishes information about national education levels every five years.	Every five years (to coincide with national survey)	Within Fjardaál, Landsvirkjun and national data for comparison.	Iceland Statistics
6.1 Income levels						
Average salary levels in East Iceland compared to national average	Average salary levels in East Iceland compared to national average	2007 - decommission	Iceland Statistics publishes information regularly for Iceland as a whole as well as divided by regions.	Yearly	Nationally and in East Iceland	Iceland Statistics
Average salary for Alcoa/ Landsvirkjun employees compared with other sources of employment in East Iceland and nationally	Average salary for Alcoa/ Landsvirkjun employees compared with other sources of employment in East Iceland and nationally	2007 - decommission	Human resource division of Landsvirkjun and the financial department of Fjardaál will provide this information.	Yearly	Nationally and within Fjardaál and Landsvirkjun	Iceland Statistics
6.2 Housing prices						
Average house price in East Iceland and nationally compared to average income	Property prices in selected municipalities	2005- decommission	Information will be pulled from data on the website of the government Land Registry Agency	Yearly.	In Fjardabyggd and Egilsstadir in East Iceland & in Reykjavik and Akureyri for comparison	Icelandic Land Registry Agency
7.1 Levels of public services in local communities						

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Survey regarding availability and quality of health care services in East Iceland	Information from people using health care facilities in East Iceland about how satisfied they are with the service.	2005 - decommission	The Directorate of Health conducts surveys in health care centers around Iceland every year in all health care centers and hospitals. Results from the last question (question 16 e) will be used: "Overall, how satifsied or dissatisfied are you with the service in this health care center?"	Every year.	In all health care centers and hospitals in East Iceland.	Directorate of Health and East Iceland Health Institute
Satisfaction with public services in local municipalities	Information from a survey the companies ask Gallup to conduct.	2006 - decommission	Gallup survey	Once a year	In East Iceland	Gallup
7.2 Quality of schools						
Results for standardized tests for primary students (4th, 7th and 10th grade) in East Iceland vs. nationally	Results of standardized tests for primary students in East Iceland (4th, 7th and 10th grade) vs. nationally.	2005 - decommission	Namsmatsstofnun, an independent research institute on education and test results, collects information about results from standardized tests and publishes on its website. It is also possible to ask the institute for specific results if the information on the website is not sufficient to be tailored the metric.	Yearly.	In East Iceland and nationally.	Namsmatsstofnun
Results of standardized tests for secondary schools in East Iceland vs. nationally	Results of standardized tests for students in secondary schools in East Iceland vs. nationally.	2005 – decommission	Namsmatsstofnun, an independent research institute on education and test results, collects information about results from standardized tests and publishes on their website. It is also possible to ask the institute for specific results if the information on the website are not sufficient to be tailored the metric.	Yearly.	In East Iceland and nationally.	Namsmatsstofnun

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Percentage of teachers without certification in primary schools in East Iceland vs. nationally	Information about the percentage of teachers without certification teaching in primary schools in East Iceland vs. nationally.	2005 - decommission	Information on percentage of teachers without certification in primary schools is available at Iceland Statistics.	Yearly.	In East Iceland and nationally.	Iceland Statistics
8.1 Community wellbeing						
Number of crimes for financial gains, assaults and vandalism per capita in East Iceland and Nationally	Number of crimes for financial gains, assaults and vandalism per capita in East Iceland and Nationally	2005 - decommission	The National Commissioner of Police publishes reports with crime rates, broken down by police districts, on its website.	Per incident	In Seydisfjordur and Eskifjordur districts in East Iceland, and nationally for comparison.	National Commissioner of Police
Number of accidents per km on selected roads: • Road between Egilsstadir and Reydarfjordur • Road between Faskrudsfjordur and Reydarfjordur • Road from Egilsstadir to Hallormsstada-skógur	Number of accidents per km on selected roads	Baseline is from 2000-2002 and first update of indicator will be for the period 2002-2004.	Information about accidents per km on selected roads is collected by the Public Road Authority, that has meters counting the number of cars passing on different roads.	Ongoing	At three roads in East Iceland: a. Road between Egilsstadir and Reydarfjordur b. Road between Faskrudsfjordur and Reydarfjordur c. Road from Egilsstadir to Hallormsstada-skogur	Public Road Authority
Number of drug violations per capita in East Iceland compared with national average	Number of drug violations per capita in East Iceland compared with National average	2005 – decommission	From police reports.	Per incident	In Seydisfjordur and Eskifjordur districts in East Iceland, and nationally for comparison.	National Commissioner of Police
9.1 Involvement in local community						
Hours Alcoa employees participate in Alcoa foundation activities (Action and Bravo) per year	Alcoa and Bravo allocation.	2008 – decommission	Through allocations paid out.	At the end of the year, each year.	Alcoa Foundation support for Iceland	None

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
10.1 Cultural opportunities						
Number of cultural events per year in East Iceland	Number of cultural events per year in East Iceland	2005 - decommission	Advertisements of events counted in the local media.	Ongoing	In East Iceland (local newspaper and weekly TV guide with advertisements)	Cultural Committee in East Iceland (Signý Ormarsdóttir)
11.1 Alcoa annual exports						
Net exported products from Fjardaál as a percent of annual exports from Iceland (ISK/year)	Net exported products from Fjardaál as a percent of annual exports from Iceland (ISK/year)	2007 – decommission	Iceland Statistics monitors this information.	First quarter each year.	In Iceland as a whole and in Fjardaál.	Iceland Statistics
12.1 Employment						
Percentage of new Alcoa/Landsvirkjun employees who are: • East Iceland residents • East Iceland returnees • Other Iceland residents • Foreign nationals living outside Iceland	Background of new Alcoa and Landsvirkjun employees, and employees of contractors according to where they are from when hired.	2005 - decommission	The human resource departments in Landsvirkjun and Fjardaál will collect this information. Contractors will report to lead persons within companies.	Ongoing	From contractors, within Landsvirkjun and Fjardaál.	None

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Number and proportion of jobs in key economic sectors in East Iceland and nationally.	The number and proportion of jobs in key economic sectors in East Iceland and nationally	2005 – decommission	Information available from Iceland Statistics. Use the Hachman Index to calculate diversity in East Iceland compared to national economic diversity	Once a year	In East Iceland and nationally.	Iceland Statistics
Proportion of total Alcoa/Landsvirkjun project employment compared to total East Iceland employment	Proportion of total Alcoa and Landsvirkjun project employment compared to total East Iceland employment.	2005 – decommission	Information from Landsvirkjun and Fjardaál compared to information about total workforce in East Iceland from Iceland Statistics.	Once a year	Within Landsvirkjun and Fjardaál and in East Iceland.	Iceland Statistics
12.2 Unemployment						
Unemployment rate in East Iceland and Nationally	Unemployment rate in East Iceland and Nationally	2005 – decommission	The Directorate of Labour collects this information.	Every month	In East Iceland and nationally.	Directorate of Labor
13.1 Tourism						
Proportion of jobs per year in tourism industry in East Iceland vs. Nationally	Proportion of jobs per year in tourism industry in East Iceland vs. Nationally	2005 - decommission	From Iceland Statistics	Every quarter	In East Iceland and nationally	Iceland Statistics
Number of bed nights in hotels/guest houses in East Iceland	Number of bed nights in hotels/guest houses in East Iceland	2005 – decommission	From Iceland Statistics	Every quarter	In East Iceland and nationally	Iceland Statistics
Number of passengers on flights to Egilsstadir	Number of passengers on flights to Egilsstadir	2005 – decommission	From Air Iceland	Once a year	The route Reykjavik-Egilsstadir and Reykjavik-Akureyri	Air Iceland

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Number of visits to smelter and Karahnjukar projects	Number of visits to smelter and Karahnjukar projects (Note: only possible to count those that visit Vegardur or notify Landsvirkjun about entering the hydro site, since there is open access for private cars to enter the area, unlike the smelter site)	2005 - decommission	Information officers from Landsvirkjun and Fjardaál monitor number of visits to hydro and smelter sites.	Ongoing.	At the smelter and hydro site.	None
14.1 Retain value added						
ISK retained in Iceland through Alcoa and Landsvirkjun salaries, payments to public authorities, supplies procured in Iceland, and profits that stay domestically	ISK retained in Iceland through Alcoa and Landsvirkjun salaries, payments to public authorities, supplies procured in Iceland, and profits that stay domestically	2005 - decommission	Financial depertments of Landsvirkjun and Fjarðaál in cooperation with an independent consultant	First quarter	Within Landsvirkjun and Fjarðaál	To be determined
14.2 Quantity of goods and services procured in Iceland						
Percent of total goods and services (value in ISK) procured by Alcoa and Landsvirkjun and subcontractors in Iceland	Percent of total goods and services (value in ISK) procured by Alcoa and Landsvirkjun and subcontractors in Iceland	2005 - decommission	Financial departments of Fjardaál and Landsvirkjun will collect this information for operation, and ask for data from contractors where possible during construction.	First quarter	Within Alcoa and Landsvirkjun, and from contractors.	None
15.1 Financial status of municipalities						
Contribution of the projects to municipal revenues as a percentage of the total municipal revenue	Contribution of the projects to municipal revenues as a percentage of the total municipal revenue	2005 – decommission	Municipalities in East Iceland will make this data available.	Yearly	In municipalities in East Iceland.	SSA

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Municipal revenue/ expenditure ratio	Municipal revenue/ expenditure ratio	2005 - decommission	Municipalities in East Iceland will make this data available.	Yearly	In municipalities in East Iceland.	SSA
16.1 Noise at Fjardaál and in Reyðarfjörður						
Average noise level db(A) at established monitoring stations at Fjardaál.	Day, evening, night noise levels	2005 – decommission	Continuous noise monitor will record data for specified intervals	Baseline operations, monthly, and each time noise levels change	Six monitoring stations at Fjardaál (2005 Fjardaál Noise Model stations)	Contractor
Average noise level at established monitoring stations in Reyðarfjörður	Day, evening, night noise levels	2005 – decommission	Continuous noise monitor will record data for specified intervals	Baseline operations, monthly, and each time noise levels change	One location in Reyðarfjörður	Contractor
17.1 Dust Pollution						
Average monthly concentration of air particulates measured at designated sample locations at Hálslón and Fljótsdalshérad	The amount of dust in the area around Hálslón and in populated areas from before hydro.	2005 – decommission	Measurements will be conducted according to a method developed in cooperation with experts at the Environmental and Food Agency. Measurements will begin before the operation of the hydro station to establish some baseline.	Monthly	In 13 places in East Iceland	Icelandic Fisheries Laboratories (office in Neskaupsstadur)
17.2 Air emissions						
Dust, sulphur dioxide (SO2), fluoride (F), and polycyclic aromatic hydrocarbons (PAH) emissions (in kg) per metric ton of aluminum produced	Stack: • Gaseous F • F in Dust • Dust • PAH-16 (or POM) • SO_2 Pothouse Air Vent: • Gaseous F • F in Dust • Dust Point sources: Dust	2005 – decommission	Continuous emissions monitor for one stack at each scrubber. Monitoring devices will record emissions from: • pothouse stack, after scrubbing • pot room ventilation air • point sources Stack dust samples collected randomly	Annual "significant measurement" (EOL) • Gaseous F: Continuous • F in dust, PAH: discrete samples to comprise annual measurements • SO_2: mass balance	Stack – continuous emissions monitor Stack	Contractor

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Concentrations of dust, SO_2, F, and PAH-16 at established monitoring station in Reyðarfjörður	Ambient air: • SO_2 • gaseous F • F in Dust • Dust • PAH-16 in dust Precipitation: • F • Cl • SO_2 • PAH-16	2005 – decommission	Ambient air monitors, and precipitation monitor for both rain and snow.	Annual "significant measurement" (EOL) Continuous measurements for SO_2 and gaseous F, weekly for dust	Three stations in vicinity of Fjardaál (baseline monitoring locations)	Contractor
18.1 Erosion of river bank at Jokulsá á Fljótsdal and Lagarfljót						
Location of riverbank in selected areas as measured by riverbank profiles	Location of riverbank in selected areas as measured by riverbank profiles	2007 – decommission	Profiles will be taken of the riverbank in selected places and marked on a map.	Every five years	In selected areas in the two rivers	VST (Gunnar Tómasson)
19.1 Sediment deposition in Hálslón Reservoir						
Volume (m^3) of sedimentation in a 10 year period	Volume of sedimentation in Hálslón reservoir	2017 – decommission	Bathymetric survey of reservoir	Every ten years	At Hálslón	Contractor
20.1 Mine reclamation						

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Proportion of disturbed land that is reclaimed to pre-project conditions	Hydro: Information about if land is in the right height after construction has ended and how vegetation is progressing in areas being revegetated. Smelter: Percentage of land deeemed to have been affected by construction, which has been landscaped.	Hydro: 2005 - decommission Smelter: 2004-2007	Hydro: During construction monitors will visit the area and make visual observation to check if contractors are working according to plans. Measurements will be done if needed. After constructions are finished surface spoils areas will be measured to see if it is in the right height. After construction has ended, areas in need of revegetation will be evaluated every five years. Smelter: Through field engineering records.	Hydro: During construction: visual monitoring every few months After construction: information about revegetation every five years. Smelter: Data will be presented once, after construction is finished.	In working area for the hydro project On smelter site	Contractors hired for monitoring and the Environment and Food Agency

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
21.1 Fluoride in vegetation						
Concentration of F in vegetation at designated sample plots around Reyðarfjörður	Coniferous leaves (needles), broadleaf trees, vegetables and vegetable leaves for F, N, S, and heavy metals Grass and forage for F and S/N ratio Mosses, lichens and broadleaf plant tissue for F Lichen plots photographed Ecological survey: Vegetation cover and species composition recorded and photographed Visual inspection of vegetation	2004 – 2008 but may be revised based on monitoring results	Samples collected from designated stations during the growing season: - 40 samples of coniferous leaves, broadleaves, vegetables and vegetable leaves collected in Reydarfjordur (ten samples for each vegetation type) and analyzed for F, N, S and heavy metals - 30 samples of forage grass collected in Reydarfjordur and analyzed for F and S/N ratio - Mosses, lichens, and broadleaf plant collected from 30 stations and analyzed for F - Lichen on rock photographed at 50 locations in Reydarfjordur. - Ecological survey: Vegetative species composition and vegetation cover (%) recorded in 150 vegetation quadrats in 30 sample stations around Reydarfjordur. Quadrats photographed. Vegetation in Reyðarfjörður visually inspected for fluoride impact	Baseline sampling conducted from 2004 - 2005 Lichen (plots) and vegetation quadrats photographed annually from 2005-2008 Vegetation visually inspected once a year from 2004-2008 2007 and 2008 samples collected every month during the growing season for up to six months: - 30 each for moss, lichen, broadleaves, and forage grass. - 10 each for conifer (previous years growth), 10 conifer new growth, - broadleaf tree tissues - 10 vegetable 2007 and 2008: Ecological survey	Coniferous leaves, broadleaves, vegetables and vegetable leaves sampled in Reydarfjordur: Forage grass (30 stations): - 30 stations at farms in Reydarfjordur and surrounding areas Mosses, lichens, and broadleaf plants sampled at the 30 stations designated for Ecological survey: - 29 stations in Reydarfjordur - 1 control station in Eskifjordur Valley Visual inspection: - Reyðarfjörður and towards Fjardaál Ecological survey - 150 quadrats at 30 stations in Reyðarfjörður Lichen (50 stations): - 49 stations in Reyðarfjörður - 1 control station in Eskifjörður	Contractor and Natturustofa Austurlands Technical Oversight: Profs L.H. Weinstein & A.W. Davison

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
22.1 Contaminant levels in mollusks						
Concentration of PAH-16 and heavy metals in mollusks at established survey points in the Fjord	Benthic samples	2012 The need for continued monitoring will be reevaluated based on results	Grab samples of the benthic community (including mollusks) will be collected at designated sample locations and analyzed for concentrations of PAH-16	Every five years	At least one location inside and one location outside of the dilution zone in the seabed below the tidal belt	Marine Research Institute
22.2 Groundwater and surface water quality at smelter						
Concentrations of fluoride (F), chlorine (Cl), and sulfate (SO_4) and pH, in groundwater and surface water and heavy metals and alkalinity in surface water at established sample locations at smelter site and near outfall.	Concentration of F, Cl, SO_4, and pH in groundwater extracted from soil Concentrations of F, SO_4, Cl, heavy metals, PAH-16, alkalinity, and pH in surface water Concentration of PAH-16 in snow and snowmelt	2007-2008 The need for continued monitoring (post 2008) will be reevaluated based on results.	Soil samples (groundwater) will be collected and analyzed for concentration of F, Cl, SO_4, and pH (sampling protocols yet to be determined as per AW Davidson) Surface water will be collected and analyzed for concentrations of F, SO_4, Cl, heavy metals, PAH-16, alkalinity, and pH Samples collected from surface snow and snowmelt will be collected and analyzed for concentration of PAH-16	Groundwater: Once a year from 2004-2008 Surface water: Every three months from 2005-2008 Surface snow and snowmelt: annually from 2005-2008	Groundwater: Ten sampling locations within a 2-kilometer radius of the smelter Surface Water: Eight sampling locations, including four rivers in Reydarfjordur and two samples from each of the municipal waterworks (Búdareyri and Eskifjordur). Surface snow and snowmelt: Three locations inside and outside of the dilution zone	Contractor and Natturustofa Austurlands

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
22.3 Project-related oil/chemical spills						
Number of spills over 20 liters and 2,000 liters per year on land	Number of reportable incidents at projects per year	2005 – decommission	Hydro – Contractors report spills to the East Iceland Hydropower - Health Environmental Surveillance will send report to Landsvirkjun. Smelter - Project manager will complete a spill report for each incident.	Per incident	At site of incident occurrence	East Iceland Health Surveillance
23.1 Quantity and treatment of solid waste from construction and operation						
Total wastes left/landfilled at hydro site	Total wastes left/landfilled at hydro site	2005-2007	In reports from contractors working on hydro project	Continuous	From monthly reports	
Total wastes landfilled annually	Total waste disposed in landfill	2005– decommission	Truck manifest records	Continuous	Truck manifest	None
Percentage of wastes sold or recycled annually	Total waste sold or recycled	2005 – decommission	Truck manifest records (smelter), monthly reports from contractors and informatin from the Waste Agency in Egilstadir (hydro)	Continuous	Truck manifest and from monthly reports from contractors	Waste Agency in Egilstadir
Spent pot lining (SPL) reused/recycled annually (percent of total)	Spent pot lining (SPL) reused/recycled annually (percent of total)	2007 – decommission	EHS dept. of Fjardaál	Continuous	Truck manifest	None
24.1 Pink-footed goose						
Number of breeding birds in selected sample plots close to Jökulsá á Dal and Fljotdsalur Valley	Number of breeding birds in selected sample plots close to Jökulsá á Dal and Fljotsdalur Valley	2005 - 2007	Experts from the IINH will count the birds.	Twice (2005 and 2007). After the second counting a decision will be made about future monitoring.	Birds will be counted in reservoir area as well as other areas that will be directly influenced, but also outside the area directly impacted	IINH (Kristinn Haukur Skarphéðinsson)

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Number of geese in moulting in Snaefellsoraefi	Number of geese in moulting in Snaefellsoraefi	2005 - 2007	Experts from the IINH will count the birds.	Twice (2005 and 2007). After the second counting a decision will be made about future monitoring.	Geese in moulting will counted in Eyjabakkar and other moulting sites in the area.	IINH (Kristinn Haukur Skarphéðinsson)
24.2 Reindeer						
The number of reindeer in Vesturoraefi, Muli, and Hraun east of Snaefell	The number of reindeer in the area around the hydro	2005 – decommission	Aerial photos used to count the number of animals	In the spring and early summer each year	In Vesturoraefi, Muli, Hraun and east of Snaefell	National Land Survey of Iceland and East Iceland Nature Institute
24.3 Birds at Uthérad						
Feeding site use (# feeds/hour) by Red-throated Divers at Lagarfljót and the ocean	Feeding site use (# feeds/hour) by Red-throated Divers at Lagarfljót and the ocean	2004 – 2005. Baseline study indicates that the projects will have no impact since the birds goes to the ocean for food. Thus, indicator will be removed.	Experts from the IINH will collect information. Flying directions of the Red-throated Divers will be documented from some key locations, in order to find out if they go to the ocean for food or to the rivers	Baseline study conducted in summer of 2004 - 2005.	Data will be collected in areas around the rivers Jökulsá á Dal and Lagarfljót.	IIHN (Kristinn Haukur Skarphéðinsson)
Distribution of Long-tailed Duck in Uthérad	Distribution of Long-tailed Duck in Uthérad	2005 - 2015. Monitoring results will determine if data collection will continue.	Experts from the IINH will collect information. Birds will be counted and and distribution mapped out.	Baseline data collected in 2005. New information will be collected in 2015.	Data will be collected in the area around Lagarfljót.	IIHN (Kristinn Haukur Skarphéðinsson)
Number of moulting Greylag Goose in areas adjacent to Jökulsá á Dal	Number of moulting Greylag Goose in areas adjacent to Jökulsá á Dal	2005 - 2015. Monitoring results will determine if data collection will continue.	Experts from the IINH will collect information. Experts will count the birds using both aerial photos and field studies.	Baseline data collected in 2005. New information will be collected in 2015.	Data will be colleted in the areas around the rivers Jökulsá á Dal and Lagarfljót.	IIHN (Kristinn Haukur Skarphéðinsson)

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Number of nesting Great Skuas in areas adjacent to Jökulsá á Dal	Number of nesting Great Skuas in areas adjacent to Jökulsá á Dal	2005 – 2008. Results from monitoring will determine if data collection will continue.	Experts from the IINH will collect information. The birds will be counted.	Every year for the period 2005-2008.	Data will be collected in Uthérad, but also in other areas of the country (Öxarfjordur and South East Iceland) for comparison.	IIHN (Kristinn Haukur Skarphéðinsson
25.1 Hydrology						
Water levels and discharge at gauging stations in rivers	Information about water levels and discharge in rivers	2005 – decommission	Seven gauging stations have been placed in the rivers and those stations send information to a central database of the NEA.	In each gauging station there is digital equipment that measures and registers the water level every hour. A report is piled every year for each station.	In Jökulsá in Fljótsdal, Lagarfljót, Jökulsá á Dal	National Energy Authority
Ground water levels in depressions located in Jökulsá á Fljótsdal and Jökulsá á Dal basins	Information about groundwater levels in areas close to affected rivers	2005 – decommission	Four stations to measure groundwater have been located in wells close to the rivers. In addition groundwater will be measured manually in 13 places, located where changes in water levels are most likely to occur.	In each gauging station there is digital equipment that measures and registers the water level every hour. A report is piled every year for each station.	In wells close to Jökulsá in Fljótsdal, Lagarfljót & Jökulsá á Dal	National Energy Authority
26.1 Vegetation in Vesturoraefi						
Vegetation cover and species composition	Information about vegetation cover and density of vegetation will be collected using satellite maps.	2007 – decommission	Satellite photos will be used to calculate NDVI. The higher the index, the more density of plant growth.	Satellite photos every second year, during summer.	In Vesturöræfi	National Land Survey Agency and the Agricultural University of Iceland.
26.2 Blowing sand from Hálslón Reservoir						
Volume of soil in sand piles east of the reservoir	Volume of soil in sandpiles east of the reservoir	2007 – decommission	Visual monitoring	After the reservoir is filled. Regular visits to the area after bad weathers	At Hálslón	Contractor

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
26.3 Vegetation change caused by land reclamation						
Area (ha) of reclaimed land at Nordur Hérad and Fljótsdal, recorded every five years	Area (ha) of reclaimed land at Fljótsdalshérad and Fljótsdalshreppur, recorded every five years	2005 – decommission	The Soil Conservation will measure the areas and enter into their database.	Every five years	In Fljótsdalshérad and Fljótsdalshreppur	Icelandic Soil Conservation, local municipalities
27.1 Freshwater aquatic fauna in Jökulsá á Dal and Lagarfljót						
Species composition and condition of fish in Lagarfljót (arctic charr & trout)	Species composition and condition of fish in Lagarfljót	2005-2008 and then decide further	Samples of arctic charr & trout will be taken once a year in two places by Lagarfljót (Hallormsstadir/Hafursa and Egilsstadir). Results will be interpertated in the light of changes of environmental factors such as temperature.	Samples once a year, late summer Samples will be taken in 2005 and then decided how often until 2008 (not necessarily every year)	In Lagarfljót	Iceland Freshwater Fish Agency (Guðni Guðbergsson)

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Species composition and distribution of fish in Jökulsá á Dal, Lagarfljót and tributary systems (salmon)	Species composition and distribution of fish in Jökulsá á Dal, Lagarfljót and tributary systems.	2005-2008 and then decide on further monitoring	Will focus on salmon. Electrical fishing will be used to give and index for species composition, density and the status of fish spawning. Electrical fishing will be used in the following locations: - Jökulsá á Fljótsdal - Kelduá - Rangá - Jökulsá á Dal, three places (after hydro starts operation) - Laxá í Jökulsárhlíd - Fögruhlíd - Hrafnkelsdalsa In addition, two places will be added in Gilsa/Selfljót, outside the impact area, to use for reference.	Samples once a year, late summer Samples will be taken in 2005 and then decided how often until 2008 (not necessarily every year)	In Lagarfljót, Jökulsá á Dal and tributary systems.	Iceland Freshwater Fish Agency (Guðni Guðbergsson)
Fishing (no. of fish) in relevant rivers as registered by the Freshwater Fish Agency.	The number of fish caught in rivers in the impact area of the hydro project.	2005 - decommission	Fishing orgnizations give information about the number of fish caught in each river to the Freshwater Fish Agency. The Agency registers the data.	Yearly	In fishing rivers in the impact area of the hydro project.	Iceland Freshwater Fish Agency (Guðni Guðbergsson)
28.1 Marine benthic fauna in Héradsfloi						

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Grain size and distribution of sediment in selected sample plots	Grain size and distribution of sediment in selected sample plots	2006 – decommission	Data will be collected in three areas: Héradsfloi, and in Vopnafjordur and Seydisfjordur Bay for comparison. In each area six monitoring stations will be established and three samples taken at each station. The following factors will be monitored: - temperature and salt - grain size and the amount of organic matter in sediment - bethnic fauna species	Collection of data will begin in 2006 and will be repeated at regular intervals (not decided yet how often).	Héradsfloi Bay, Vopnafjordur and Seydisfjordur Bay.	MRI, Karl Gunnarsson
Diversity and density of benthic fauna at selected sampling spots	Diversity and density of benthic fauna at selected sampling spots	2006 – decommission	Same as above	Collection of data will begin in 2006 and will be repeated at regular intervals (not decided yet how often).	Héradsfloi Bay, Vopnafjordur and Seydisfjordur Bay.	MRI, Karl Gunnarsson
29.1 Movement of coastline and vegetation changes on delta						
Location of shoreline			Arial photos and bathymetric profiles	Every 10 to 20 years	Coastline by Héradsfloi	None
Vegetation cover on delta	Vegetation cover and density of vegetation will be collected using satellite maps.	2007 – decommission	Satellite photos will be used to calculate NDVI. The higher the index, the more density of plant growth.	Satellite photos every second year, during summer.	In Héradsfloi delta	National Land Survey Agency, the Agricultural University of Iceland.
30.1 Flow in waterfalls						
Number of days specific waterfalls downstream of Hálslón reservoir are flowing with normal discharge	Spilling flow is registered	2007 – decommission	Part of regular operation of the hydro station	Continuously	Jökulsá á Fljótsdal	None
31.1 Extent of wilderness						

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Total area (km^2) of wilderness, as defined by Icelandic law for nature conservation	Changes that influence the size of an area that is defined as wilderness	2007 – decommission	New wilderness map will be created after 2007 and then repeated as needed if further changes	As needed	In area around the hydro project.	
32.1 Greenhouse gas emissions						
Total carbon dioxide (CO_2) and perfluorocarbon (PFCs) emissions from smelter per metric ton of aluminum produced	Anode effect minutes per pot day; net carbon consumption (MT carbon/MT Al); facility-wide fuel usage (propane)	2007 – decommission	Total CO_2 eq. emissions = CO_2 emissions from pots + CO_2 eq. (PFCs) emissions from anode effects + CO_2 emissions from fossil fuel combustion sources (excluding mobile sources) CO_2 emissions from pots (MT) = 44/12 * net carbon consumption (MT) CO_2 equivalent emissions from anode effects = TBD CO_2 emissions from fossil fuel sources (MT) = [Propane usage (liters) * 1.5 kg CO_2/liter)]/1000 (kg/MT)	Monthly	Potroom operational data (AEM/day and net carbon) and Fuel use (purchasing) records	
Total leakage of SF_6 from substations of transmission lines (total CO_2 equivalents)	The amount of SF_6 used in each substation and changes in the weight (to determine leakage)	2007 – decommission	The equipment in substations is monitored 24 hours from Landsnet´s headquarters and if gas pressure falls more than 0,8 bars, the computer issues a warning and action is taken to stop the leakage. In addition, the metric is monitored by filling out special forms every time more gas is added. Every year the containers with the gas are weighted and compared to information on the forms.	24 hour computer monitoring to notify is something unexpected happens, but otherwise measurements once a year, in spring or summer	In electrical substations Landsnet runs in East Iceland.	

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
CO2 emissions (total CO2 equivalents) calculated from the amount of gas and diesel fuel used by Alcoa and Landsvirkjun and contractors for transport vehicles	Fuel Use Records and Production Records	2005 – decommission (2005 – 2007 for hydro since only for construction period)	Diesel fuel use (liters) * 2.69 (kg CO_2/liter of diesel) + Gasoline use (liter) * 2.34 (kg CO_2/liter of gasoline)]/production (MT)	Monthly	Facility or contractor fuel use (purchasing) and production records	None
Net carbon sequestration (total CO_2 equivalents) achieved by Alcoa/Landsvirkjun carbon sequestration projects in Iceland.	Information about areas where carbon is being sequestrated (with vegetation or afforestation) and areas where there is loss of carbon due to the projects	2005 – decommission	To be determined. Further expert consultation needed to decide which formulas to use for the sequstration in the different areas and decide if baseline research is needed.	Once a year	At Hálslón (loss of vegetation), in areas where Alcoa has planted trees and in areas where Landsvirkjun is paying for revegetation projects.	Agricultural University of Iceland
33.1 Community rating of Alcoa/Landsvirkjun performance						

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Indicator/Metric	Information to be collected	Data collection period	How will data be collected	How often will data be collected	Where will data be collected	External data provider (if applicable)[1]
Survey of community attitudes – percent of survey respondents rating company performance on community relations, communications, and presence of the projects as good or very good	Information from surveys about community attitudes towards the performance of Fjardaál and Landsvirkjun. Question in Landsvirkjun survey: Are you positive or negative towards Landsvirkjun?	Landsvirkjun: 2005 – decommission Fjardaál: 2008 – decommission	By Gallup	Fjardaál: yearly, in september Landsvirkjun: Twice a year (mid summer and end of the year)	Through national surveys and/or East Iceland surveys	Gallup
34.1 Compliance with Icelandic Standards and Legislation						
Number of non-compliances per year	Number of non compliances per year	2005 – decommission	By offices of directors in Fjardaál and Landsvirkjun	Per incident	Within companies	None