Environmental Report

International Isotopes Incorporated
Germanium Fluoride Process
Idaho Falls, Idaho

April 2005

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EXECUTIVE SUMMARY

International Isotopes Incorporated (I^3) proposes to increase the storage and use of depleted uranium (DU) at their facility to increase the production of germanium tetrafluoride. In order to accomplish this increase, I^3 is applying for a license from the U.S. Nuclear Regulatory Commission (NRC) to receive and to store up to 5000 kilograms of DU at any one time with an additional 1000 kilograms of DU in process equipment.

The purpose of the germanium tetrafluoride (GeF_4) process is to develop high purity gases for the semiconductor industry. I^3 wants to increase production of germanium tetrafluoride and develop production of other fluoride products. I^3owns the rights to an exclusive patent for the reaction of depleted uranium tetrafluoride to form gases like germanium tetrafluoride, silicon tetrafluoride, boron trifluoride, and tungsten hexafluoride.

The Proposed Action uses an existing process in an existing building. The building is located in the St. Leon Industrial Park, one mile north of Idaho Falls, Idaho. No improvement to the facility would be required to increase production of GeF_4 from quantities supported under the source material quantity limitations outlined in the general license provision of 10 CFR § 40.22 to quantities that would be supported by the requested possession limits. Future expansion inside the facility would be to accommodate additional staff. These additions would be office space and a conference room.

The location of the Proposed Action helps minimize the environmental impacts and overall project cost by utilizing an existing building and process control system developed to produce GeF_4 under the general license provision of 10 CFR § 40.22 . Additional resource consumption for the process would be minor, primarily relying on waste materials of other industries to produce high purity GeF_4 in a more efficient manner. In summary, the Proposed Action would have insignificant impacts to the surrounding natural areas while providing a more cost effective and less resource intensive source of high purity GeF_4 for the semiconductor industry.

1.0 INTRODUCTION

International Isotopes Incorporated (I^3) is applying for a license from the U.S. Nuclear Regulatory Commission (NRC) to receive and to store depleted uranium (DU) to be used in the production of germanium tetrafluoride for the semiconductor industry and to allow for the development of processes for the production of silicon tetrafluoride and boron trifluoride.

I^3 is proposing to use an existing process in an existing building near Idaho Falls, Idaho to accommodate the process. In accordance with the National Environmental Policy Act (NEPA) of 1969, this environmental report evaluates the impacts to the natural environment from construction of the facility. In addition to NEPA, this document was prepared in accordance with the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (Title 40 of Code of Federal Regulations Parts 1500-1508) and the NRC *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (NRC, 2003).

The State of Idaho does not have a state-equivalent to the National Environmental Policy Act. Idaho Code 39-102 describes the state policy on environmental protection:

> *STATE POLICY ON ENVIRONMENTAL PROTECTION. 1. It is hereby recognized by the legislature that the protection of the environment and the promotion of personal health are vital concerns and are therefore of great importance to the future welfare of this state. It is therefore declared to be the policy of the state to provide for the protection of the environment and the promotion of personal health and to thereby protect and promote the health, safety and general welfare of the people of this state.*

This document is compliant with the state policy on environmental protection.

1.1 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to increase production of high purity fluorine gases for the semiconductor industry. I^3 owns the exclusive rights to patents for the reaction of depleted uranium to form gases like silicon tetrafluoride, boron trifluoride, and germanium tetrafluoride. This process was developed on a bench scale, and I^3 intends to develop the process so that commercial scale production of GeF_4 may be accomplished, with other gases to follow.

The process produces germanium tetrafluoride in a more economical fashion and uses resources more efficiently than current processes. The I^3 process uses waste materials to produce commercially valuable products, while reducing the inherent toxicity and volume of existing and residual wastes of other industries.

1.2 The Proposed Action

I^3 is requesting an NRC license to receive and to store up to 5000 kilograms of DU per year with an additional 1000 kilograms of DU in process equipment. The Proposed Action will allow I^3 to increase production in an existing building. The building is located at 1359 Commerce Way in the St. Leon Industrial Park one mile north of Idaho Falls, Idaho. Approximate coordinates are Longitude 112° 00' W and Latitude 43° 53' N.

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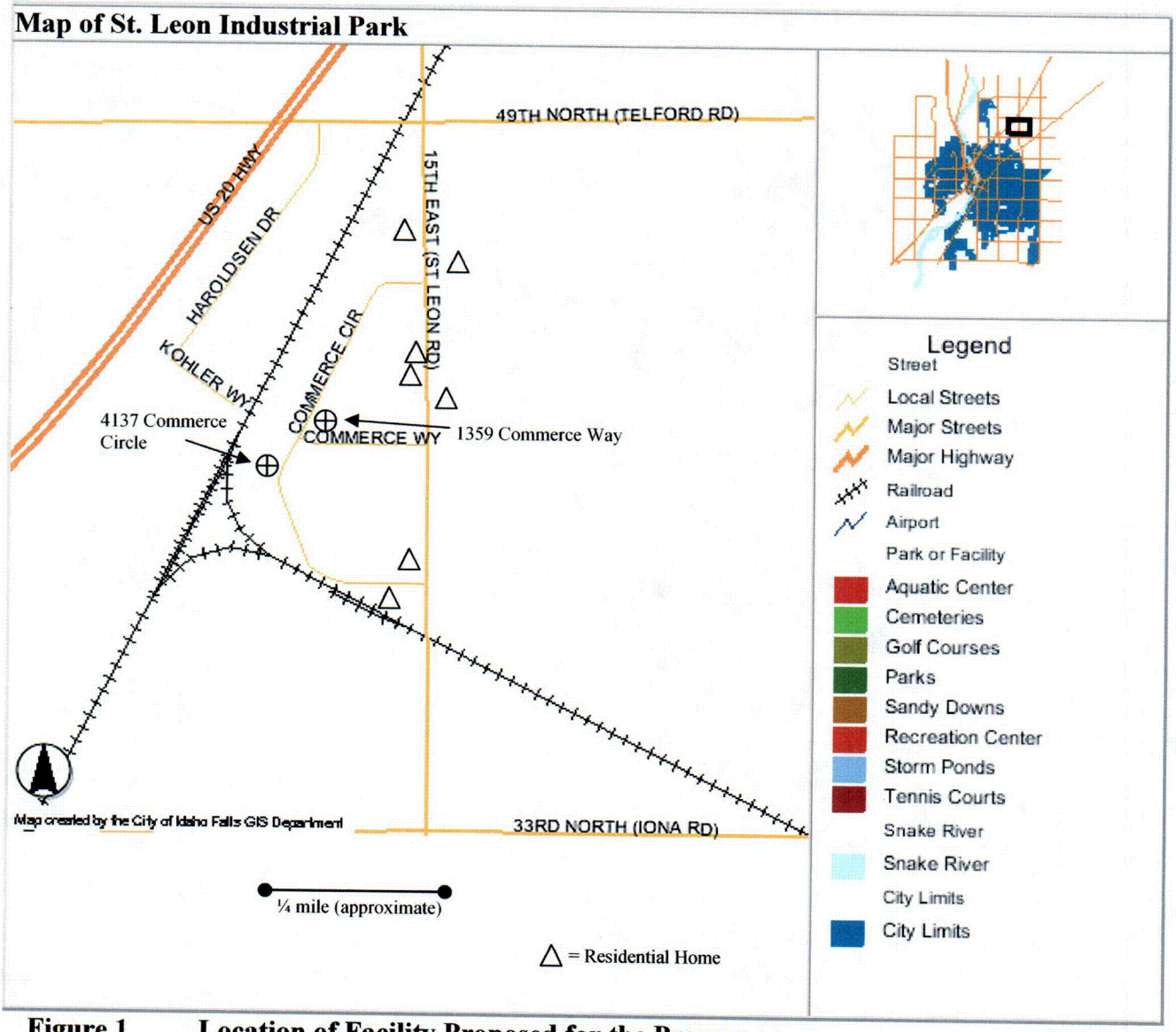

Figure 1 Location of Facility Proposed for the Process

Processing activities take place inside the building, minimizing impacts to the environment. The Proposed Action will require hiring a maximum of ten additional local staff, which will result in insignificant impacts on the community infrastructure and natural resource consumption.

In addition, the process of the Proposed Action relies on waste materials of other industries to produce germanium tetrafluoride in a more cost effective manner. In summary, the Proposed Action would have insignificant impacts to the surrounding natural areas while producing a needed commodity for the semiconductor industry using waste products of other industries.

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1.3 Applicable Regulatory Requirements, Permits and Required Consultation

Most agency contact was made by telephone, because the small scale of the project did not warrant a site visit or staff analysis. The following agencies or entities were consulted:

Bonneville County Planning and Zoning, September 17, 2004, agency representative stated land use was consistent with zoning.

Bonneville County Public Works, September 20, 2004, agency representative agreed the Proposed Activity would have no significant impact on the solid waste rate going to the Bonneville County Landfill.

Utah Power, September 20, 2004, company representative stated power usage should be insignificant

Idaho Department of Ecology, ongoing conversations to develop a document that air emissions are below regulatory concern.

Idaho Department of Fish and Game, September 20, 2004, Agency representative stated that a process placed in an existing building in an existing industrial park should not affect endangered or threatened species.

Idaho State District Seven Health Department, September 21, 2004, agency representative stated that the planned activity was consistent with the design for the installed septic tank system.

Idaho State Historical Society, September 21, 2004, agency representative stated that there was no indication that the planned activity would have an impact to cultural or historical sites.

East Side Soil and Water Conservation District/West Side Soil and Water Conservation District, September 27, 2004, agency representative stated that there was no indication that the planned activity would have an impact on farmland.

Each of the above agencies or entities provided information to support the environmental report and none objected to the project. Refer to Appendix A, Agency Contact Records and Idaho Department of Environmental Quality Letter Dated November 23, 2004.

Apart from the NRC, no other federal agency is participating in the project either through the provision of additional funds, a companion project, or permit review authority.

2.0 ALTERNATIVE

Two alternatives were considered:

(1) Constructing a new building (the New Building Alternative); and

(2) Doing nothing (the No Action Alternative).

These alternatives are discussed in the following paragraphs. A summary of the three alternatives and expected impacts is presented in Figure 2 located in Section 2.5.

2.1 No Action Alternative

The No Action Alternative entails doing nothing. It would eliminate all impacts associated increased production, but would not provide the more efficiently produced germanium tetrafluoride for the semiconductor industry and will prevent further development of future fluorine gases.

2.2 Proposed Action

I^3 intends to produce germanium tetrafluoride gas from depleted uranium tetrafluoride under the general license provision of Title 10 Code of Federal Regulations §40.22, Small quantities of source material. The proposed action is to apply for an NRC license to increase storage and use of depleted uranium so that the production of germanium tetrafluoride gas will not be limited by the restrictions imposed by §40.22. This will allow I^3 to increase production of germanium fluoride at the current site and develop processes to produce other fluorine gas compounds utilizing depleted uranium tetrafluoride. The Proposed Action entails using the current germanium tetrafluoride process in the existing building therefore no additional building materials or utility hookups are required. The Proposed Action would require minimal additional staff and I^3 could better use the building. The Proposed Action minimizes impacts to the natural environment and saves money on construction costs.

Additional detail on the proposed action and impacts associated with the proposed action are included throughout the remainder of this report.

2.3 New Building Alternative

The New Building Alternative entails process construction in a different or non-existing building to accommodate the process. This alternative was rejected due to higher construction costs and operating expenses. Locating a new facility at an undeveloped location would require excavation, construction for utilities and storm water drainage, new construction materials for the building, and potentially more staff with attendant resource requirements.

2.4 Cumulative Effects

The area adjacent to, as well as the Proposed Action site is within the St. Leon Industrial Park. Bonneville County has zoned this area Zone IM-1, manufacturing. The Industrial Park was developed to house activities such as the Proposed Action. The Proposed Action is consistent with the land use planned for the area. There are vacant lots available within the St. Leon Industrial Park, as such, additional growth is expected. The location of the Proposed Action helps minimize the environmental impacts by utilizing an existing facility.

The potential impacts to human population, farmland, energy, storm water management, potable water demand are discussed below. There is no impact on municipal waste water treatment because all facilities located in the St. Leon Industrial Park utilize individual septic systems.

2.4.1 Human Population

Increasing production at the current site is not expected to impact the local population. I^3 anticipates additional personnel (up to three) can be hired from the Idaho Falls area, so there should be no net population gain in the area.

The New Building alternative would result in additional staffing, but the impacts would not differ substantially from the Preferred Alternative. The No Action Alternative would have no impact to the surrounding human population.

2.4.2 Farmland

The land surrounding the facility is an industrial park and is not considered prime farmland. The local Soil Conservation Service District concurred with this assessment.

Since there is not a building site associated with the New Building Alternative, impacts to farmland cannot be assessed. There would be no impact to farmlands with the No Action Alternative.

2.4.3 Energy Impacts

No significant energy impacts are associated with the I^3 Proposed Action process. The process is estimated to require 147,700 kilowatt-hours/year if each piece of equipment were run 24 hours per day for 365 days per year, which is not a significant level of service for the electrical utility (Utah Power - generating capacity of 8300 megawatts).

For comparison, the municipality of Idaho Falls owns hydroelectric facilities with a capacity of approximately 48 megawatts and produces roughly a third of the electricity used by Idaho Falls. The electrical need for the Proposed Action is insignificant compared to the current usage of electricity in the area.

I^3 uses natural gas for comfort heating and to power an emergency electrical generator. The Proposed Action develops no new needs for natural gas and therefore will not require additional natural gas usage.

Energy impacts for the New Building Alternative would be similar to the Proposed Action. Additional energy and fuel requirements would not be required for construction or operation under the No Action Alternative.

2.4.4 Storm Water Management

Storm water management was developed as part of the industrial park. The Proposed Action will not change the building or storm water management system. No impact to surface water is expected from increased operation because the process is inside of the existing building. There is no process water discharge from the Preferred Alternative.

Because there is no site associated with the New Building Alternative, surface water quality impacts could not be assessed. The No Action Alternative would have no impact to water quality.

2.4.5 Potable Water Demand

I^3 receives potable water from the well dedicated to the St. Leon Industrial Park. The Bonneville Planning and Zoning representative stated that the Industrial Park well was sized correctly to provide appropriate fire suppression. The Proposed Action does not use water in the process. The only impact to water resources would be use by the additional staff. It is expected that the water usage will have an insignificant impact on ground water resources because the Idaho Falls area has a population of over 50,000.

The New Building Alternative will require more staff than the Proposed Action and, hence, will require more potable water. However, the impacts would be minimal. Potable water usage would not increase with the No Action Alternative.

The building has a septic tank and drain field system and will not discharge to the Idaho Falls treatment system. Staffing at the building is minimal and does not adversely impact the septic system. The local office of the State Public Health Department reviewed the permit and confirmed it was acceptable to receive 500 gallons per day of waste (the equivalent of 25 persons).

The New Building Alternative will require more staffing than the Proposed Action and, hence, will result in additional wastewater. However, the impacts would be minimal, even if the New Building Alternative were to utilize the municipal system. Wastewater generation would not increase with the No Action Alternative. There would be no additional wastewater generated or increased need for wastewater treatment.

No measures are required to mitigate the impact on local utilities. The wastewater collection system is designed to handle the necessary flow, and the wastewater treatment facility has ample capacity. Incoming natural gas lines and electrical power lines also have ample capacity to handle the required loads.

2.5 Summary of Impacts

Table 1: Summary of Alternatives and Impacts to Natural Resources

	Existing Building-Proposed Action	New Building	No Action	Potential Impact to Resource
Air Quality	Insignificant	Insignificant	No impact	Some air emissions
Water Quality	No impact	Not known*	No impact	Runoff from construction
Potable Water	Insignificant	Insignificant	No impact	Increased consumption
Wastewater	Insignificant	Insignificant	No impact	Increased generation
Solid Waste Management	Insignificant	Insignificant	No impact	Increased generation
Land Use	No impact	Insignificant	No impact	Potential land disturbance
Transportation	Insignificant	Insignificant	No impact	Increased traffic on roads
Natural Environment	No impact	Not known	No impact	Removal of vegetation
Human Population	Insignificant	Not known	No impact	Surrounding workers and residents disturbed
Energy Impacts	Insignificant	Insignificant	No impact	Increased consumption
Coastal Zone Management Act	No impact	No impact	No impact	No coastal zones in Idaho
Historic Preservation	No impact	Not known	No impact	Modification of historic building

Table 1: Summary of Alternatives and Impacts to Natural Resources

	Existing Building-Proposed Action	New Building	No Action	Potential Impact to Resource
Wild and Scenic Rivers	No impact	No impact	No impact	Discharge to wild and scenic river
Endangered Species	No impact	Not known	No impact	Potential loss of habitat
Floodplain Management & Protection of Wetlands	No impact	Not known	No impact	Loss of floodplains or wetlands
Farmland Protection	No impact	Not known	No impact	Loss of farmland
Coastal Barrier Resources	No impact	No impact	No impact	No coastal barriers in Idaho
Environmental Justice	No impact	Not known	No impact	Impacts to minority groups

*Not available since the site has not been selected

Additional detail on the impacts listed above is provided throughout this report. In summary, the impacts, even considered cumulatively, can be sufficiently mitigated.

3.0 ENVIRONMENTAL DESCRIPTION

3.1 Land Use

The proposed project is located in St. Leon Industrial Park, which is currently zoned for manufacturing. Some of the businesses in the park are a piping supply warehouse, an Idaho Fish and Game office, a radio station, a printing company, a lawn care company, a siding and window supply company, and two NRC licensed facilities. The International Isotopes Inc 4137 Commerce Circle Facility, licensed through Region IV (NRC license 11-27680-01) and Qal-Tek Associates, licensed through Region IV (NRC license 11-27610-01). The proposed project is consistent with this zoning and there is no known opposition to the proposal. A record of contact with the Bonneville County Planning and Zoning is included in appendix A.

Because a site is not associated with the New Building Alternative, land use impacts could not be assessed. The land use would not change with the No Action Alternative.

3.2 Transportation

The St. Leon Business Park is conveniently located to US Highway 20 which connects to Interstate 15 approximately 5 miles from the US Highway 20, St. Leon Road exit. St. Leon Road is currently being widened to 4 lanes. Refer to Figure 1 on the previous page.

3.3 Geology and Soils

The St. Leon Business Park is located in the Idaho Falls sub-basin. This sub-basin is situated on the eastern most edge of the Snake River Plain around the city of Idaho Falls. The geology of the sub-basin is generally comprised of Pleistocene lava flows on the western side and Pleistocene outwash flood and terrace gravels on the eastern side. The Snake River Plain consists of rhyolite erupting from a series of volcanoes beginning approximately 13 million years ago in the Western

part of the state The Snake River basalt gets progressively younger in age as it extends eastward. The Snake River Plain ends at the Yellowstone Plateau Volcanic Field, approximately 120 miles from the International Isotopes Inc facility. The surface of the Snake River Plain is covered with basalt, ranging from 10 to 50 feet thick, and is visible throughout the sub-basin. Much of the Snake River basalt flows in this sub-basin are overlain from soil blown into the region or from alluvium from the Snake River and its tributaries. The Western portion of the sub-basin is almost entirely the Snake River Plain basalt flows with moderately deep soils overlain.

The topography of the sub-basin is relatively flat as compared to other areas in Idaho. Elevations range from 4623 feet to 7252 feet with an average of 5030 feet. The St. Leon business park is situated at approximately 4700 feet.

There are numerous faults located throughout the sate of Idaho. Geological and seismological studies show that earthquakes are likely to happen in any of several active zones in Idaho and adjacent states. Idaho has experienced the two largest earthquakes in the contiguous United States in the last thirty years—the 1959 Hebgen Lake earthquake (M7.5) and the 1983 Borah Peak earthquake (M7.3). Neither of these earthquakes affected the Idaho Falls area.

Geological and seismological studies show that earthquakes are likely to happen in any of several active zones in Idaho and adjacent states. Idaho is ranked fifth highest in the nation for earthquake risk. In all parts of Idaho, the historical record of seismicity reveals at least a moderate threat from earthquakes. The St. Leon Business Park, located in Idaho Falls, is located in an area of moderate risk. The closest fault, the Gateway Fault, is located approximately 20 miles due south of Idaho Falls. The Gateway Fault is classified as a lesser tertiary fault with a slip rate of 0.8 mm/year.

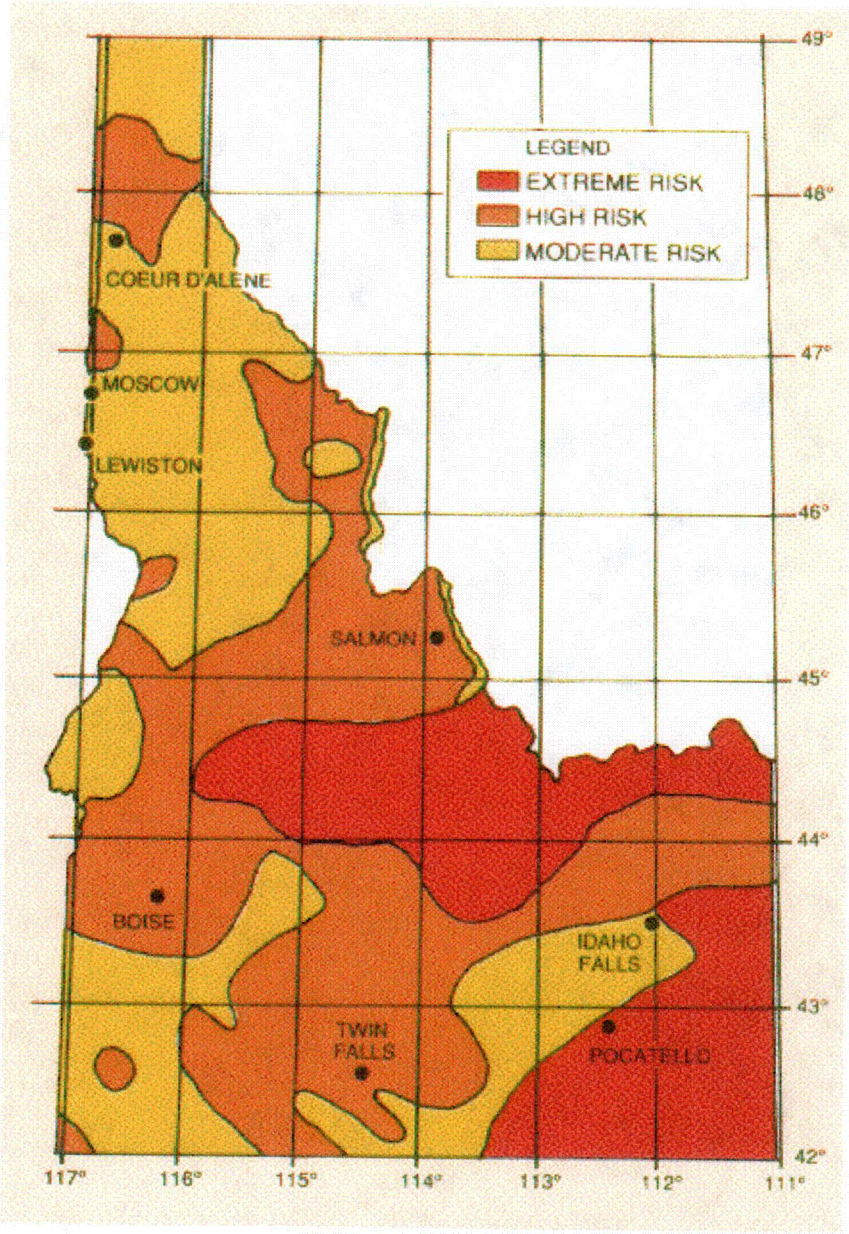

Figure 2 Earthquake Risk in Idaho

The 1991 Uniform Building Code (UBC), a nationwide industry standard, sets construction standards for different seismic zones in the nation. UBC seismic zone rankings for Idaho are among the highest in the nation. When buildings are built to these standards they have a better chance to withstand earthquakes.

3.4 Water Resources

3.4.1 Ground Water

The Snake River Plain regional aquifer system underlies a large, crescent-shaped lowland that extends from near the western boundary of Yellowstone National Park in eastern Idaho to the Idaho-Oregon border where the Snake River enters Hells Canyon.

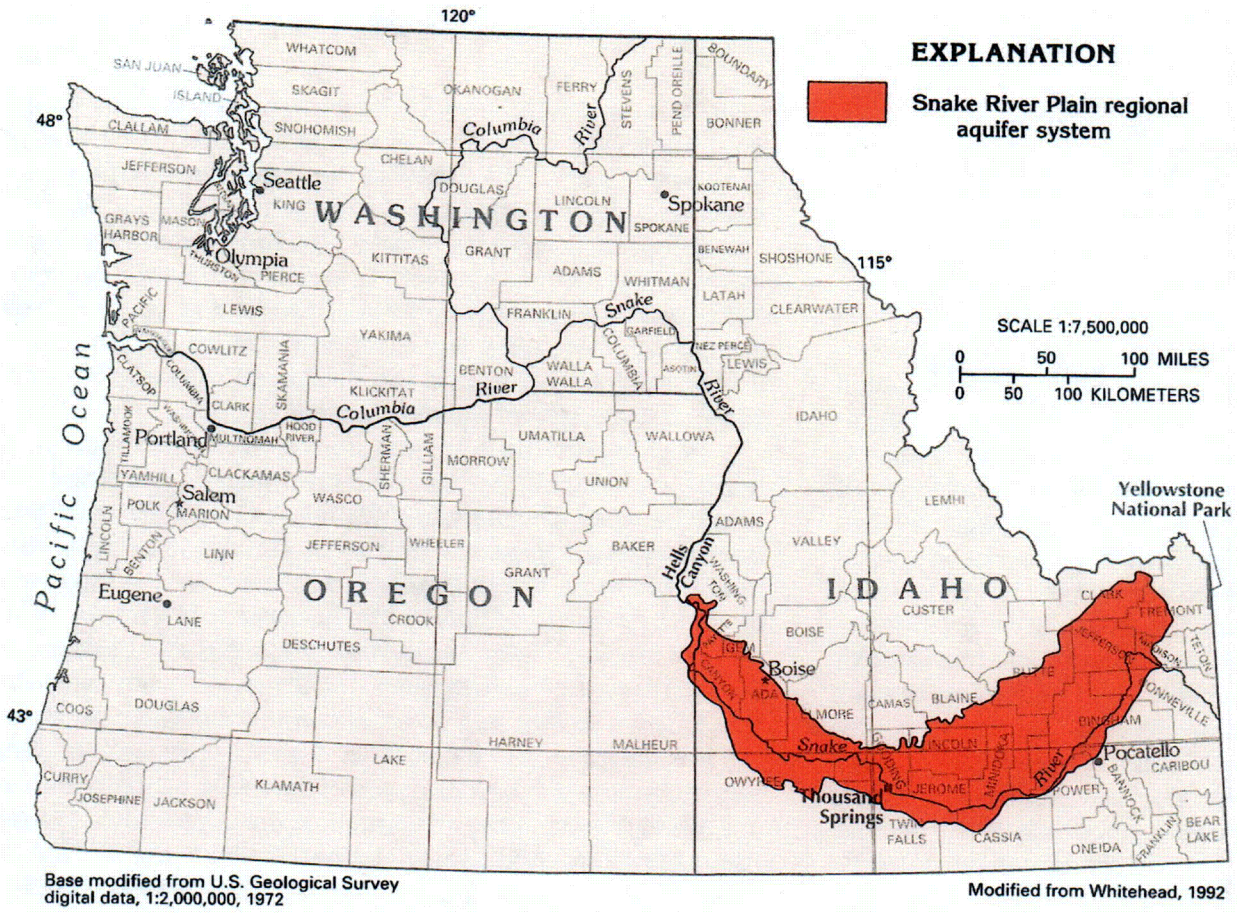

Figure 3 Snake River Plain Aquifer

Generally, the regional aquifer system in the eastern plain is an unconfined system, although dense, unfractured basalt and interbedded clay layers cause semiconfined and confined conditions in places.

Ground water is used in Bonneville County for public supply, domestic and commercial, agricultural, and industrial purposes. Most development is near the Snake River in areas of unconsolidated deposits or in upland areas in Pliocene and younger basaltic or volcanic and sedimentary rocks. Depth to water ranges from flowing to 500 feet below land surface. Typical well depth varies between less than 100 to greater than 1,000 feet below the surface. Yields range between less than 100 to greater than 3,600 gallons per minute, with large yields in places near Idaho Falls.

Much of the recharge in the eastern plain originates as precipitation on the highlands adjacent to the plain, chiefly on the northern side. Precipitation falling on the plain itself accounts for less than 10 percent of the total recharge. Infiltration of surface water diverted from the Snake River for irrigation of land near the river accounts for about 67 percent of the total recharge. Rainfall and snowmelt on the plain infiltrate quickly to the water table because of many surface or near-surface openings in Pliocene and younger basaltic rocks; similar openings at depth provide conduits for water movement.

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3.4.2 Surface Water

The Idaho Falls sub-basin is located in eastern Idaho around the city of Idaho Falls. The sub-basin is comprised of a portion of the South Fork Snake River from Heise to the Henry's Fork, and a section of the main Snake River from the Henry's Fork confluence down to the diversion dams south of Idaho Falls. Other than the Snake River, there are very few natural waterways in the sub-basin. Birch Creek, located approximately 15 miles north east of the St. Leon Business Park is a natural drainage from the eastern foothills north of the Willow Creek sub-basin, and is considered water quality-limited for unknown reasons. Willow Creek, including the North Fork and the South Fork, below Ririe dam is listed as water quality-limited for sediment pollution; however, this waterway is an irrigation canal in this sub-basin. More than three and one-half miles of the South Fork Snake River near Heise are listed as water quality-limited for flow alteration, a continuation of the listing of this river in the Palisades sub-basin.

The closest surface water body to the proposed site is an intermittent irrigation canal (a spur from the South Fork of Willow Creek) is located to the west of the building across the railroad tracks. Various other intermittent irrigation canals crisscross Bonneville County and are within 2 miles of the proposed facility, the largest of which is the Idaho Canal, approximately 1 mile south west of the proposed site. The closest natural water way, the Snake River is located approximately 3 miles south west of the proposed site and flows year round.

Ririe Lake, located approximately twelve miles north east of the proposed facility was formed by the construction of Ririe Dam across Willow Creek. The damn's principal purpose is for flood control on the lower reaches of Willow and Sand Creeks. Out of a total reservoir capacity of 100,500 acre-feet, 10,000 acre-feet is dead and inactive space, 80,500 acre-feet serves both flood control and irrigation, and the top 10,000 acre-feet is held exclusively for emergency flood control operations. Principal facilities of the Ririe Project include one storage dam with a total active capacity of 90,500 acre-feet and one floodway or outlet channel.

3.4.3 Floodplain Management and Protection of Wetlands

Executive Order 11988, Floodplain Management, requires federal agencies to avoid the adverse impacts associated with occupying and modifying floodplains and to avoid floodplain development whenever possible. Federal Emergency Management Agency information was reviewed for the location of the 100-year floodplain in the area of the facility and a map is provided in Appendix C. The site does not lie within a 100-year floodplain and therefore will result in no adverse impacts to floodplain management.

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid undertaking or providing assistance for new construction located in wetlands unless there are no practicable alternatives. There are no jurisdictional wetlands on the site. A National Wetland Inventory map for this area is provided in Appendix C.

3.4.4 Costal Zone Management Act

The Coastal Zone Management Act is not pertinent to this location. The nearest coast is approximately 600 miles west of the proposed site.

3.5 Ecological Resources

3.5.1 Natural Environment

The area adjacent to the proposed building includes light industrial facilities, an office park, a paved parking area, and county streets. The industrial park is located in an urban area. The Proposed Action would have insignificant impacts to the surrounding natural environment.

Because a site is not associated with the New Building Alternative, impacts to the natural environment could not be assessed. However, the New Building Alternative requires new construction; it is likely that impacts would be somewhat greater than the Preferred Alternative. The No Action Alternative would leave the existing building unoccupied, and would have no impacts to the natural environment.

3.5.2 Vegetation

The Idaho Falls sub-basin is largely an agricultural sub-basin, the majority of which occurs in the southern two-thirds of the sub-basin. However, the northern and western most extents of the sub-basin are predominantly sagebrush shrub lands. These areas once had abundant herbaceous species and wildflowers. Much of the species diversity has been reduced by many years of livestock grazing, altered fire cycles, and the invasion of annual exotic grasses.

This sub-basin includes two vastly different features on the landscape, recent (Pleistocene) lava flows and sand dunes. Areas where lava flows are still evident are usually vegetated slowly as soil forms in the cracks and crevasses. Dominant vegetation on these flows include junipers, fernbush, and Wyoming big sagebrush. The St. Anthony sand dunes, located approximately 20 miles north of the proposed facility, are sparsely vegetated with grasses and a globally rare, but not imperiled species of evening primrose known only in Idaho at these sand dunes in Fremont County.

There are a few pieces of coniferous forest vegetation in the upper Birch Creek drainage, the upper Kelly Canyon area, and on the slopes of Mount Taylor at the very southern tip of the sub-basin. Also, in these same areas are isolated clumps of deciduous forest, primarily made up of quaking aspen. Along the Snake River, especially in the Heise area, are areas of narrow-leaf cottonwood gallery forest.

Riparian vegetation consists of a variety of facultative and obligate wetland plants including, willows, sedges and water birch and alders at higher elevations. The South Fork Snake River floodplain and possibly other floodplain areas are notable habitat for the rare orchid Ute Ladies' Tresses. This particular plant is ranked global priority 2 (G2), imperiled due to rarity or other factors that make it vulnerable to extinction. The US Fish and Wildlife Service has listed this species of orchid as "threatened."

3.5.3 Endangered Species

The process would not directly or indirectly impact threatened and endangered species known to reside in Bonneville County. The industrial park setting does not provide nesting, feeding, or habitat for any species. Habitat areas (including the Market Lake and Tex Creek Wildlife Management Areas), which provide high quality nesting, cover, and general use are located 15 to 20 miles from the facility and would not be impacted by the

action. The US Fish and Wildlife service concurred that no impact is expected. State and federal listed species known to inhabit Bonneville County are listed in Appendix B.

3.6 Metrology, Climatology and Air Quality

3.6.1 Metrology and Climate

The climate of the Idaho Falls sub-basin is classified as semiarid high desert characterized by warm to hot dry summers and long, cold winters. The Upper Snake River basin is primarily influenced by air masses moving inland from the Pacific Ocean during the winter months. In summer months, rainfall, cloud cover, and relative humidity are at a minimum due to the weakening of the westerly winds allowing continental climate conditions to prevail.

Precipitation throughout the sub-basin varies widely. The average is about 12.4 inches with a maximum of 27 inches along the Eastern Caribou Mountains, and a minimum of nine inches in western region of the sub-basin. The majority of the precipitation in the basin occurs during the spring and fall months.

The annual average snowfall for the sub-basin is approximately 38 inches, with majority of the snowfall occurring in December and January. Snow-pack tends to be greatest along the eastern boundary of the sub-basin and decreases towards the west. Light snowfall begins in September in the higher elevations, but the lower elevations in the sub-basin generally do not receive snow until October.

Table 2: Summary of precipitation data from three stations within the sub-basin

	Average Total Precipitation (in.)			Average Total Snowfall (in.)		
	Rexburg 7/77-12/00	**Idaho Falls 5/52 – 12/00**	Hamer 10/48-12/00	Rexburg 7/77-12/00	**Idaho Falls 5/52 – 12/00**	Hamer 10/48-12/00
January	1.09	**1.03**	0.58	13.3	**8.3**	6.9
February	1.10	**0.94**	0.49	11.1	**5.3**	5.2
March	1.09	**1.03**	0.59	4.1	**3.2**	2.7
April	1.15	**1.10**	0.74	2.4	**0.5**	1.1
May	2.02	**1.68**	1.41	0.6	**0.4**	0.4
June	1.47	**1.30**	1.25	0.0	**0.0**	0.0
July	0.97	**0.59**	0.75	0.0	**0.0**	0.0
August	0.72	**0.76**	0.73	0.0	**0.0**	0.0
September	0.81	**0.84**	0.60	0.9	**0.4**	0.8
October	1.05	**1.04**	0.63	8.0	**3.3**	3.5
November	1.17	**1.00**	0.66	8.0	**3.3**	3.5
December	1.05	**1.04**	0.63	16.2	**7.1**	7.8
Annual	13.71	**12.25**	9.03	56.9	**28.5**	28.5

Source: Western Regional Climate Center at http://wrcc.dri.edu/summary/climsid.html

Maximum monthly temperatures climb to 87° F in July, the average warmest month, while minimum monthly winter temperatures drop to 4°F in January, the average coldest month. The annual average maximum temperature is 58.6°F and the average minimum temperature is 26.4°F for the region. The growing season ranges from late May to early September with an average of 119 days.

Table 3: Summary of temperature data from three stations within the sub-basin

	Average Maximum Temperature (F)			Average Minimum Temperature (F)		
	Rexburg 7/77-12/00	Idaho Falls 5/52 – 12/00	Hamer 10/48-12/00	Rexburg 7/77-12/00	Idaho Falls 5/52 – 12/00	Hamer 10/48-12/00
January	29.5	30.1	28.3	10.6	12.8	4.1
February	34.8	37.4	34.8	15.5	17.9	9.9
March	46.3	47.0	45.7	23.4	24.3	18.4
April	57.8	58.2	59.3	30.6	31.6	26.9
May	66.1	68.4	69.6	38.8	39.5	36.0
June	75.0	77.5	78.3	45.1	46.6	42.9
July	83.6	86.4	87.6	49.3	52	47.5
August	84.4	85.5	86.2	47.4	50.2	45.5
September	74.3	75.2	75.7	38.7	41.5	36.8
October	60.5	61.5	62.1	29.7	32.0	26.6
November	41.4	43.9	43.1	20.2	23.3	16.4
December	29.8	32.0	30.3	10.1	14.1	6.0
Annual	56.9	58.6	58.4	30.0	32.2	26.4

Source: Western Regional Climate Center at http://wrcc.dri.edu/summary/climsid.html

Winds in the sub-basin are mainly from the south-southwest. The highest average wind speed occurs in spring during March, April, and May with speeds of 20 to 30 mph for days at a time. The lowest wind speeds occur in the late summer during July, August, and September.

Influenced by the Pacific Ocean, Idaho's moderate climate sees relatively few severe storms in comparison with the rest of the nation. Severe storms constitute the most common type of Presidential Disaster declaration in the United States, although only two storm-related Presidential Disaster declarations were made in Idaho during the period 1976-2000. The State of Idaho ranks 36 in tornado frequency averaging 3 tornados per year, these ranking low on the Fujita scale.

3.6.2 Air Quality

Air quality in the region is generally good. In 2004, there where two days with an Air Quality Index (AQI) as *Unhealthy for Sensitive Groups*, with the maximum of 137 for criteria pollutant PM 2.5. There were seven days with and AQI as *Moderate* for criteria pollutant PM 2.5. For all other days and criteria pollutants the AQI was reported as *Good.* AQIs with the highest value occur during the winter months.

The emissions directly from the process prior to controls were calculated and compared to Idaho air regulations. Fluoride emissions prior to emission controls (high efficiency particulate air filter, scrubber, etc.) are approximately 0.8% of the State fluoride regulatory emission limit (IDAPA 58.01.01.585). The potential to emit prior to emission controls at maximum design capacity is 9 % of the emission limit. The potential to emit is less than the limit for Below Regulatory Concern (10% of the emission limit as stated in IDAPA 58.01.01.221). I^3 has obtaining written Idaho Department of Environmental Quality (DEQ) concurrence with this assessment. In a letter dated November 23, 2004, DEQ determined the project is exempt from PTC requirements in accordance with

IDAPA 58.01.01.220 and is a Level I toxic exempt source in accordance with IDAPA 58.01.01.223.

3.7 Noise

Characterization of the noise baseline at and near the proposed facility was not performed. The proposed facility currently exists and is situated in an industrial park. Industrial park traffic and traffic on St. Leon Road and the railroad are the largest contributors to the noise baseline. Modifications to the facility to support the Proposed Action, (additional rooms) are occurring within the facility during normal business hours and can not be heard outside of the facility. During operation, process equipment located outside of the facility that would impact noise levels include back-up emergency generator and an air condenser. The proposed process is not expected to result in a significant change in the current noise level.

3.8 Historic and Cultural Resources

Section 106 of the National Historic Preservation Act and associated regulations at 36 CFR 800 Subpart A require a review by the State Historical Society for presence of buildings or potential encounters or impacts with artifacts with historic importance. Since the site was previously disturbed, there are no historic structures in or near the building that will house the proposed process (see Appendix A).

3.9 Visual/Scenic Resources

The proposed project is located in St. Leon Industrial Park, which is currently zoned for manufacturing. The building in which the proposed project intends to utilize currently exists. Locating the proposed project in an existing building would not alter the scenery or current views.

3.9.1 Wild and Scenic Rivers

No wild or scenic rives are located in the vicinity of Bonneville County. Therefore, none of the alternatives would affect wild and scenic rivers.

3.10 Socioeconomic

There are no concentrations of minority populations, low-income populations, or Indian tribes located near or affected by the proposed project according to data provided by the US Census Bureau. US Census bureau data for the Iona city tract, the Idaho Falls city tract, Bonneville County, the State, and the USA are included in Appendix D and Appendix F, Idaho Falls Community Profile.

Executive Order 12898, Environmental Justice, was created to ensure that each federal agency identifies and addresses disproportionately high and adverse human health or environmental impacts of its programs and activities on minority and low-income populations. There are no environmental justice issues associated with the proposed project.

Since there is not a building site associated with the New Building Alternative, environmental justice impacts cannot be assessed. The No Action Alternative would not adversely impact any low-income populations, minority groups, or Indian tribes.

Maps of the area are provided in Appendix E.

3.11 Public and Occupational Health

3.11.1 Public Health Statistics

The State of Idaho 2002 Age-Adjusted Incidence Rate for Cancer was 460 per 100,000. The incidence rates for all cancers combined were similar for males and females in Idaho until approximately age 60-64, after which rates for males rose dramatically. The highest rates for both males and females were observed in age groups after age 70, peaking in the age group 75-79 for males and 80-84 for females. Health District 1 ($p<0.05$) had statistically significantly more cases of cancer than expected based upon rates for the remainder of Idaho, and Health Districts 6 ($p<0.01$) and 7 ($p<0.01$) had statistically significantly fewer cases than expected. Health District 7, comprised of Bonneville, Clark, Custer, Fremont, Jefferson, Lemhi, Madison, Teton counties had the lowest age-adjusted incidence rate at 370.8 per 100,000.

The data presented cover those cases diagnosed among Idaho residents between January 1, 2002, and December 31, 2002. In this time frame, there were 6,205 cases of cancer diagnosed among Idaho residents (3,233 among males and 2,972 among females). By race and ethnicity, there were 5,393 cases among non-Hispanic whites, 154 among Hispanic whites, 7 cases among Blacks, 29 cases among Native Americans, 8 cases among Asians/Pacific Islanders, and 16 cases among other races. Race was missing for 22 cases. 297 of these cases where diagnosed in Bonneville County.

There are no known existing public or occupational health issues associated with the city of Idaho Falls or Bonneville County Idaho. The table below summarizes the vital health statistics for Bonneville County for the year 2002, the latest year compiled data is available.

Table 4: Bonneville County Vital Statistics

Population Estimate[1]	Bonneville County 2002 Vital Statistics	
85,180 – 7/1/2002	Number	Rate[2][3]
Live Births	1582	18.3
Infant Deaths	5	3.2
Perinatal Deaths	18	11.5
Deaths	593	696.2
Disease of the Heart	183	214.8
Malignant neoplasms	86	101
Cerebrovascular diseases	29	34
Accidents	65	76.3
Chronic lower respiratory disease	34	39.9
Diabetes mellitus	37	43.4
Alzheimer's disease	12	14.1
Influenza and pneumonia	7	8.2
Intentional self-harm (suicide)	5	5.9
Chronic liver disease and cirrhosis	6	7.0

All other causes	129	151.4
(1) US Bureau of the Census, 8/8/2003		
(2) Infant and perinatal death rate per 1,000 live births		
(3) Death rate express per 100,000 population		

3.11.2 Background Radiation Exposure

Background radiation exposure in Bonneville County Idaho is typical to that of the general population of the United States. The Environmental Protection Agency categorizes Bonneville County Idaho as a Radon Zone 2, Moderate Potential (2 pCi/L – 4 pCi/L).

The state of Idaho, Division of Idaho National Laboratory Oversight and Radiation Control (DEQ-INL) maintains an Environmental Surveillance Program (ESP) independent of the Department of Energy's (DOE's) Idaho National Laboratory (INL). The primary objective for DEQ-INL's ESP is to maintain an independent environmental monitoring and verification program designed to verify and supplement DOE's data and programs. This program is also used to provide the citizens of Idaho with information that has been independently evaluated to enable them to reach informed conclusions about DOE activities in Idaho and potential impacts to public health and the environment.

DEQ-INL monitoring stations are located within the INL, at the boundaries of the INL and at distant locations form the INL. One of these distant monitoring stations is located in the city of Idaho Falls. The Idaho Falls monitoring station is located on the green belt along the Snake River in downtown Idaho Falls, approximately four miles from the St. Leon Industrial Park. Tables summarizing the third quarter monitoring results for the city of Idaho Falls follow. All results are within the expected range of values for historical data.

Table 5: Sample Type- Total Suspended Solids, Air Filter

Concentration ($1x10^{-3}$ pCi/m^3)

Gross Alpha	Gross Beta	Man-Made Gamma Emitting Radionuclides[1]
0.6 – 1.4	15.4 – 27.6	<MDC

(1) Via gamma-spectroscopy

Table 6: Sample Type- Atmospheric Water Vapor

Tritium Concentration (pCi/m^3)

	± 2 σ	MDC
0.14	0.20	0.33

Table 7: Sample Type- Precipitation

Tritium (pCi/L)			Cs-137 (pCi/L)		
Concentration	± 2 σ	MDC	Concentration	± 2 σ	MDC
-20	70	130	-0.1	1.5	2.6

Table 8: Sample Type- Ambient Radiation Levels

High-Pressure Ion Chamber (uR/hr)		Electret Ionization Chamber (uR/hr)	
Average	± 2 σ	Average	± 2 σ
11.9	0.6	15.5	1.8

3.11.3 Major Sources and Levels of Chemical Exposures

There are no known sources of chemical exposures to local population. A search of the Environmental Protection Agency's Toxic Release Inventory failed to identify any off-site releases of TRI chemicals in the 83401 zip code or any surrounding zip codes.

3.11.4 Occupational Injury and Fatality Rates.

Refer to Appendix G, State of Idaho fatal occupational injuries by employee status, sex, age, race, event or exposure, occupation, and industry, 2003. Occupational Injury data for the local area was unavailable. International Isotopes Inc. has had zero occupational injuries at its 4137 Commerce Circle Facility since occupancy March 2000.

3.12 Waste Management

The Proposed Action would generate negligible additional solid waste (paper products, kitchen, and janitorial waste). Waste is collected by a local private waste hauling company and disposed of at the Bonneville County Landfill.

Also, the facility will increase the receipt of excess uranium tetrafluoride, which will be converted to uranium oxide. The market for uranium oxide is small and so it is likely the majority will be shipped offsite for disposal at a commercial waste disposal facility (such as Envirocare in Utah or US Ecology in Richland Washington). Conversion of the material from uranium tetrafluoride to uranium oxide stabilizes the waste material by reducing its reactivity. Offsite shipments are anticipated to be approximately one truckload every month, which will have minimal impacts on area transportation.

Other radiological waste expected would be that associated with handling radioactive materials, i.e. slightly contaminated latex gloves, disposable lab coats, sample filter media etc. For economical reasons, this waste will be consolidated but will remain segregated from the byproduct waste associated with the International Isotopes Inc 4137 Commerce Circle facility.

Mixed or hazardous waste is not expected to be generated as part of the process. The process may produce small quantities of hydrofluoric acid which will be neutralized during the process so that the waste stream has a near neutral pH. This liquid waste will be sampled and if free of radioactivity and safe for septic system disposal would be disposed of in the facility septic system. If the waste is not acceptable for disposal in a

septic system due to radiological contamination then the liquid waste will be collected and volume reduced via evaporation utilizing equipment at the International Isotopes Inc. 4137 Commerce Circle facility specifically designed for this task. If the chemical characteristics of the waste prevents septic system disposal, the waste will be treated so that it maybe disposed of via the septic system or transferred to a facility capable of handling the waste.

4.0 ENVIRONMENTAL IMPACTS

4.1 Land Use Impacts

The proposed project is located in St. Leon Industrial Park, which is currently zoned for manufacturing. The proposed project is consistent with this zoning and there is no known opposition to the proposal. There are currently two NRC licensed facilities located in the park, International Isotopes Inc 4137 Commerce Circle Facility and Qal-Tek Associates, located at 3998 Commerce Circle. There is no expected impact on land use should the Proposed Action go forward. In addition, the site of the Proposed Action is of sufficient acreage to accommodate facility expansion should the need arise in the future.

Because a site is not associated with the New Building Alternative, land use impacts could not be assessed. As the building that will house the proposed project currently exists, the land use would not change with the No Action Alternative.

4.2 Transportation Impacts

The St. Leon Business Park is conveniently located to US Highway 20 which connects to Interstate 15 approximately 5 miles from the US Highway 20, St. Leon Road exit. St. Leon Road is currently being widened to 4 lanes. Because the facility and site of the Proposed Action has already been developed, there will be no impact to transportation as a result of construction. There will be a slight increase in vehicle traffic in the St. Leon Industrial Park as a result of an increase in park employment levels and deliveries and pick-ups of supplies and products to and from the facility once operations commence. These increases in traffic are not expected to exceed that which was anticipated during the planning of the St. Leon Industrial Park.

It is expected that The New Building Alternative would have an increased impact on transportation during the construction phase of the facility. The No Action Alternative would have no impact on transportation.

4.3 Geology and Soils Impacts

Because the Proposed Action utilizes a site that has already been developed there are no environmental impacts expected to the geology and soil associated with the Proposed Action. The 1991 Uniform Building Code (UBC), a nationwide industry standard, sets construction standards for different seismic zones in the nation. UBC seismic zone rankings for Idaho are among the highest in the nation. The facility utilized by the Proposed Action was built to the UBC and would be expected to withstand an earthquake of magnitude consistent with the area.

The New Building Alternative would require construction of a facility and clearing of a site. Although a New Building Alternative site has not been selected, zoning restrictions would limit the New Building Alternative to an area zoned for manufacturing.

Constructing a new facility in an area zoned as such would have minimal impacts on geology and soil. The No Action Alternative would have no impact on geology and soil.

4.4 Water Resources Impacts

No Impact to surface or ground water is expected from increased operation because the process is inside of the existing building and there is no process water discharge from the Proposed Action.

I^3 receives potable water from the well dedicated to the St. Leon Industrial Park. The Bonneville Planning and Zoning representative stated that the Industrial Park well was sized correctly to provide appropriate fire suppression. The Proposed Action does not use water in the process. The only impact to water resources would be use by the additional staff. It is expected that the water usage will have an insignificant impact on ground water resources because the Idaho Falls area has a population of over 50,000.

The Proposed Action will not change the storm water management system.

The New Building Alternative would not be expected to impact ground or surface water or affect potable water demand for the same reasons cited above. The No Action Alternative would have no impacts on water resources.

The Proposed Action does not affect wetlands and is not sited in a floodplain. Since there is not a building site associated with the New Building Alternative, impacts to floodplains or wetlands cannot be assessed. The No Action Alternative would have no impact to floodplain or wetlands.

4.5 Ecological Resources Impacts

Because the Proposed Action utilizes a site that has already been developed there would be insignificant impacts to the surrounding natural environment. The area adjacent to the proposed building includes light industrial facilities, an office park, a paved parking area, and county streets. The industrial park is located in an urban area.

Because a site is not associated with the New Building Alternative, impacts to the natural environment could not be assessed. However, the New Building Alternative requires new construction; it is likely that impacts would be somewhat greater than the Proposed Action. The No Action Alternative would leave the existing building unchanged, and would have no impacts to the natural environment.

4.6 Air Quality Impacts

The emissions directly from the process prior to controls were calculated and compared to Idaho air regulations. Fluoride emissions prior to emission controls (high efficiency particulate air filter, scrubber, etc.) are approximately 0.8% of the State fluoride regulatory emission limit (IDAPA 58.01.01.585). The potential to emit prior to emission controls at maximum design capacity is 9 % of the emission limit. The potential to emit is less than the limit for Below Regulatory Concern (10% of the emission limit as stated in IDAPA 58.01.01.221). I^3 has obtaining written Idaho Department of Environmental Quality (DEQ) concurrence with this assessment. In a letter dated November 23, 2004, DEQ determined the project is exempt from PTC requirements in accordance with IDAPA 58.01.01.220 and is a Level I toxic exempt source in accordance with IDAPA

58.01.01.223. The impact of these emissions on the existing air quality of the region would be insignificant.

Secondary emissions are those that are not emitted from the facility, but are emitted as a result of operations occurring at the facility. These emissions typically include increased emissions resulting from additional auto traffic associated with projects and increased power demands of additional support personnel. Because the Proposed Action would use minimal additional staff, secondary emissions resulting from the operation of the new facility are estimated to be insignificant.

The New Building Alternative would result in the aforementioned operational air impacts plus air quality impacts resulting from new construction (fugitive dust from excavation activities and increased secondary emissions from construction worker traffic). The No Action Alternative would have no impact to air quality, as there would be no additional emissions from furnaces, traffic, construction equipment, etc.

4.7 Noise Impacts

The operations associated with the Proposed Action will not result in a change in the current noise level outside of the facility. The exterior walls of the facility are constructed of 4 inch thick poured concrete. Process operations are conducted entirely within the confines of the facility and do not require heavy equipment or machinery that would generate noise levels that could be heard outside of the facility. A natural gas powered back-up generator will be located adjacent to the facility that would run in the event of a power outage or for routine maintenance. This generator will be housed in a weather proof enclosure and will produce sound levels at 69 dBA at full load at a distance of 7 meters from the generator, a distance well within the site boundary. Noise levels associated with the operation of the back-up generator are considered insignificant when compared with the noise level inherent to the industrial park. Process equipment located outside of the Proposed Action facility will increase noise levels. This increase is regarded as insignificant and acceptable given the location of the facility and the current zoning of the industrial park. The noise level associated with the Proposed Action

The New Building Alternative would result in an increase in noise levels during the construction phase which would be in addition to increase in noise levels associated with the process once operating. These impacts would be considered insignificant because the New Building Alternative would be located in an area zoned for manufacturing. The No Action Alternative would have no impact on noise.

4.8 Historic and Cultural Resources Impacts

The Proposed Action will have no affect on historic or cultural resources. Section 106 of the National Historic Preservation Act and associated regulations at 36 CFR 800 Subpart A require a review by the State Historical Society for presence of buildings or potential encounters or impacts with artifacts with historic importance. Since the site was previously disturbed, there are no historic structures in or near the building that will house the proposed process (see Appendix A).

Since there is not a building site associated with the New Building Alternative, historical impacts cannot be assessed. The No Action Alternative would not disturb any land and hence would have no impact.

4.9 Visual/Scenic Resources Impacts

The proposed project is located in St. Leon Industrial Park, which is currently zoned for manufacturing. The building in which the proposed project intends to utilize currently exists. Locating the proposed project in an existing building would not alter the scenery or current views. Therefore the Proposed Action will no have any impact on visual or scenic resources.

Since there is not a building site associated with the New Building Alternative, impacts on visual or scenic resources cannot be assessed. The No Action Alternative would not disturb any land and hence would have no impact.

4.10 Socioeconomic Impacts

The Propose Action is expected to have positive impacts on the local economy by providing additional jobs to the area. There are no concentrations of minority populations, low-income populations, or Indian tribes located near or affected by the proposed project according to data provided by the US Census Bureau.

The New Building Alternative would be expected to have the same positive impact to the local economy created by providing additional jobs would be expected. The No Action Alternative would not have any socioeconomic impact.

4.11 Environmental Justice

There are no concentrations of minority populations, low-income populations, or Indian tribes located near or affected by the proposed project according to data provided by the US Census Bureau. US Census bureau data for the Iona city tract, the Idaho Falls city tract, Bonneville County, the State, and the USA are included in Appendix E and Appendix F, Idaho Falls Community Profile.

Executive Order 12898, Environmental Justice, was created to ensure that each federal agency identifies and addresses disproportionately high and adverse human health or environmental impacts of its programs and activities on minority and low-income populations. There are no environmental justice issues associated with the proposed project.

Since there is not a building site associated with the New Building Alternative, environmental justice impacts cannot be assessed. The No Action Alternative would not adversely impact any low-income populations, minority groups, or Indian tribes.

4.12 Public and Occupational Health Impacts

In lieu of maps the following description is provided so the reviewer has an understanding of the distance between the facility associated with the Proposed Action to the closest residents, collocated businesses and sensitive receptors. The Propose Action is situated in the St. Leon Industrial Park. Building Sites in the St. Leon Industrial park average approximately 3 acres, the Proposed Action Site is no exception. The Proposed Action site sits on the corner lot bounded by Commerce Circle and Commerce Way, so

that there is not a building site to the west of the Site. There is a business located in the Lot that borders the east side Proposed Action site. The Lot behind the Proposed Action site is currently vacant.

As indicated in Figure 1. Map of St. Leon Industrial Park, there are about ten homes located within a 3/4 mile radius from the Proposed Action site. Some of these homes are in the process of being rezoned to support the expansion of St. Leon Road to four lanes. The property to the south of Commerce Way is currently listed for sale. The property that sits North of Commerce Circle consists of a private residence and horse stable, C&D Stables. The next closest resident is located approximately ¾ of a mile north east of the Proposed Action site along St. Leon road.

The closest school, Rocky Mountain Middle School at 3443 N. Ammon Road is located approximately 3 miles south east of the Proposed Action site.

The largest major hospital, Eastern Idaho Regional Medical Center, is located approximately eight miles south of the Proposed Action site.

Diagrams of the facility and process are provided in Appendix H.

Potable water for the St. Leon Industrial Park is provided by PWS ID7100070 with a well head located very near the Proposed Action site boundary. Because the process associated with the proposed action does not involve the handling of large volumes of water or chemicals that would contaminate ground water the proximity the Proposed Action site to the well head is not considered to impact the St. Leon Industrial Park drinking water supply. A copy of the Saint Leon Industrial Park (PWS 7100070) Source Water Assessment Final Report, Dated April 28, 2003 prepared by the Idaho Department of Environmental Quality is included for review as Appendix K.

4.12.1 Non radiological Impacts

Both the chemical and radiological hazards of uranium are moderate compared to those of other industrial materials and radionuclides. Table 9 compares Threshold Limit Values (TLV) published by ACGIH for uranium and selected other metals. The comparison of TLVs is presented to provide perspective on the need for uranium workplace controls, as compared to other hazardous materials. Since these materials affect the body in different ways, this should not be considered a comparison of relative hazards.

Table 9: Threshold Limit Values for Selected Metals

	Soluble and Insoluble TLV	
Metal	TLV-TWA mg/m^3	TLV-STEL mg/m^3
Uranium	0.2	0.6
Beryllium	0.002	-
Lead	0.05	0.045
Mercury vapor (all forms except alkyl)	0.05	
Arsenic	0.01	

The radiological hazard contributed by the depleted uranium compounds, (UF_4 - Solubility Class W and U_3O_8/UO_2- Solubility Class Y, as high fired oxides) associated with the Proposed Action is more limiting than the chemical toxicity hazard associated

with uranium as a heavy metal. This being the case, the health impact associated with depleted uranium compounds will be discussed in Section 4.12.2, Radiological Impacts.

Public Health Impacts

The potential non-radiological impacts associated with the Proposed Action would result from the release of germanium tetrafluoride gas. Although the Proposed Action would allow for the production of other fluorine gas compounds, these will be in research quantities and would be considered insignificant relative to the quantity of GeF_4 produced.

International Isotopes Inc. with consulting support from Washington Group International, Boise Idaho, worked with Idaho Department of Environmental Quality (DEQ) Air Permitting Division and analyzed the process in order to make a determination regarding the applicability of air permitting based on the risk posed to the public for both non-radiological and radiological air emissions. DEQ has determined that the project is exempt from Permit to Construct (PTC) requirements in accordance with IDAPA 58.01.01.220 and us a Level I toxic exempt source in accordance with IDAPA 58.01.01.223. A copy of the Idaho DEQ Exemption Concurrence No. X-040522 dated November 10, 2004 that supports the conclusion that the Proposed Action will have insignificant non-radiological public health impacts is included in Appendix J.

The process would remain the same with the New Building Alternative and therefore would expect to have the same insignificant non-radiological public health impacts as the Proposed Action. The No Action Alternative would have no impact on non-radiological public health.

Because the process associated with the Proposed Action does not involve liquid discharges, analysis of the non radiological impacts associated with liquid discharges or waterborne contaminates is not warranted.

Occupational Health Impacts

The non-radiological occupational health impacts associated with the Proposed Action process would be consistent with any small manufacturing process that involves chemicals and drum handling. The analytical equipment utilized to support the process will be calibrated with various chemical standards. These are small quantity standards, typically 250 ml to 1 liter in volume and will be maintained in a chemical locker. These standards pose an insignificant risk to the worker and public. Material Safety Data Sheets along with purity certifications will be maintained for each standard as applicable.

There are currently three full time employees associated with the Proposed Action. It is expected that additional employees will be added as demand for the product increases. The most notable risk to occupational health would be that posed by a release of the GeF_4 gas compound within the confines of the facility. GeF_4 gas will be present in the production system. Product transportation cylinders will remain installed in the system until they are transferred to the customer. A release of GeF_4 from the system or product cylinder is highly unlikely. The GeF_4 is produced in a leak tight corrosion resistant system which is totally contained within a fume hood. The product transportation cylinders are manufactured under stringent specifications and hydrostatic testing requirements. Separate toxic gas detectors, calibrated to HF, monitor the fume hood

exhaust and process abatement exhaust for the presence of HF. All potential toxic exhaust is combined into a single exhaust duct which is vented to the environment through a stack. This effluent exhaust is monitored for the presence of toxic gas as well.

Although the system has been designed so that there is minimal exposure to the worker for GeF_4 gas, the following scenario is provided for the purpose of estimated worker exposure to GeF_4 gas. It is assumed that 95% of the GeF_4 gas produced is collected. This assumption is consistent with that used for the air permitting analysis. That leaves 5% of the GeF_4 gas remaining in the system. Assuming backflow prevention valves installed in the system fail, the remaining 5% of the gas is released into the fume hood when the product cylinder or reaction vessel is disconnected. Also assume the fume hood has a removal efficiency of 99%. Therefore 0.05% or 1.01 grams of GeF_4 gas is released into the workspace. Refer to the calculations below:

Assumptions:

Batch size = 7.5 pounds of U

Conversion rate 95% UF_4.

Equivalent amount of UF_4:

(7.5 lb U)(454g/lb)(mole U/238g U)(mole UF_4/mole U)(314g UF_4/mole UF_4)= 4492 g

Amount of UF_4 consumed:

(conversion rate)(mass UF_4) = (0.95)(4492) = 4267.4 g

Amount of GeF_4 produced:

(4267.4g UF_4)(moleUF_4/314g UF_4)(moleUF_4/moleGeF_4)(148.6g GeF_4/mole GeF_4) =2019.5g

Amount of GeF_4 released:

(2019.5g)(0.05)(.01) = 1.01 g

Because there are no exposure limits established for GeF_4 the exposure limits are derived using the exposure limits for HF assuming the GeF_4 gas immediately reacts with the moisture in the air and all the GeF_4 gas is used to produce HF, with a 4 to 1 molar ratio, the GeF_4 exposure limits would be ¼ the HF exposure limits. This being the case the following exposure limits would apply:

- NIOSH TLV-TWA = 0.8 ppm
- NIOSH TLV-STEL (15 minute) = 1.5 ppm
- IDLH = 7.5 ppm.

Refer to Appendix I GeF_4 MSDS.

The concentration of GeF_4 corresponding to the release scenario given above would be 1.45 ppm. This level would be expected for a short duration and is consistent with the TLV-STEL. Adverse affects to the worker would not be expected as a result of short-term exposure to GeF_4 gas at this level. The following assumptions apply:

- Work area dimensions are 19 ft by 17.5 ft by 12 ft high, room volume of 113 m^3

- The GeF_4 gas fills the volume of Room 301, GeF_4 Production Room and remains undiluted even though the north and south walls of Room 301 have 9 ft x 9 ft openings.
- Volume in liters of GeF_4 = nRT/P
- Where n = number of moles
- Where R = 0.0821 atm-L/(K-mol)
- Where T = 293 °K
- Where P = 1 atm.
- And ppm GeF_4 = Volume GeF_4 / Volume Room x 1E6

Mitigative Measures

Both engineering and administrative controls are in place to mitigate the non-radiological public and occupational health impacts associated with the Proposed Action. These controls include:

- Toxic gas monitoring instrumentation is located in exhaust ducting where the potential exists for toxic gases to be present.
- Much of the GeF_4 production system is automated so that the duration the worker must spend in an area where GeF_4 gas may be present is minimized.
- The GeF_4 system and ICP-MS analytical system are housed in fume hoods.

4.12.2 Radiological Impacts

External Radiation Exposure

Uranium isotopes are primarily alpha-emitters and their progeny emit a wide variety of radiations, including alpha and beta particles, as well as more penetrating x rays and gamma rays. Alpha-neutron interactions (and the small cross-section for spontaneous fission) add the potential for neutron exposure.

Beta surface dose rate associated with an equilibrium thickness of depleted uranium in the form of UF_4 and uranium oxide may be as high as 180 mr/hr (1.8 mSv/hr) and 210 mr/hr (2.1 mSv/hr) respectively. However, the shielding provided by the storage container, the contamination containment and the reaction vessel would be sufficient to mitigate this hazard.

The radiological impact to public health resulting from external exposure to beta radiation is considered insignificant.

The radiological impact to occupational health resulting from external exposure to beta radiation is easily mitigated through the use of shielding and will be monitored utilizing extremity dosimeters.

Gamma radiation from uranium is normally not the controlling challenge to radiation protection. For example, the contact beta radiation field from depleted uranium is approximately 200 mrem/h, while the contact gamma radiation field is less than 10 mrem/h. Although gamma radiation fields from uranium are not usually the dominant concern, significant gamma fields can exist in areas where large quantities of uranium are stored. Although beta radiation fields from unshielded uranium tend to present the most intense radiation problem, storage of large quantities of uranium can create widespread, low-level (<5 mrem/h) gamma radiation fields. Such fields can create ALARA challenges--particularly when significant numbers of people must work in adjacent areas. The quantity of uranium associated with the Proposed Action is not sufficient to produce gamma radiation levels that would pose exposure control challenges.

The radiological impact to public health resulting from external exposure to gamma radiation is considered insignificant.

The radiological impact to occupational health resulting from external exposure to gamma radiation is easily mitigated through the use of shielding and administrative controls and will be monitored utilizing whole body dosimeters.

Neutron radiation fields may be present as a result of the α-n reaction with fluorine and oxygen. However in low enrichments and depleted uranium compounds, the neutron radiation is considerably lower than the gamma component and, consequently, is not limiting. The table below summarizes the neutron yields which would be expected from the uranium isotopes associated with the Proposed Action.

Table 9: Neutron Yields for Alpha-Neutron Reactions with Oxides and Fluorides

Isotope	Alpha decay half-life (Years)	Alpha Yield (α/s-g)	Ave. Alpha Energy (MeV)	α,n Yields in Oxides (n/s-g)	α,n Yields in Fluorides (n/s-g)
U-234	2.45×10^{5}	2.3×10^{8}	4.76	3.0	580
U-235	7.04×10^{7}	7.9×10^{4}	4.40	7.1×10^{-4}	0.08
U-238	4.47×10^{9}	1.2×10^{4}	4.19	8.3×10^{-5}	0.028

Using the depleted uranium ratio of: 99.8% U-238, 0.199% U-235 and 0.001% U-234 the expected neutron yield for 900 kg (a single 55 gallon drum) of depleted uranium as an oxide and as a fluoride is 103 n/s and 3.05×10^{4} n/s respectively.

The radiological impact to public health resulting from external exposure to neutron radiation is considered insignificant.

The radiological impact to occupational health resulting from external exposure to neutron radiation will be mitigated through the actions used to limit the external exposure to gamma radiation.

Mitigative Measures External Radiation Exposures

Both engineering and administrative controls are in place to mitigate the external radiological exposure impacts to public and occupational health associated with the Proposed Action. These controls include:

- Work practices are designed to control radiation exposure to levels that are as low as is reasonably achievable (ALARA).
- External exposure concerns are limited to beta and gamma emissions, of which the gamma field is quite low and the beta field may be mitigated using protective clothing including safety glasses with side shields and utilizing shields constructed of materials with low atomic numbers.
- Work which requires the handling of depleted uranium will be governed by radiological work permits.
- Employees working with depleted uranium will be specifically trained in the radiological hazards associated with the material.
- Depleted uranium will be stored and used in controlled areas within the confines of the facility to prevent unauthorized public access.
- Personnel will be monitored with extremity and whole body dosimetry.
- Radiation surveys will be performed on a routine basis in areas where depleted uranium is handled and stored.

Internal Radiation Exposure

Effective contamination control techniques and filtered ventilation systems help reduce airborne radioactive material concentrations and resulting internal doses. Where complete contamination control is not reasonable or becomes compromised, internal exposure of uranium compounds as aerosols or deposited particulates may occur. The effects of uranium exposure on the body depend on the mode of exposure. Internal exposure and its potential effects depend on the route of entry, and its distribution depends on the solubility of the material.

Solubility is complicated by the wide variety of stoichiometric and crystalline uranium compounds. The depleted uranium compounds associated with the Proposed Action are considered insoluble. Inhalation and ingestion are most commonly assessed as routes of entry, inhalation predominating.

Entry of uranium into wounds is also a concern, and its distribution depends on its solubility. This route of entry is not very likely and is not considered. Absorption through intact skin is unlikely.

Inhalation

Inhalation hazards from uranium result primarily from the alpha emissions. Inhalation of uranium particles and deposition into the respiratory system are dependent on particle size. The nasal-pharynx system filters out most large particles that are still small enough to be inhaled. Larger particles can be inhaled--a common convention is to assume inhalation possible for all particles 10-μm or less aerodynamic equivalent diameter (AED)--but most particles that penetrate to the lower respiratory tract are less than 3- or 4-μm AED. Uranium in the lungs has been shown to exhibit a wide range of retention values. Clearance may occur through physical processes removing particles that are not

embedded into the lung by cilia motion to the esophagus. Uranium particles that are soluble in lung fluid are chemically dissolved, and the ions are transported into the bloodstream where they are further distributed. Uranium particles remaining in the lung constitute a potential radiological hazard as they impart their alpha emission energy into the surrounding absorbing tissue, potentially causing significant damage within a small sphere around each particle. A chemical toxicological hazard would exist if uranium particles migrating from the lungs to the bloodstream. The significance of these hazards is evaluated using models of uptake and removal recommended by national and international scientific radiation protection organizations. The lung model described in ICRP Publication 66 (ICRP 1994) uses solubility Types of F (fast), M (moderate), and S (slow). In comparison to previous models, this model better describes deposition, retention, and clearance data and decouples physical and chemical clearance processes.

Ingestion

Appropriate uranium contamination controls should prevent ingestion of uranium. Nevertheless, the potential exits for accidental ingestion of uranium. Particles inhaled through the mouth and temporarily deposited there are removed from the respiratory system to the esophagus. Deposition and removal of ingested uranium are approximated using the Gastrointestinal (GI) Tract Model adapted from Eve (Eve 1966). This model calculates material transferred from the GI tract to the blood based on solubility classes (ICRP 1979 and IAEA 1994) or based on a single value for all compounds, as described in ICRP Publication 69 (ICRP 1995). Distribution of uranium transferred into the bloodstream is calculated using a once-through metabolic model. ICRP Publication 30 also provides values for this distribution and excretion to calculate committed doses and long-term tissue retention. Recent models (Wrenn et al. 1994 and ICRP 1995) have been developed to include recycling of uranium back into the blood.

Mitigative Measures External Radiation Exposures

Both engineering and administrative controls are in place to mitigate the internal radiological exposure impacts to public and occupational health associated with the Proposed Action. These controls include:

- Contamination containment systems with HEPA filtered ventilation will be utilized when handling of depleted uranium outside of transportation and storage containers is required.
- Continuous air monitoring for uranium particulate will be performed in the powder handling room.
- Air samples and contamination surveys will be performed in areas where the potential for airborne uranium particles or uranium contamination exists.
- Ultra efficient filters are installed in the GeF_4 production system to prevent carryover of uranium particles into the product stream.
- Analytical equipment capable of extremely low detection limits for isotopic uranium (parts per trillion range) will be used to verify the effectiveness of filters to maintain the product stream free of uranium contaminates.

- Routine bioassay program meeting the requirements of ANSI/HPS N13.22-1995, Bioassay Programs for Uranium will be in place to monitor employees routinely working with depleted uranium compounds.

4.12.2.1 Pathway Assessment

Because there are no radioactive liquid effluents associated with the Proposed Action and the depleted uranium compounds utilized and generated by the Proposed Action are chemically characterized as insoluble, exposure pathway assessments pertaining to the contamination of the food (locally derived meat, dairy and produce) and water supply is not applicable.

The following exposure pathways have been assessed:

- Public exposure resulting from uranium particulate carryover in the GeF_4 process exhaust disregarding process abatement.
- Accidental internal exposure resulting from a single intake resulting from a free fall of UF_4 powder from 1 meter.
- Occupational internal exposure associated with normal operations.

Exposure estimates associated with the aforementioned pathways are provided in Section 4.12.2.2 below.

4.12.2.2 Public and Occupational Exposure

Public Exposure

The dose to the maximumly exposed individual resulting from the Proposed Action was estimated as **2.8×10^{-2} mrem/year** using the US Environmental Protection Agency COMPLY Code –V1.6 at a compliance Level 2. The following assumptions where used:

- 6000 kg of UF_4 processed per year.
- Source Term calculated as: Source Term = MAR x DR x ARF x RF x LPF
  Where: ARF = Airborne Release Fraction = 1.1E-4

  RF = Respirable Fraction = 1.0E-3

  DR = Damage Ratio (maximum 1.0)

  LPF = Leakpath Factor (maximum = 1.0)

  MAR = Material at Risk = 20.1 Ci U-238, 0.26 Ci U-235 and 3.7 Ci U-234 per year..
- Building Height = 6 meters
- Release Height = 7 meters
- Building Width = 30 meters
- Default mean wind speed used (2.0 m/s)
- Distance from Source = 100 meters

- ARF and RF obtained from DOE Handbook 3010-94, Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities, Volume I – Analysis of Experimental Data.

Impact to Public health resulting form a dose of $2.8x10^{-2}$ mrem/year is considered insignificant.

Occupational Exposure

The exposure anticipated from internally deposited radioactivity during normal operations associated with transferring 6.8 kg of depleted uranium into and then out of the reaction vessel every day for a working year without considering the use of engineering controls was calculated to be **625 mrem** for the year. This assumes that the worker is exposed to airborne activity levels of 2.22 DAC for 1 hour per day.

- Airborne Radioactivity level = (MAR x DR x ARF x RF x LPF)/volume
  Where: ARF = Airborne Release Fraction = 4.0E-5

  RF = Respirable Fraction = 0.83

  DR = Damage Ratio (maximum 1.0)

  LPF = Leakpath Factor (maximum = 1.0)

  MAR = Material at Risk = 2.3 mCi U-238, 0.03 mCi U-235 and 0.04 mCi U-234.
- Room Volume = 136 m^3
- DAC value for UF_4 and uranium oxide = $3.00x10^{-10}$ uCi/ml.

ARF and RF obtained from DOE Handbook 3010-94, Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities, Volume I – Analysis of Experimental Data.

The committed effective dose equivalent to a hypothetical worker resulting from an accidental internal exposure resulting from the free fall of 900 kg of depleted uranium from a height of 1 meter was calculated as **212 mrem** using the Radiological Safety Analysis Computer Program (RSAC-6), Revision 6.2. The following assumptions where used:

- Source Term calculated as: Source Term = MAR x DR x ARF x RF x LPF
  Where: ARF = Airborne Release Fraction = 4.0E-5

  RF = Respirable Fraction = 0.83

  DR = Damage Ratio (maximum 1.0)

  LPF = Leakpath Factor (maximum = 1.0)

  MAR = Material at Risk = 0.3 Ci U-238, 0.004 Ci U-235 and 0.06 Ci U-234.
- Room Volume = 136 m^3
- Breathing rate = $3.33X10^{-4}$ m^3/sec

- Time receptor remains in the room following the spill is 60 seconds.
- ARF and RF obtained from DOE Handbook 3010-94, Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities, Volume I – Analysis of Experimental Data.

The radiological impact on occupational dose to the worker associated with normal operations and under a accident scenario is considered to be acceptable when compared with the regulatory dose limits and conservative assumptions used in determining the dose.

4.13 Solid Waste Management Impacts

The Proposed Action would generate negligible additional solid waste (paper products, kitchen, and janitorial waste). Waste is collected by a local private waste hauling company and disposed of at the Bonneville County Landfill.

Also, the facility will increase the receipt of excess uranium tetrafluoride, which will be converted to uranium oxide. The market for uranium oxide is small and so it is likely the majority will be shipped offsite for disposal at a commercial waste disposal facility (such as Envirocare in Utah or U.S. Ecology in Richland Washington). Conversion of the material from uranium tetrafluoride to uranium oxide stabilizes the waste material by reducing its reactivity. Offsite shipments are anticipated to be approximately one truckload every month, which will have minimal impacts on area transportation.

The New Building Alternative would generate the same volumes of waste during operation as the Proposed Action. However, new construction requires using more building materials, there would be more associated construction waste; due to the size of the project, the impacts would be minimal. The No Action Alternative would have a minimal negative impact to solid waste management in that the depleted uranium tetrafluoride would not be converted to an oxide which is inherently a more stable waste form.

5.0 MITIGATION MEASURES

Under the Proposed Action, activities will occur within an existing facility utilizing an existing system. As discussed in Chapter 4.0 of this ER, the Proposed Action would not result in any significant adverse environmental impacts. Mitigative measures associated with the Proposed Action have been discussed in Section 4.12.

6.0 ENVIRONMETNAL MEASUREMENTS AND MONITORING PROGRAMS

6.1 Radiological Monitoring

The Proposed Action does not warrant environmental radiological monitoring. However, radiological monitoring will be performed within the confines of the facility. Continuous air monitoring for uranium particulate will be performed in the powder handling utilizing an Eberline Alpha 7A Continuous Air Monitor – This continuous air monitor with radial entry head will continuously monitor the ambient air in areas where uncontained depleted uranium is handled. In addition to continuous air monitoring, air samples will be obtained within the facility during maintenance activities and operations that may have the potential to generate airborne radioactivity. Air samples will be analyzed for gross alpha and beta activity using a Ludlum Model 3030 dual channel counter with shielded

scintillation detector designed for simultaneous alpha and beta sample measurements. Alpha spectroscopy measurements utilizing an Ortec SOLOIST – Single Chamber Alpha Spectroscopy System with 1200 mm^2 low background detector is available to complement the gross alpha analysis. It should be noted that the instruments identified above are currently in use at the facility. International Isotopes Inc may replace these instruments with equivalent or superior instrumentation as necessary.

It should be noted that continuous air monitoring of the fluorine gas stream is not performed. The fluorine gas stream would be the only gas stream that would be exhausted to the environment. Real time monitoring of the fluorine gas stream for radioactivity is not practicable due to the corrosive characteristics of the fluorine gas. Based on calculations and tests from pilot scale operations, uranium in concentrations that would exceed the values listed in Table 2, *Effluent Concentrations* of Appendix B of Title 10 Code of Federal Regulations Part 20 is not expected to be present in the fluorine gas stream. I^3 will sample the fluorine gas product using Inductively Coupled Plasma – Mass Spectroscopy (ICP-MS) to verify the absence of uranium.

Ambient radiation level monitoring outside of the facility utilizing fixed instrumentation or dosimetry is not warranted based on the radiological characteristics associated with depleted uranium.

6.2 Physiochemical Monitoring

The Proposed Action does not warrant physiochemical monitoring.

6.3 Ecological Monitoring

The Proposed Action does not warrant ecological monitoring.

7.0 COST BENEFIT ANALYSIS

No Action Alternative: The cost to construct the GeF_4 production system was approximately $700,000. The time necessary to recoup those costs continuing to operated under the general license restrictions of §40.22 would be approximately 10 years. This is not an acceptable option.

The New Building alternative would require the construction of a new facility. Because a new building site has not been identified it will be assumed that a new facility could be constructed at a cost very close to the cost of the current facility. The difference then in the cost between the New Building Alternative and the Proposed Action would be the cost to relocate the GeF_4 production equipment, the cost associated with releasing the 1359 Commerce Way Facility for unrestricted use and the additional overhead cost associated with the separation of the two International Isotopes Inc. facilities. Based on the assumptions utilized in the decommissioning funding plan the cost associated with releasing the 1359 Commerce Way Facility for unrestricted use would be $55,500. This assumes all activities with the exception of radioactive waste disposal would be required. The cost of relocating and reinstalling the GeF_4 production equipment is estimated at $15,000. The bulk of this cost being the labor associated with reinstalling the equipment. It is difficult to estimate the cost associated with the separation of the two facilities. It would be appropriate to assume that at a minimum an additional full time administrative employee would be needed for the New Building Alternative. A low estimate for this cost is assumed to be $30,000. A minimum of $100,000 would be a reasonable estimate in the

additional capital costs associated with the New Building Alternative. Environmental Impact costs associated with the New Building Alternative have been addressed throughout Section 4.0 of this ER.

The Proposed Action utilizes an existing facility and equipment and would result in a more rapid recovery of the capital invested into the GeF_4 production facility when compared to the No Action Alternative which would continue to produce GeF_4 under the General License provision of §40.22. Because the Environmental Impacts associated with all of the alternatives, including the Proposed Action, are minimal, insignificant or nonexistent, capital advantage of the Proposed Action over the alternatives was the primary consideration in selecting the proposed action.

8.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The Proposed Action (granting a license to I^3 to increase uranium storage and use at the existing facility and therefore increasing germanium fluoride production) would have no significant environmental impacts. Administrative and Engineered controls preclude release of uranium and analysis of even improbable release scenarios predicts public exposure to radiation will be less than 0.01% of the limits in 10 CFR Part 20.

By utilizing an existing building, environmental impacts would be less than if a New Building Alternative were selected and constructed. This action would provide the semiconductor industry with more germanium fluoride in a cost-effective manner. The proposed increased production would comply with all state environmental regulations.

On the basis of this Environmental Report, we have concluded that there are no significant environmental impacts and the license does not warrant the preparation of an Environmental Impact Statement. Accordingly, we have determined that a Finding of No Significant Impact is appropriate.

9.0 REFERENCES

Idaho Department of Fish and Game, 2004. Special Status Species in Bonneville County.

http://fishgame.idaho.gov/tech/CDC/animals/animals_by_county.cfm

http://fishgame.idaho.gov/tech/cdc/county_spp_lists/bonneville_animals.cfm

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U.S. Department of Commerce, Census Bureau, 2004. Census Bureau Facts for Area.
http://quickfacts.census.gov/qfd/states/16000.html

http://quickfacts.census.gov/qfd/states/16/16019.html

http://factfinder.census.gov/servlet/GCTTable?_bm=n&_lang=en&mt_name=DEC_2000_PL_U_GCTPL_ST7&format=ST-7&_box_head_nbr=GCT-PL&ds_name=DEC_2000_PL_U&geo_id=04000US16

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Special Status Species in Bonneville County. http://idahoes.fws.gov/county/bonneville.htm

U.S. Department of Interior, Fish and Wildlife Service, 2004.
National Wetlands Inventory Map. http://wetlandsfws.er.usgs.gov/wtlnds/viewer.htm

U.S. Nuclear Regulatory Commission, 2003., Final Report, NUREG-1748.
Environmental Review Guidance for Licensing Actions Associated with NMSS Programs

Idaho Department of Environmental Quality, August 25, 2004,
Idaho Falls Sub-basin Assessment and Total Maximum Daily Load

Idaho Department of Health and Welfare, 2004,
Idaho Vital Statistics 2002 Annual Report

Cancer Data Registry in Idaho, April 2004,
Cancer in Idaho- 2002

USGS Groundwater Atlas of the United States, Idaho, Oregon, Washington HA-730, 1994
http://capp.water.usgs.gov/gwa/ch_h/index.html

US Department of Energy, *Guide of Good Practice for Occupational Radiological Protection in Uranium Facilities*, August 2000.

10.0 LIST OF PREPARERS

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Washington Group International
720 Park Boulevard
Boise, ID 83712

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Fax: 208.386.7146
Email: steve.cory@wgint.com

Mr. John Miller, CHP
Radiation Safety Officer
International Isotopes Inc
4137 Commerce Circle
Idaho Falls, ID 83401

Phone: 208.524.5300
Fax: 208.386.7146
Email: jjmiller@intisoid.com

Appendix A

Agency Contact Records

Subject: Significance of Land Use

Who: Steve Serr
With: Bonneville County Planning and Zoning
How: By Phone (208-529-1380, ext.1386)
When: Friday September 17, 2004 4:00 PM

Mr. Serr and Steve Cory of Washington Group International discussed the planned activity. Mr. Serr checked the zoning designation for the property and stated that it was IM-1 (manufacturing). He believed the planned activity was consistent with the zoning designation so the planned activity would have no significant impact on the Bonneville County land use.

Subject: Significance of solid waste stream

Who: Kevin Eckersell
With: Bonneville County Public Works
How: By Phone (208-589-7002)
When: Monday September 20, 2004 11:00 AM

Mr. Eckersell and Steve Cory discussed the planned activity and in particular the expected solid waste generation. Mr. Eckersell stated that the proposed office waste generation rate had no significant impact on the Bonneville County landfill.

Subject: Significance of Power usage

Who: Vance Witbeck
With: Utah Power
How: By Phone (888) 221-7070
When: Monday September 20, 2004

Mr. Witbeck and Steve Cory discussed the planned activity and in particular the expected electricity. Mr. Witbeck stated that the proposed electricity usage rate had no significant impact on Utah Power.

Subject: Endangered Species

Who: Gary Vecellio
With: Idaho State Fish and Game
How: By Phone (208 525-7290)
When: Tuesday September 20, 2004

Mr. Vecellio said it was unlikely installation of a process in an existing building in an existing industrial park would affect wildlife but a routine review can be initiated on request. Confirmatory letter attached. This assessment was also confirmed with US Fish and Wildlife Service. Both letters are attached.

Subject: Adequacy of Septic Tank System

Who: Nathan Taylor
With: District Seven Idaho State Health Department
How: By Phone (208-523-5382)
When: Tuesday September 21, 2004, 10:00 AM

Mr. Taylor retrieved from Department files the permit for the septic tank system for 1359 Commerce Way. He reported that the system was properly permitted and sized to receive 500 gallons per day (the equivalent of 25 persons).

Subject: Impact to cultural or historical sites

Who: Susie Neitzel
With: Idaho State Historical Preservation Office
How: By Phone (208-334-3961)
When: Tuesday September 21, 2004

Ms. Nietzel and Steve Cory discussed the planned activity and in particular the use of an existing building in an existing industrial park. Ms. Nietzel stated that the Proposed Activity would have no significant impact on cultural or historical activities. Confirmatory letter attached.

Subject: Impact to farmland

Who: Dennis Hadley
With: East Side Soil and Water Conservation District/West Side Soil and Water Conservation District
How: By Phone (208-522-6250, x-108)
When: Monday September 27, 2004

Mr. Hadley and Steve Cory discussed the planned activity and in particular the use of an existing building in an existing industrial park. Mr. Hadley stated that the Proposed Activity would have no significant impact on farmland.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

EASTERN IDAHO FIELD OFFICE - ES
4425 BURLEY DR., SUITE A
CHUBBUCK, IDAHO 83202
Telephone (208) 237-6975 Fax Number (208) 237-8213

TAKE PRIDE IN AMERICA

Steve Cory
Washington Group International
P.O. Box 73
Boise, Idaho 83729

SEP 24 2004

Subject: Proposed Construction of the St. Leon Industrial Park in Idaho Falls, Bonneville, County, Idaho Species List SP# 1-4-04-SP-0324

Dear Mr. Cory:

The U.S. Fish and Wildlife Service (Service) is writing in response to your request for information about the potential impacts to endangered species from the proposed construction of St. Leon Industrial Park in Idaho Falls, Bonneville County, Idaho. It is our preliminary determination that given the general nature of the proposal, the project is unlikely to adversely impact any species listed under the Endangered Species Act of 1973, as amended. If you determine otherwise or require further assistance, please contact Deb Mignogno of this office at (208) 237-6975. Thank you for your interest in endangered species conservation.

Sincerely,

Deb Mignogno
Supervisor, Eastern Idaho Field Office

IDAHO STATE HISTORICAL SOCIETY

Our mission: to educate through the identification, preservation, and interpretation of Idaho's cultural heritage.

Dirk Kempthorne
Governor of Idaho

Steve Guerber
Executive Director

Administration
1109 Main Street, Suite 250
Boise, Idaho 83702-5642
Office: (208) 334-2682
Fax: (208) 334-2774

Archaeological Survey
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3847
Fax: (208) 334-2775

Capitol Education Center
Statehouse/P.O. Box 83720
Boise, Idaho 83720-0001
Office: (208) 334-5174

Historical Museum and Education Programs
610 North Julia Davis Drive
Boise, Idaho 83702-7695
Office: (208) 334-2120
Fax: (208) 334-4059

Historic Preservation Office
210 Main Street
Boise, Idaho 83702-7264
Office: (208) 334-3861
Fax: (208) 334-2775

Historic Sites Office
2445 Old Penitentiary Road
Boise, Idaho 83712-8254
Office: (208) 334-2844
Fax: (208) 334-3225

Library/Historical and Genealogical Collection
450 North Fourth Street
Boise, Idaho 83702-6027
Office: (208) 334-3356
Fax: (208) 334-3198

Oral History
450 North Fourth Street
Boise, Idaho 83702-6027
Office: (208) 334-3863
Fax: (208) 334-3198

Membership and Outreach and Development
1109 Main Street, Suite 250
Boise, Idaho 83702-5642
Office: (208) 334-3986
Fax: (208) 334-2774

Publications
450 North Fourth Street
Boise, Idaho 83702-6027
Office: (208) 334-3428
Fax: (208) 334-3198

State Archives/Manuscripts
2205 Old Penitentiary Road
Boise, Idaho 83712-8250
Office: (208) 334-2620
Fax: (208) 334-2626

DATE: September 24, 2004
TO: Steve Cory, Washington Group International
FEDERAL AGENCY: Misc. (NRC)
PROJECT NAME: International Isotopes Idaho Inc., 1359 Commerce Way, Idaho Falls

Section 106 Evaluation

	The field work and documentation presented in this report meet the Secretary of the Interior's Standards.
X	No additional investigations are recommended; project can proceed as planned.
	Additional information is required to complete the project review. (See comments.)
	Additional investigations are recommended. (See comments.)

Identification of Historic Properties (36 CFR 800.4):

X	No historic properties were identified within the project area.
X	Property is not eligible. Reason: Less than fifty years old.
	Property is listed in National Register of Historic Places.
	Property is eligible for listing in the National Register of Historic Places. Criterion: A B C D Context for evaluation:
X	*No historic properties* will be affected within project area.

Assessment of Adverse Effects (36 CFR 800.5):

	Project will have *no adverse effect* on historic properties.
	Project will have an *adverse effect* on historic properties; further consultation is recommended.

If you have any questions, feel free to contact Suzi Neitzel at 208-334-3847.
Comments:

Susan Pengilly Neitzel

Susan Pengilly Neitzel, Deputy SHPO
State Historic Preservation Office

September 24, 2004
Date

The Idaho State Historical Society is an Equal Opportunity Employer.

IDAHO FISH & GAME

Upper Snake Region
4279 Commerce Circle
Idaho Falls, Idaho 83401

6 October 2004

Dirk Kempthorne / Governor
Steven Huffaker / Director

Steve Cory
Environmental Engineer
Washington Group International
720 Park Blvd.
PO Box 73
Boise ID 83729

Re: International Isotopes Idaho Incorporated process equipment installation

Dear Mr Cory:

Idaho Department of Fish and Game (IDFG) staff has reviewed the above referenced proposal letter. We understand the project includes installation of processing equipment used in the silicon chip industry to convert uranium fluoride to uranium oxide. The letter goes on to state that "the proposed action is...at the [existing] facility.... [and] all activities will take place inside the existing building.

Thank you for the additional information pertaining to site location, and current conditions. As long as all construction and materials storage/disposal occur within the existing facility, IDFG staff is not aware of any potential negative impacts to fisheries or wildlife resources within the project area.

Thank you for the opportunity to provide comment. If you have further questions please contact Gary Vecellio, Environmental Staff Biologist, at 525-7290.

Sincerely,

R. J. Saban
Regional Supervisor

RJS:gmv

Appendix B

Threatened and Endangered Species in Bonneville County

US FISH AND WILDLIFE SERVICE
BONNEVILLE COUNTY, IDAHO
SPECIES LIST

LISTED SPECIES	COMMENTS
Gray wolf *(Canis lupus)*	XN - Experimental/Non-essential population
Canada lynx *(Lynx canadensis)*	LT
Bald eagle *(Haliaeetus leucocephalus)*	LT - Wintering/Nesting area
Ute ladies'-tresses *(Spiranthes diluvialis)*	LT
Utah valvata snail *(Valvata utahensis)*	LE
PROPOSED SPECIES	
None	
CANDIDATE SPECIES	
Yellow-billed cuckoo *(Coccyzus americanus)*	C

LE - Listed endangered
LT - Listed threatened
XN - Experimental/non-essential population
C - Candidate

IDAHO FISH AND GAME, BONNEVILLE COUNTY, IDAHO
SPECIAL STATUS SPECIES LIST

Vertebrates

Bufo Boreas	Western Toad
Rana Pipiens	Northern Leopard Frog
Podiceps Nigricollis	Eared Grebe
Aechmophorus	Occidentalis Western Grebe
Plegadis Chihi	White-Faced Ibis
Cygnus Buccinator	Trumpeter Swan
Histrionicus Histrionicus	Harlequin Duck
Bucephala Clangula	Common Goldeneye
Bucephala Islandica	Barrow's Goldeneye
Haliaeetus Leucocephalus	Bald Eagle
Accipiter Gentilis	Northern Goshawk
Buteo Regalis	Ferruginous Hawk
Falco Peregrinus Anatum	Peregrine Falcon
Tympanuchus Phasianellus Columbianus	Columbian Sharp-Tailed Grouse
Grus Americana	Whooping Crane
Numenius Americanus	Long-Billed Curlew
Larus Pipixcan	Franklin's Gull
Sterna Forsteri	Forster's Tern
Chlidonias Niger	Black Tern
Otus Flammeolus	Flammulated Owl
Strix Nebulosa	Great Gray Owl
Calamospiza Melanocorys	Lark Bunting
Quiscalus Quiscula	Common Grackle
Myotis Yumanensis	Yuma Myotis
Myotis Evotis	Long-Eared Myotis
Myotis Volans	Long-Legged Myotis
Myotis Ciliolabrum	Western Small-Footed Myotis
Corynorhinus Townsendii	Townsend's Big-Eared Bat
Tamias Umbrinus	Uinta Chipmunk
Gulo Gulo Luscus	North American Wolverine
Lynx Canadensis	Lynx

Invertebrates

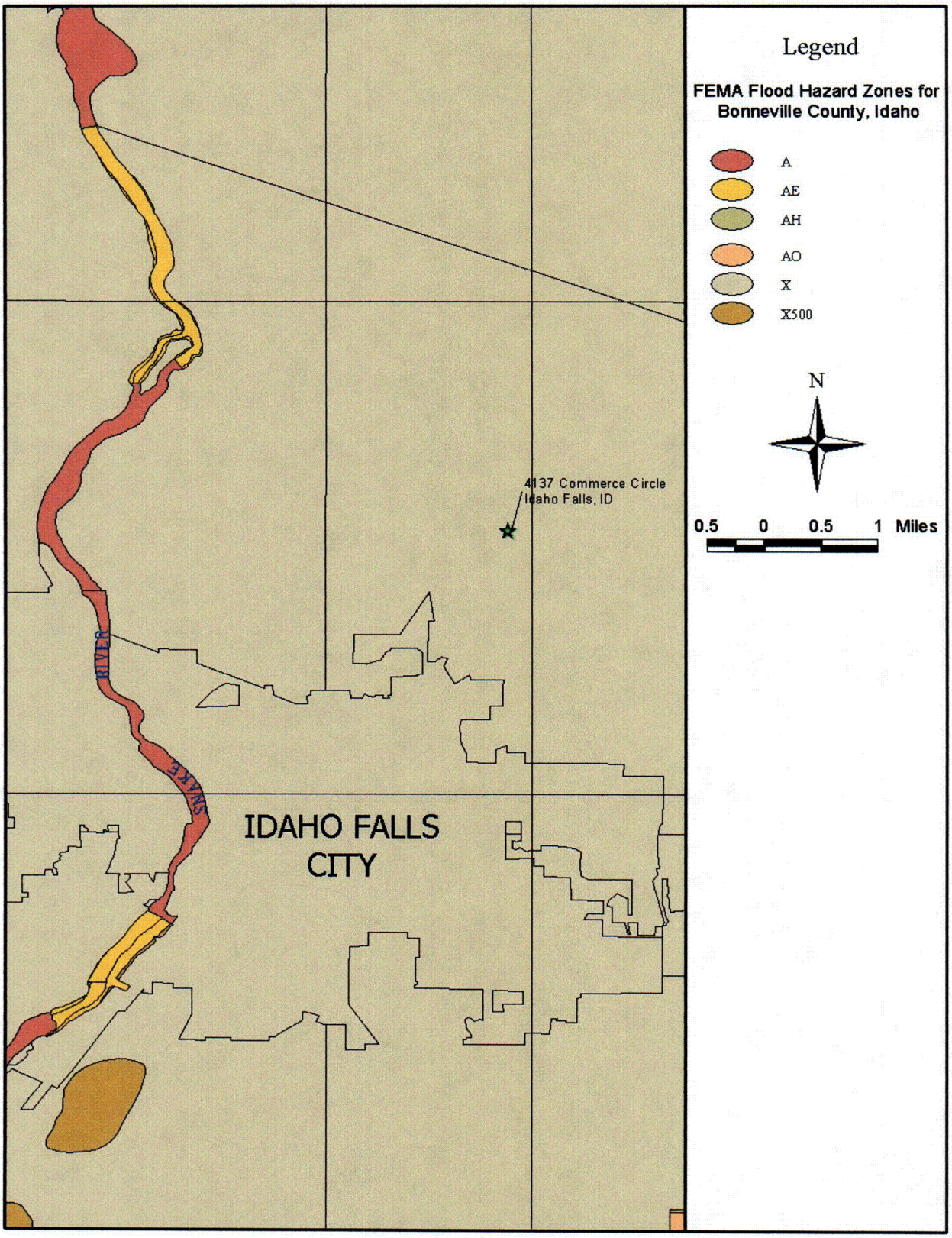
Cicindela Arenicola	Idaho Dunes Tiger Beetle

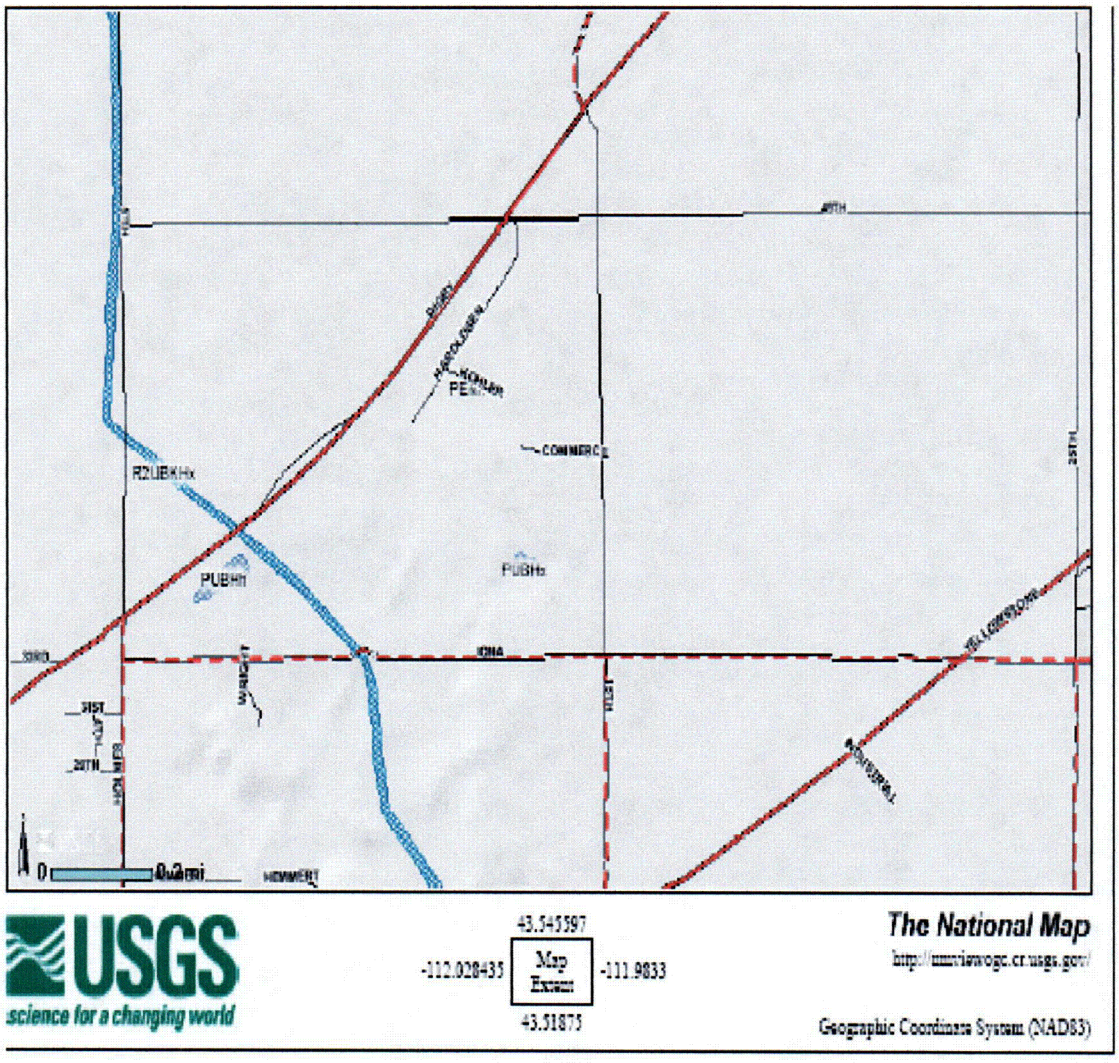
Plants

Asplenium Trichomanes-Ramosum	Green Spleenwort
Astragalus Paysonii	Payson's Milkvetch
Carex Occidentalis	Western Sedge
Lesquerella Paysonii	Payson's Bladderpod
Salix Glauca	Gray Willow
Spiranthes Diluvialis	Ute Ladies' Tresses

Appendix C

Federal Emergency Management Agency and National Wetland Inventory Maps


Legend
FEMA Flood Hazard Zones for Bonneville County, Idaho
A
AE
AH
AO
X
X500
N
0.5 0 0.5 1 Miles
4137 Commerce Circle
Idaho Falls, ID
SNAKE RIVER
IDAHO FALLS CITY


USGS
science for a changing world
43.545597
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Map Extent
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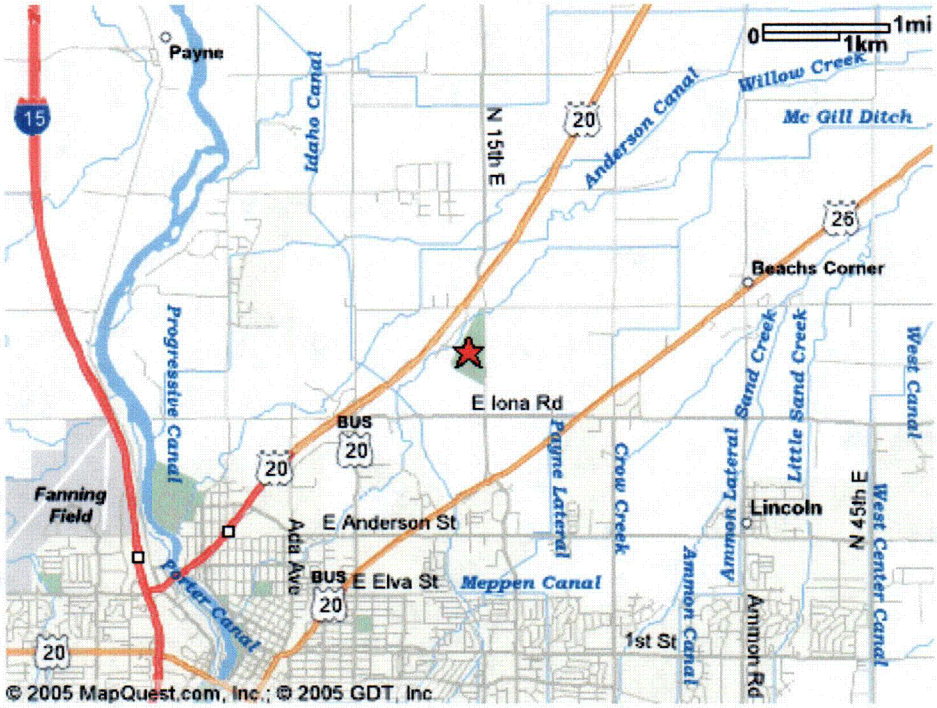
43.51875
The National Map
http://nmviewogc.cr.usgs.gov/
Geographic Coordinate System (NAD83)

C05

Appendix D

Area Maps

The St. Leon Industrial Park is indicated by the red star.



Appendix E

US Census Bureau Statistics

People QuickFacts	Bonneville County	Idaho	USA
Population, 2003 estimate	87,007	1,366,332	290,809,777
Population, percent change, April 1, 2000 to July 1, 2003	5.4%	5.6%	3.3%
Population, 2000	82,522	1,293,953	281,421,906
Population, percent change, 1990 to 2000	14.3%	28.5%	13.1%
Persons under 5 years old, percent, 2000	8.2%	7.5%	6.8%
Persons under 18 years old, percent, 2000	32.1%	28.5%	25.7%
Persons 65 years old and over, percent, 2000	10.2%	11.3%	12.4%
Female persons, percent, 2000	50.1%	49.9%	50.9%
White persons, percent, 2000 (a)	92.8%	91.0%	75.1%
Black or African American persons, percent, 2000 (a)	0.5%	0.4%	12.3%
American Indian and Alaska Native persons, percent, 2000 (a)	0.6%	1.4%	0.9%
Asian persons, percent, 2000 (a)	0.8%	0.9%	3.6%
Native Hawaiian and Other Pacific Islander, percent, 2000 (a)	0.1%	0.1%	0.1%
Persons reporting some other race, percent, 2000 (a)	3.7%	4.2%	5.5%
Persons reporting two or more races, percent, 2000	1.5%	2.0%	2.4%
Persons of Hispanic or Latino origin, percent, 2000 (b)	6.9%	7.9%	12.5%
White persons, not of Hispanic/Latino origin, percent, 2000	90.2%	88.0%	69.1%
Living in same house in 1995 and 2000', pct age 5+, 2000	53.0%	49.6%	54.1%
Foreign born persons, percent, 2000	3.9%	5.0%	11.1%
Language other than English spoken at home, pct age 5+, 2000	7.9%	9.3%	17.9%
High school graduates, percent of persons age 25+, 2000	87.8%	84.7%	80.4%
Bachelor's degree or higher, pct of persons age 25+, 2000	26.1%	21.7%	24.4%
Persons with a disability, age 5+, 2000	11,835	200,498	49,746,248
Mean travel time to work (minutes), workers age 16+, 2000	19.6	20	25.5
Housing units, 2002	31,795	552,117	119,302,132
Homeownership rate, 2000	74.7%	72.4%	66.2%
Housing units in multi-unit structures, percent, 2000	18.1%	14.4%	26.4%
Median value of owner-occupied housing units, 2000	$93,500	$106,300	$119,600
Households, 2000	28,753	469,645	105,480,101
Persons per household, 2000	2.83	2.69	2.59
Median household income, 1999	$41,805	$37,572	$41,994
Per capita money income, 1999	$18,326	$17,841	$21,587
Persons below poverty, percent, 1999	10.1%	11.8%	12.4%

(footnotes defined at bottom of next page)

Business QuickFacts	Bonneville County	Idaho	USA
Private nonfarm establishments with paid employees, 2001	2,661	37,622	7,095,302
Private nonfarm employment, 2001	37,947	467,316	115,061,184
Private nonfarm employment, percent change 2000-2001	Z	3.7%	0.9%
Nonemployer establishments, 2000	5,374	84,378	16,529,955
Manufacturers shipments, 1997 ($1000)	267,920	16,952,872	3,842,061,405
Retail sales, 1997 ($1000)	933,394	11,649,609	2,460,886,012
Retail sales per capita, 1997	$11,664	$9,623	$9,190
Minority-owned firms, percent of total, 1997	2.9%	4.7%	14.6%
Women-owned firms, percent of total, 1997	20.1%	23.5%	26.0%
Housing units authorized by building permits, 2002	801	13,488	1,747,678
Federal funds and grants, 2002 ($1000)	1,168,257	8,377,844	1,901,247,889
Geography QuickFacts	Bonneville County	Idaho	USA
Land area, 2000 (square miles)	1,868	82,747	3,537,438
Persons per square mile, 2000	44.2	15.6	79.6
Metropolitan Area	None		
FIPS Code	19	16	

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.
FN: Footnote on this item for this area in place of data
NA: Not available
D: Suppressed to avoid disclosure of confidential information
X: Not applicable
S: Suppressed; does not meet publication standards
Z: Value greater than zero but less than half unit of measure shown
F: Fewer than 100 firms
Source: US Census Bureau State & County QuickFacts

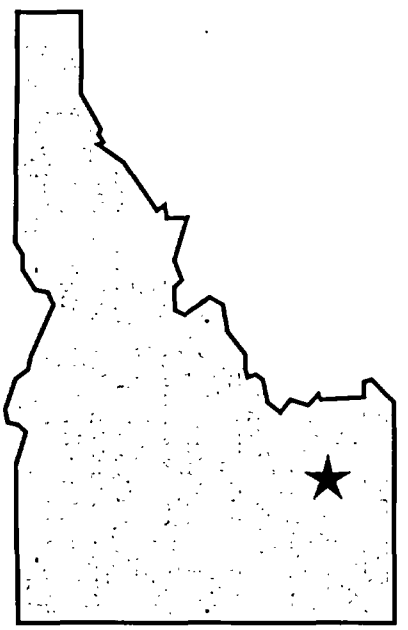
Geographic area	Total population	Race								Hispanic or Latino(of any race)
		One race							Two or more races	
		Total	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race		
Idaho	1,293,953	1,268,344	1,177,304	5,456	17,645	11,889	1,308	54,742	25,609	101,690
COUNTY										
Bannock County	75,565	74,069	68,987	446	2,198	748	122	1,568	1,496	3,540
PLACE										
Idaho Falls city, Bonneville County	50,730	49,914	46,717	315	385	533	32	1,932	816	3,641
Iona city, Bonneville County	1,201	1,196	1,182	1	2	1	0	10	5	35

Appendix F

Idaho Falls Community Profile

IDAHO COMMUNITY PROFILES

IDAHO FALLS



Bonneville County

POPULATION

	1970	1980	1990	2002
CITY	35,776	39,739	43,973	51,096
	1970	1980	1990	2002
COUNTY	52,457	65,980	72,207	83,807

COMMUNITY AGE GROUPS

	1970	1980	1990	2000
Under 5 years	3,879	4,043	4,005	4,164
5 to 19 years	11,624	10,556	11,359	12,707
20 to 44 years	11,683	14,792	16,598	17,626
45 to 64 years	6,246	6,904	7,458	10,590
65+ years	2,344	1,803	4,509	5,643
Median age	24.3	27.0	29.9	32.3

COMMUNITY GOVERNMENT REVENUE

Typical Property Tax Rate	2.2594670 %
Total Net Market Value 2001	1,744,859,485

COUNTY LABOR FORCE DATA

Nonfarm Employment	2000
Total Nonfarm Employment	39,482
Food Products	459
Lumber & Wood Products	44
Chemicals	291
Metals	149
Machinery (exc. elect)	240
Electronics & Elec. Equip.	47
Other Manufacturing	1,086
Construction	2,731
Mining	22
Trans/Comm/Util	1,793
Wholesale & Retail Trade	12,617
Finance, Insur. & Real Est.	1,391
Services & Misc.	13,272
Government	5,341

Civilian Labor Force	2000	2001
Total Labor Force	46,478	47,563
Total Employment	44,921	45,977
Total Unemployed	1,558	1,585
Percent Unemployed	3.4 %	3.3 %
Farm Employment	1,203	1,206

* -- indicates no employment or suppressed data

IDAHO Works

Idaho Department of Commerce
P.O. Box 83720, Boise, ID 83720-0093
(208) 334-2470
http://www.idahoworks.com

International Isotopes Inc.

(Including International Isotopes Idaho Inc. subsidiary)

MSDS for: Germanium Tetrafluoride (GeF_4)

Section 1. Chemical Product and Company Identification

Product Name:	INIS-HPGeF4	Trade Name:	Germanium Tetrafluoride
Chemical Name:	Germanium Tetrafluoride	Synonyms:	Germanium fluoride, Tetrafluorogermane
Formula:	GeF_4	Chemical Species:	Inorganic fluoride
Routine Telephone:	800-699-3108 208-524-1723*	Company Information:	International Isotopes Inc. 1359 Commerce Way Idaho Falls, ID 83401
Emergency Telephone:	800-424-9300	Web Page:	http://www.intisoid.com/
(CHEMTREC)	703-527-3887*		
	* Outside the Untied States		

Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information contact your supplier, or International Isotopes Inc. Fluorine Products Division.

Section 2. Composition/Information on Ingredients

Ingredient Name	CAS Number	Percentage	OSHA PEL	ACGIH TLV
Germanium Tetrafluoride	7783-58-6	≥99.999%	Not Established	Not Established

Section 3. Hazards Identification

DANGER!! Toxic, corrosive compressed gas.
Harmful if inhaled. Can cause eye skin and respiratory tract burns.
Self-contained breathing apparatus must be worn by emergency response workers.

Exposure Limits: None currently established. International Isotopes Inc. recommends using limits established for hydrogen fluoride, formed through the hydrolysis of GeF_4. Concentrations listed below are for GeF_4.

OSHA PEL = 0.8 ppm **NIOSH REL** = 0.8 ppm TWA (1.5 ppm ceiling) **IDLH** = 7.5 ppm

Conversion: 1 ppm = 6.15 mg/m^3 (GeF_4) at 1 atm and 21.1 °C.

GeF_4 is a colorless gas with a pungent garlic-like odor. It fumes to form a dense white cloud in moist air. The intermediate health hazard is that it is a poisonous gas. It reacts with water vapor in the air to form other corrosive and toxic substances, primarily hydrogen fluoride (HF).

Routes of Entry: Inhalation, skin, eye, and mucous membrane contact.

Target Organs: Lungs, kidney, liver, blood, bones and teeth.

Emergency contact CHEMTREC 1-800-424-9300 (703-527-3887 outside US)

COUNTY INCOME/PAYROLL (In Dollars)

	1969	1979	1989	1999
Median Household Income	9,708	18,167	30,462	41,805
	1969	1979	1989	2001
Per Capita Income	3,429	8,353	16,067	24,806
Personal Income Total (000)	177,794	548,142	1,145,503	2,080,201
	1969	1979	1989	2001
Avg. Monthly Wage	580	996	1,588	2,258
Annual Payroll (000)	102,679	277,347	518,437	1,094,660

LARGEST EMPLOYERS/MANUFACTURERS

Name	Product or Service	Employees
Bechtel BWXT Idaho	Research and Management Services	2,500
Idaho Falls School District	Education	1,700
Eastern Idaho Regional Medical Center	Health Care Services	1,311
Melaleuca, Inc.	Cosmetics, Vitamins, Soap	1,300
Bonneville Joint School District #93	Education	850
City of Idaho Falls	Government Services	750
Center Partners	Call Center	600
Bonneville County	Government Services	450
Wal-Mart	Department Store	450
Albertsons, Inc.	Retail Food Sales	350

ENERGY

	NATURAL GAS	ELECTRICITY
RESIDENTIAL	$ 45.78 (75 therms/mo.)	$ 36.97 (1,000 KWH/Mo.)
COMMERCIAL	$ 224.86 (400 therms/mo.)	$ 5,283.64 (300 KW, 90,000 KWH/Mo.)
INDUSTRIAL	$ 40,965 (100,000 therms/mo. Direct Sale)	$ 18,033.42 (1 MW, 400,000 KWH/Mo.)
	$ 11,848 Customer Owned Gas Transport Fee (100,000 therms/mo.)	

HOUSING

COMMUNITY

Percent Built Between 1980 and 1989	10.2 %		
Percent Built Between 1990 and 2000 Census	15.7 %		
	1980	1990	2000
Total Housing Units	15,037	16,845	19,826
Median Value of Owner-Occupied Housing	48,200	63,400	90,100
Median Rent	198	293	475

COUNTY

	1980	1990	2000
Total Housing Units	23,492	26,049	30,484
Median Value of Owner-Occupied Housing	48,700	63,700	93,500

REGIONAL LABOR COSTS *

Average Hourly	1st Quart.	Median	3rd Quart.
Business & Financial	$ 14.70	$ 19.94	$ 27.03
Computer & Math	18.55	25.25	32.53
Architecture & Engineering	22.87	28.42	35.18
Healthcare Practitioners & Technical	12.90	17.83	22.84
Sales & Related	6.36	8.21	12.61
Office & Administrative Support	7.60	9.36	12.27
Construction & Extraction	9.78	13.53	19.83
Production	8.50	10.80	14.98

*Idaho contains six wage survey regions.

Community specific wages may differ from regional averages.

FINANCIAL SERVICES

	Number	Total Deposits -2001
Banks & Savings Institutions (local)	30	$ 1,034,086,000

TRANSPORTATION

MAJOR HIGHWAYS

Jurisdiction	Route Designation	Direction (Route)	Miles To Access
Federal Interstate	I-15	N-S	1
Federal Interstate	I-15B	E-W	0
Federal Highway	US 20	E-W	0
Federal Highway	US 26	E-W	5
Federal Highway	US 91	N-S	0

AIR SERVICE

	Navigation Equipment	Runway Length	Miles To Downtown
Fanning Field	ILS, NDB, VOR	9,001	2

	Scheduled Passenger Flights		Freight Flights		Local Charter
	Carriers	Flights per day	Carriers	Flights per day	Service Available?
Fanning Field	2	15	4	7	yes

BUS SERVICE

Scheduled Bus Service Available	yes
Passenger Service Available	yes
Buses Per Day	17
Distance to Nearest	0 mi
Charter Service Firms (local)	yes

RAIL SERVICE

Railroads Serving the Community	Union Pacific		
Freight Service Available	yes	Distance to Nearest	49 mi
Passenger Service Available	no		

TRUCKING SERVICE

Scheduled Freight Carrier Service	yes
Overnight Express Parcel Service Available	yes
Overnight Express Mail Service Available	yes

MUNICIPAL SERVICES

Sewer System

Treatment Plant Design Capacity	17 mgd
Average Daily Usage (% of capacity)	44 %
Largest Main Line Capacity (diameter)	54 inches

Water System

Maximum Plant Daily Production	76 mgd
Maximum Daily Usage	58 mgd
Average Daily Usage	20 mgd
Storage Capacity	6 mg

Fire Protection System

Rating by Idaho Surveying & Rating Bureau (1 = best; 10 = worst)	3
Number of Paid and Volunteer Firefighters	94

Police Protection

Number of Full-Time Officers	85	
Part One Crimes* Per 100,000 Population	3,879	(2001)

* Part One crimes are the 8 most serious crimes as defined by the FBI.

Planning Services

	Yes	No
Regulatory System		
Comprehensive Plan	X	
Zoning Ordinance	X	
Building Permit System	X	
Subdivision Ordinance	X	
Territory Covered by Zoning		
Municipality	X	
County	X	

Library System

Number of Public Libraries	1

COMMUNICATIONS

	Yes	No	Distance to nearest
Radio Broadcast Station (local)	X		0 mi
Televison Broadcast Stations (local)	X		0 mi
Cable/CATV/Satellite TV Companies	X		0 mi
Number of Local Daily Newspapers	1		
Number of Local Weekly Newspapers	1		
Telephone Systems:			
Digital Switching Available	X		
Electronic Analog Switching Available		X	
Universal One-Party Service	X		

MEETING & LODGING FACILITIES

	Public Owned	Private Owned
Number of Meeting Facilities	4	5
Number of Meeting Rooms	47	28
Total Seating Capacity	1,518	2,583
Seating Capacity of Largest Room	400	850
Number of Lodging Rooms		1,277

HEALTH CARE FACILITIES

Number of Hospitals	1	341 Beds
Distance to Nearest	0 mi	
Ambulance Service Available	yes	
Number of General Clinics	5	

EDUCATIONAL FACILITIES

PUBLIC SCHOOLS

District Name	Average Daily Attendance (ADA)	School Year 2001-2002	Pupil/Teacher (FTE) Ratio
Bonneville Joint District #93	7,276		18.5
Idaho Falls District #91	9,758		17.7

PRIVATE SCHOOLS (all grades)

	School Year 2001-2002
Number of Schools in County	4
Enrollment Total	495

(*Not all private schools report)

PROFESSIONAL-TECHNICAL SCHOOLS

Public Secondary Programs (by District)

Name	Enrollment- 2001-2002
Bonneville Joint District #93	4,170
Idaho Falls District #91	3,692

Post-Secondary Name	Assoc/Certificate Enrollment-2001-2002	Short-Term Training	Distance (in miles)
Eastern Idaho Technical College	1,399	5,111	0
Idaho State University Professional-Technical	1,857	6,015	49

COMMUNITY COLLEGES (nearest)

Name	Enrollment-	Distance (in miles)

FOUR-YEAR COLLEGES OR UNIVERSITIES (nearest)

Name	Academic Enrollment- 2001-2002	Distance (in miles)
Idaho Falls Center for Higher Education *	2,864	0
Brigham Young University - Idaho	9,200	26
Idaho State University	12,315	49

* Some IFCHE students also commute to ISU & some take Univ. of Idaho courses

WEATHER/CLIMATE

TEMPERATURE

	Degree	Month
Lowest Average Daily Minimum Temperature	10.8	January
Highest Average Daily Maximum Temperature	86.5	July

Hottest Month	July	Driest Month	July
Coldest Month	January	Wettest Month	June

PRECIPITATION

Average Annual Total Precipitation	9.8 inches
Average Annual Snowfall	30.3 inches

ELEVATION

4,700 feet

HUMIDITY

Average July Afternoon Humidity	25 %
Average January Afternoon Humidity	79 %

RECREATIONAL OPPORTUNITIES

	Number	Acres		Number
City Parks	32	1,235	Golf Courses	3

State Parks (within 50 miles)	Distance (miles)
NA	

National Forests (within 50 miles)	Distance (miles)
Targhee	35
Caribou	45

National Parks, Monuments, Recreation Areas and Major Natural Amenities (within 100 miles)	Distance (miles)
Craters of the Moon	75
Grand Teton	75
Yellowstone	82

Downhill Ski Areas (within 100 miles)	Distance (miles)
Kelly Canyon	20
Pebble Creek	68
Grand Targhee	90
Teton Village	95

LOCAL & REGIONAL ECONOMIC DEVELOPMENT ORGANIZATIONS

Name	Contact	Phone (208)	E-Mail Address
East Central Idaho Planning & Dev. Assoc.	Ted Hendricks	356-4524	dorothy.bowen@ecipda.org
Eastern Idaho Econ. Development	Chris Hertz	522-2014	chris@eastidaho.org
Idaho Falls City Clerk	Rosemarie Anderson	529-1414	ifclerk@ci.idaho-falls.id.us

Appendix G

State of Idaho Fatal occupational injuries by employee status, sex, age, race, event or exposure, occupation, and industry, 2003

Idaho

Characteristics	Fatalities
Total	43
Employee status	
Wage and salary[1]	32
Self-employed[2]	11
Sex	
Men	38
Women	5
Age	
Under 16 years	–
16-17 years	–
18-19 years	–
20-24 years	7
25-34 years	9
35-44 years	10
45-54 years	5
55-64 years	8
65 years and older	3
Race or ethnic origin[3]	
White	39
Black	–
Hispanic	3
American Indian, Aleut, Eskimo	–
Asian	–
Pacific Islander	–
Multiple races	–
Event or exposure[4]	
Contact with objects & equipment	6
Struck by object	4
Struck by falling object	3
Caught in or compressed by equipment or objects	–
Caught in running equipment or machinery	–
Falls	5
Fall to lower level	5
Fall from ladder	–
Fall from roof	–
Fall from scaffold	
Exposure to harmful substances or environments	
Contact with electric current	
Exposure to caustic, noxious, or allergenic substances	–
Oxygen deficiency (including drowning)	–
Transportation incident	24
Highway transportation incident	18
Collision between vehicles	6
Non-collision highway incident	7
Non-highway transportation incident, except rail, air, water	3
Overturned, non-highway	–
Worker struck by vehicle, mobile equipment	–
Aircraft incidents	–

Idaho

Characteristics	Fatalities
Fires and explosions	–
Assaults and violent acts	5
Homicides	–
Shooting	–
Other homicides	–
Self-inflicted injuries	3
Occupation[5]	
Management Occupations	9
Business and Financial Operations Occupations	–
Computer and Mathematical Occupations	–
Architecture and Engineering Occupations	–
Life, Physical, and Social Science Occupations	–
Community and Social Services Occupations	–
Legal Occupations	–
Education, Training, and Library Occupations	–
Arts, Design, Entertainment, Sports, and Media Occupations	–
Healthcare Practitioners and Technical Occupations	–
Healthcare Support Occupations	–
Protective Service Occupations	5
Food Preparation and Serving Related Occupations	–
Building and Grounds Cleaning and Maintenance Occupations	–
Personal Care and Service Occupations	–
Sales and Related Occupations	–
Office and Administrative Support Occupations	–
Farming, Fishing, and Forestry Occupations	5
Construction and Extraction Occupations	5
Installation, Maintenance, and Repair Occupations	–
Production Occupations	–
Transportation and Material Moving Occupations	10
Military Specific Occupations	–
Industry[6]	
Private industry	36
Goods producing	19
Natural resources and mining	11
Agriculture, forestry, fishing, and hunting	11
Mining[7]	–
Construction	7
Manufacturing	–
Service producing	17
Trade, transportation, and utilities	13
Wholesale trade	3
Retail trade	–
Transportation and warehousing	8
Utilities	–
Information	–
Financial activities	–
Finance and insurance	–
Real estate and rental and leasing	–
Professional and business services	–
Professional, scientific, and technical services	–
Management of companies and enterprises	–

Idaho

Characteristics	Fatalities
Industry[6] - continued	
Administration and support and waste management and remediation services	–
Education and health services	–
Educational services	–
Health care and social assistance	–
Leisure and hospitality	–
Arts, entertainment, and recreation	–
Accommodation and food services	–
Other services	–
Government[8]	7
Federal government	–
State government	–
Local government	3

NOTES

1 May include volunteers.

2 Includes paid and unpaid family workers, and may include owners of incorporated businesses, or members of partnerships.

3 The race categories shown exclude Hispanic workers.

4 Based on the 1992 BLS Occupational Injury and Illness Classification Manual.

5 Based on the 2000 Standard Occupational Classification System.

6 Classified according to the North American Industry Classification System, 2002.

7 Includes fatalities at all establishments categorized as Mining (Sector 21) in the North American Industry Classification System, 2002, including establishments not governed by the Mine Safety and Health Administration (MSHA) rules and reporting, such as those in Oil and Gas Extraction.

8 Includes fatalities to workers employed by governmental organizations regardless of industry.

Totals for 2003 are preliminary. Totals for major categories may include subcategories not shown separately.

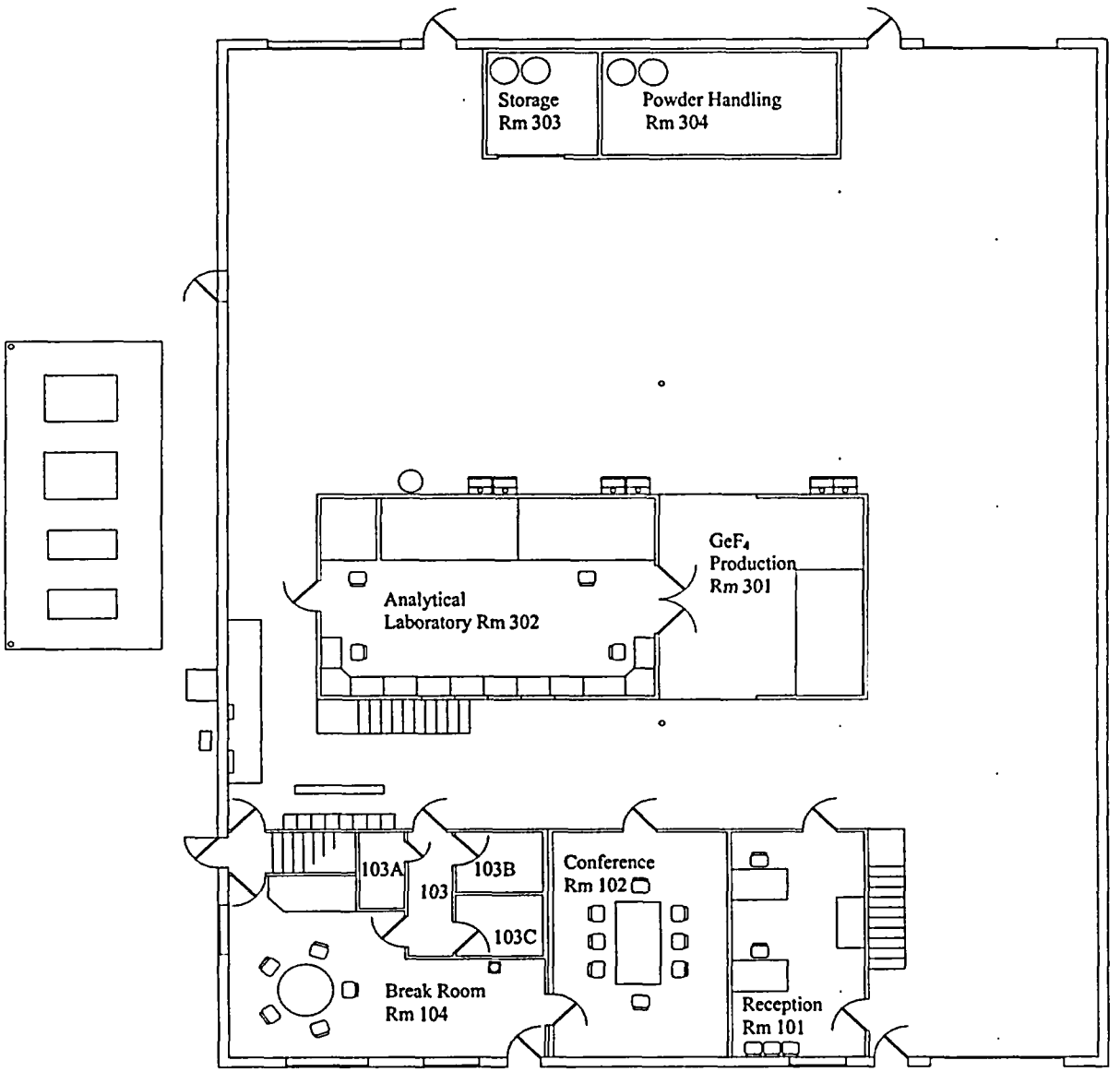
Dashes indicate no data reported or data that do not meet publication criteria.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, in cooperation with State and Federal agencies, Census of Fatal Occupational Injuries

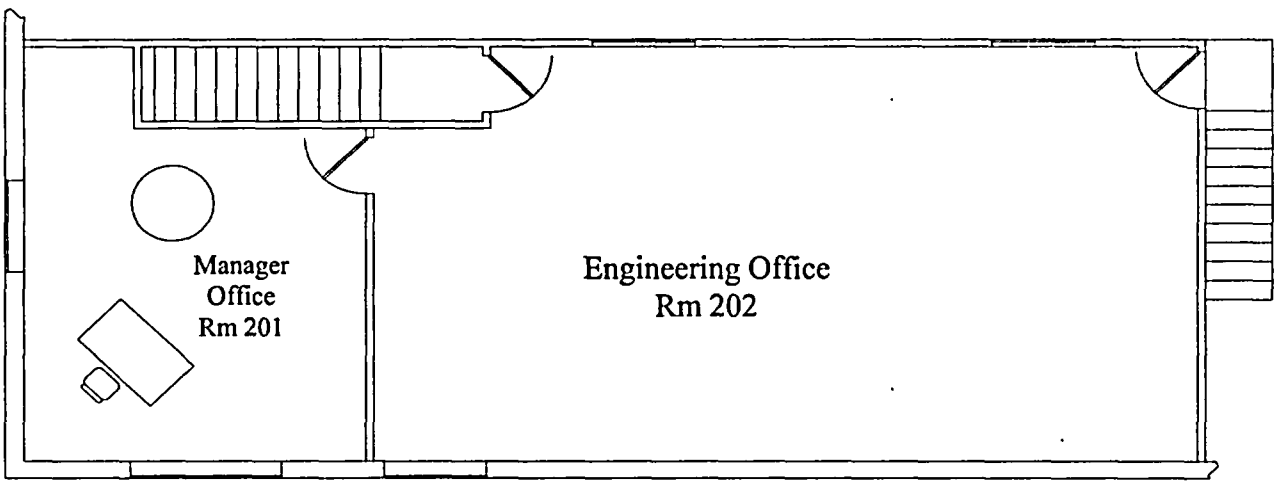
Appendix H

Facility and Process Diagrams

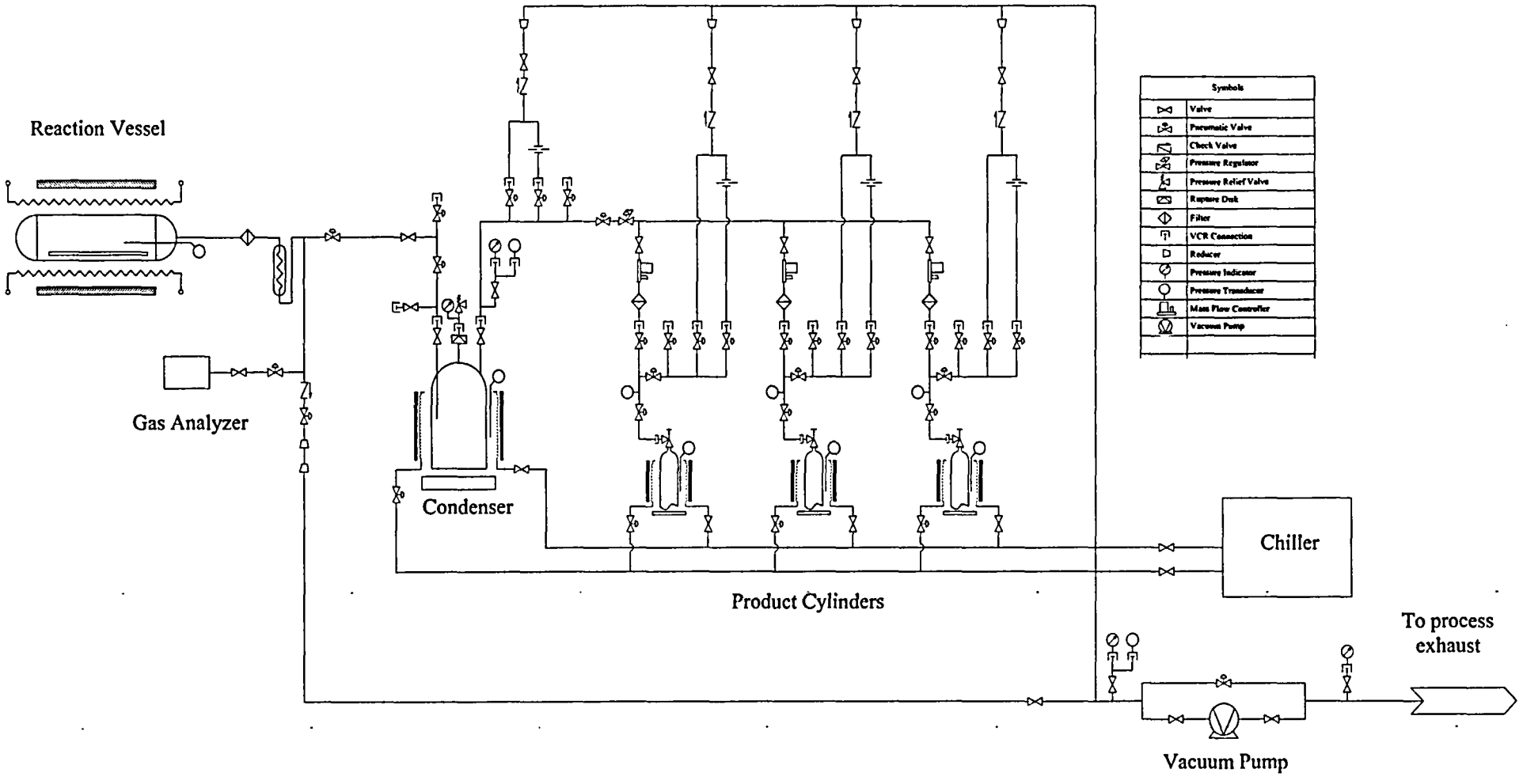
First Floor Facility Diagram



Second Floor Facility Diagram



Simplified Process Diagram GeF_4



Appendix I

GeF_4 MSDS

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION– Harmful or fatal if inhaled. Extremely irritating to mucous membranes and respiratory tract. Causes throat irritation, coughing, shortness of breath, excessive salivation, headache, vertigo, chills, nausea, abdominal pain, and vomiting. May cause bronchial spasm, and pulmonary edema (fluid in the lungs). May damage the lungs, liver, kidneys, heart, and blood. Symptoms may be delayed.

SKIN CONTACT–Germanium Tetrafluoride causes chemical burns. Skin burns may result in absorption of potentially harmful amounts of material. Symptoms may be delayed.

INGESTION –This product is a gas at normal temperature and pressure.

EYE CONTACT–Germanium Tetrafluoride burns eye tissue.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: Dental fluorisis, increase bone, serum and urinary fluoride levels, lung, kidney, heart and liver damage.

OTHER EFFECTS OF OVEREXPOSURE: None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known.

CARCINOGENICITY: Germanium Tetrafluoride is not listed by NTP, OSHA, and IARC as a carcinogen.

Section 4. First Aid Measures

Inhalation (Primary route of exposure)

1. Remove victim to fresh air. (Rescue personnel may require supplied breathing apparatus)
2. Administer rescue breathing and CPR as necessary.
3. Summon emergency medical attention immediately.
4. If available, qualified personnel may administer medical grade oxygen.
5. Keep victim warm and calm. Do not leave victim alone. Monitor breathing and pulse continuously. Administer CPR and rescue breathing as necessary
6. Transport victim to emergency medical facility as soon as possible for treatment by a physician.

Skin Contact

1. Flush affected area with copious amounts of cool water while removing contaminated garments.
2. Summon emergency medical attention immediately.
3. Continue flushing affected areas for at least 15 minutes or until professional medical attention arrives.
4. Monitor the victim for signs of inhalation.
5. Transfer victim to emergency medical facility as soon as possible for treatment by a physician.

Eye Contact

1. Flush eyes with copious amounts of cool clean water.
2. Summon emergency medical attention immediately.
3. Continue flushing eyes areas for at least 30 minutes or until professional medical attention arrives.
4. Monitor the victim for signs of inhalation.
5. Transfer victim to emergency medical facility as soon as possible for treatment by a physician, preferably an ophthalmologist.

Ingestion – Not an observed route of exposure to gaseous hazardous materials

However, if the victim experiences a burning sensation in his/her mouth, rinse mouth with clean fresh water, do not swallow. Contact poison control or emergency medical service for further instruction.

NOTES TO PHYSICIAN: Germanium tetrafluoride reacts with water or moist air to form germanium oxide and hydrofluoric and fluorogermanic acids. Composition of materials to which the victim has been exposed is dependent on the conditions of release. Skin and eye contact should be treated as exposure to acid compounds of fluorine such as hydrofluoric acid. Consider use of such agents as benzalkonium chloride, magnesium sulfate, calcium gluconate, or similar compounds. Monitor patient for hypocalcemia, hypomagnesia, and cardiac arrhythmias. Symptoms may be delayed up to 24 hours.

Section 5. Fire Fighting Measures

Flammability Classification:	Nonflammable gas. (29 CFR 1910.1200)
Flash Point:	Not applicable
Flammability Limits in Air:	Not applicable
Auto ignition Temperature:	Not applicable
Hazardous Combustion Products:	Not applicable
Extinguishing Media:	Not applicable

SPECIAL FIRE FIGHTING PROCEDURES:

DANGER! Toxic, corrosive compressed gas. Reacts with water to form hydrogen fluoride

1. Evacuate all personnel from danger area.
2. Do not approach area without self-contained breathing apparatus and protective clothing.
3. Immediately cool cylinders and surroundings with water spray from maximum distance.
4. Remove ignition sources if this can be accomplished without undo risk.
5. If cylinders are leaking, reduce toxic vapors with water spray or fog. Stop gas flow if possible.
6. Fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Cylinders with pressure relieve devices may release their contents if heated.

Cylinders without pressure relieve devices may rupture if heated.

No part of cylinder should be subjected to a temperature higher than 125°F (52°C).

Reverse flow into cylinder may cause rupture.

Section 6. Accidental Release Measures

Containment: GeF_4 is a gas at atmospheric conditions, containment requires sealed air tight vessel.

RESPONSE TO AN ACCIDENTAL RELEASE:

1. Evacuate all personnel from danger area.
2. Do not approach area without self-contained breathing apparatus and protective clothing.
3. Attempt to contain release by isolating cylinder.
4. Ventilate area or remove cylinder to a well-ventilated area or outdoors.
5. Contain water if used, prevent runoff from exposing personnel to liquid and vapors and contaminating surrounding area. Disposal in sewer may be restricted.
6. Poisonous, corrosive vapors may spread from spill. Before entering areas affected by the release check atmosphere with an appropriate gas detection device.

WASTE DISPOSAL:

Consult Federal, State and Local regulations for disposal of unused product, contaminated liquids, containers and residues.

Return empty or unused cylinders to supplier.

Section 7. Handling and Storage

Refer to Compressed Gas Association CGA P-1, *Safe Handling of Compressed Gases in Cylinders.*

HANDLING PRECAUTIONS:

Use a suitable hand truck to move large cylinders; do not drag, roll, slide, drop, or lift by cap.

Do not insert objects such as pry bars into the cap opening, doing so may damage the valve and result in a leak. Remove tight caps with a strap wrench.

DO NOT LEAVE AN UNPLUGGED CYLINDER UNATTENDED

Product may accumulate between valve and outlet plug during storage or transport, position yourself behind the outlet plug and wear appropriate protective equipment as you remove the outlet plug and connect the cylinder to your system.

HANDLE THIS MATERIAL IN SEALED SYSTEMS.

Carefully connect the cylinder and your system. Slowly open the cylinder valve and monitor system response. Consider utilizing gas detection equipment to verify a leak tight connection.

STORAGE:

Store cylinders in a secure rack, positioned upright with valve shut, plug installed and cap in place.

Protect cylinders from precipitation, mechanical damage, and temperatures in excess of 125°F.

EMPTY cylinders may contain residual product, handle and store empty cylinders as if they were full.

Section 8. Exposure Control/Personal Protection

ENGINEERING CONTROLS:

Handle GeF_4 in a closed system constructed of corrosion-resistant materials.

Local exhaust ventilation such as a fume hood is required, corrosion resistance is recommended.

Continuous gas monitoring system is recommended and may be required.

Utilize check valves or similar device to prevent flow reversal from system to cylinder.

A secondary containment system with exhaust abatement is recommended and may be required.

PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY PROTECTION

A positive-pressure, air-supplied, full-face self-contained breathing apparatus is required for any work where exposure to product could occur, such as breach of the handling system or response to a release.

Refer to OSHA §1910.134 Respiratory protection and ANSI Z88.2

EYE/FACE PROTECTION

Wear safety glasses when handling cylinders; vapor-proof goggles or face mask during when installing or removing cylinders from the system or wherever contact with product could occur.

Refer to OSHA §1910.133 Eye and face protection.

SKIN PROTECTION

Wear work gloves for cylinder handling; neoprene, natural rubber, or nitrile gloves when changing out cylinders or wherever contact with product could occur.

Full body exposure protection should be addressed by a safety professional when responding to a suspected or confirmed release

OTHER SAFETY APPAREL

Wear appropriate safety shoes when transporting and handling cylinders.

SAFETY SHOWERS/EYEWASH STATIONS

Have safety showers and eyewash fountains immediately available.

Section 9. Physical and Chemical Properties

Appearance:	Colorless
Odor:	Pungent, garlic-like
Physical State:	gas
pH:	Not applicable, however reacts with H_2O to produce hydrofluoric and fluorogermanic acids.
Vapor Pressure:	404 kPa absolute (58.6 psia) at -15°C (+5°F)
Vapor Density:	6.521 g/l
Sublimation Temperature:	-36.5 °C (-33.7°F) at 101 kPa (14.7 psia).
Melting Point:	-15°C (+5°F) at 404 kPa absolute (58.6 psia)
Solubility in H_2O (v/v):	Not applicable, reacts with H_2O
Specific Gravity as Liquid:	Not known
Molecular Weight:	148.60 g/mol

Section 10. Stability and Reactivity

Chemical Stability:	Stable, not known to thermally decompose
Incompatibility with other material:	Water, alkali metals, alkaline earth metals, calcium oxide
Hazardous decomposition, reaction and oxidation products:	Reacts with H_2O, (including moisture in the air) to produce hydrofluoric and fluorogermanic acids.
Hazardous polymerization:	Not known to polymerize.

Section 11. Toxicological Information

GeF_4 is not listed in the Registry of Toxic Effects of Chemical Substances or in the Report on Carcinogens, National Toxicology Program or with the International Agency for Research on Cancer. Exposure limits based on those associated with hydrogen fluoride. Refer to Section 3.

Section 12. Ecological Information

Does not contain any Class I or Class II ozone-depleting chemicals.

If released into the environment will react with H_2O, (including moisture in the air) to produce hydrofluoric and fluorogermanic acids.

Section 13. Waste Disposal Considerations

Consult Federal, State and Local regulations for disposal of unused product, contaminated liquids, containers and residues.

RCRA:	Characteristic, Reactive, D003
Reportable Quantity (RQ):	100 lb (45.4) D003 Unlisted Hazardous Wastes Characteristic of Reactivity

Emergency contact CHEMTREC 1-800-424-9300 (703-527-3887 outside US)

Section 14. Transportation

TRANSPORTATION OF GERMANIUM TETRAFLUORIDE BY AIR IS FORBIDDEN

Proper Shipping Name:	Compressed gases, toxic, corrosive, n.o.s. (germanium tetrafluoride) Zone B
Identification Number:	UN 3304
Hazard Class/Division:	2.3, Toxic Gas
Shipping Label:	Toxic Gas, Corrosive
Markings:	Inhalation Hazard
Placard (as necessary):	Toxic Gas, Corrosive
Transport Recommendation:	Ensure cylinders are securely stowed and in a well-ventilated compartment during transport

Section 15. Regulations

The following information is provided for reference only. Users are solely responsible for compliance with applicable federal, state and local regulations.

Toxic Substances Control Act (TSCA):	GeF_4 is listed on the TSCA inventory
Resource Conservation and Recovery Act (RCRA):	Characteristic, Reactive, D003
Toxic Release Inventory (TRI) Program:	Not Listed
Section 302 EPCRA, Extremely Hazardous Substances:	Not Listed

Section 16. Other Information

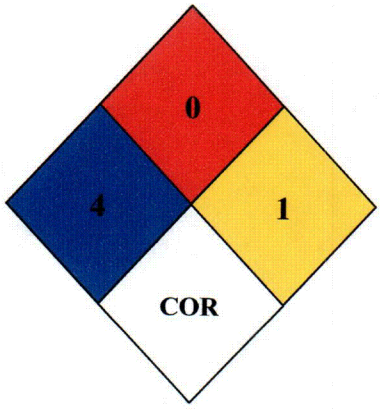
NFPA Rating

Health = 4, Can cause death or major injury

Flammability = 0, will not burn

Reactivity = 1, Normally stable. Unstable at high temperatures and pressures. Reacts with water

Special = Corrosive



References:

NIOSH Pocket Guide to Chemical Hazards, June 2004
National Safety Council, Fundamentals of Industrial Hygiene, 4th Edition, 1996
Compressed Gas Association, P-1, Safe Handling of Compressed Gases in Containers, 2000
Compressed Gas Association, P-19, CGA Recommended Hazard Ratings for Compressed Gases, 2004

Web Sites:

Compressed Gas Association: http://www.cganet.com
National Institute for Occupational Safety and Health: http://www.cdc.gov/niosh/homepage.html
National Institute of Environmental Health Sciences: http://www.niehs.nih.gov

Disclaimer

Users of this product are solely responsible for the safe storage, handling, use and disposal of this material and for compliance with applicable laws, regulations and industry practices. International Isotopes Inc. makes no warranty or representation expressed or implied, that the materials furnished under this agreement will not result in injury or damage when used for purposes authorized, or will accomplish the results for which they are requested or intended, or will not be destroyed, damaged, lost or otherwise altered in physical or chemical properties in the process of the Buyer's performance of and use of the material furnished.

Emergency contact CHEMTREC 1-800-424-9300 (703-527-3887 outside US)

Appendix J

Air Quality Permitting Statement of Basis

Air Quality Permitting
Statement of Basis

November 10, 2004

Exemption Concurrence No. X-040522

International Isotopes Inc., Idaho Falls

Facility ID No. 019-00051

Prepared by:

Carole Zundel, Permit Writer
Mike DuBois, Air Toxics Analyst
AIR QUALITY DIVISION

Table of Contents

Acronyms, Units, and Chemical Nomenclatures

AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CFR	Code of Federal Regulations
Ci/yr	curies per year
CO	carbon monoxide
CO_2	carbon dioxide
DEQ	Department of Environmental Quality
EL	emission level for toxic air pollutants regulated in IDAPA 58.01.01.585 and 586
EPA	U.S. Environmental Protection Agency
GeF_4	germanium tetrafluoride
GeO_2	germanium oxide
HAPs	Hazardous Air Pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pound per hour
MACT	Maximum Achievable Control Technology
mrem/yr	millirem per year
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
SIP	State Implementation Plan
SO_2	sulfur dioxide
T/yr	tons per year
UF_4	uranium tetrafluoride
U_3O_8	uranium oxide
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for determining exemption status.

2. FACILITY DESCRIPTION

International Isotopes Inc. produces germanium tetrafluoride for the semiconductor market. Depleted uranium (uranium tetrafluoride, UF_4), in granular form, is mixed with germanium oxide (GeO_2) in a mixing container in an enclosed glove box and mixer. The mixed material is then moved to the furnace and heated to form germanium tetrafluoride (GeF_4) gas. The gas exits into the gas recovery system, where it is cooled through a heat exchanger. Then the GeF_4 is liquefied, and a valve is opened to allow the carrier gases (O_2, N_2, CO_2, etc.) to leave. The evacuation valve closes, the storage container is heated, and a storage bottle is filled with GeF_4. The total gas captured by this process is estimated to be 95% of the total gas that left the furnace.

3. FACILITY / AREA CLASSIFICATION

International Isotopes Inc. is defined as a minor facility because, without PTC limits on the potential to emit, no air pollutants will exceed 100 tons per year.

The facility is located within AQCR 61 and UTM zone 12. The facility is located in Bonneville County which is designated as unclassifiable for all criteria pollutants (PM_{10}, CO, NO_x, SO_2, lead, and ozone).

The AIRS information provided in Appendix C defines the classification for each regulated air pollutant at International Isotopes Inc. This required information is entered into the EPA AIRs database.

4. APPLICATION SCOPE

International Isotopes Inc. has requested confirmation that the manufacturing of germanium tetrafluoride, as presented in their application received August 19, 2004, and as updated in information received on September 20, 2004, is exempt from the requirement to obtain a permit to construct.

4.1 Application Chronology

August 19, 2004	Application for exemption confirmation received
September 20, 2004	Additional information received

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC exemption concurrence action:

5.1 Emissions Inventory

This emissions inventory was compiled as if there are no controls on the emissions because this is a request for an exemption. Although emissions are estimated as uncontrolled and at maximum production, the facility plans to install HEPA filters to control particulates (which controls radionuclides) and a scrubber to control any fluoride emissions from the GeF_4 production process.

For each batch of GeF_4 manufactured, 7.5 pounds of uranium tetrafluoride (UF_4) are mixed with 3.3 pounds of germanium oxide (GeO_2). It is estimated by the facility that 95% of the UF_4 is converted to U_3O_8 and that 5% remains UF_4 and is retained in the waste product. It is also estimated that 95% of the GeF_4 is dispensed into containers as a final product and 5% is emitted to the atmosphere.

In order to assess uranium emissions, two methods were used. The exemption concurrence request includes the results of an emission test to determine the purity of the GeF_4 product. Uranium was not detected as an emission during that test.

To further assure that the uranium, and associated radionuclide emissions, are exempt from the requirement to obtain a permit to construct, the radionuclide dose is estimated using results from a model, COMPLY v 1.6, that is based on handling of plutonium fluoride (a surrogate for depleted uranium) under various conditions. The highest dose resulted from free-fall of a powder. For the condition in which 150 pounds per year of depleted uranium is processed, the resulting effective dose is 9.4 E-4 millirem per year (mrem/yr). The COMPLY v 1.6 model run is shown in Appendix B.

Fluoride emissions occur during the transfer of GeF_4 to the storage containers. It is estimated that up to 5% of the GeF_4 produced could be emitted. The emission estimates are shown in Appendix A. The maximum fluoride emissions are 0.115 pounds (102 grams GeF_4 x 0.51 grams of fluoride per 1 gram GeF_4 = 52 grams fluoride per batch = 0.115 pounds fluoride per batch). As a conservative estimate, it was estimated that all the fluoride emitted per batch was emitted in one hour. A batch normally takes at least eight hours. The estimated emission of 0.115 lb/hr fluoride is less than the emission level (EL) from IDAPA 58.01.01.585 for fluoride of 0.167 lb/hr.

5.2 Modeling

The emissions from the facility are estimated to be less than the levels which require air dispersion modeling according to DEQ's Air Quality Modeling Guideline, dated December 31, 2002.

A radionuclide dose estimation model was run to determine the radionuclide dose from the process from the handling of uranium. The results of the modeling analysis are included as Appendix B of this statement of basis. The emissions and corresponding dose are based on processing 150 pounds per year of depleted uranium. The results of the model show that an emission rate of 9.1 E-07 curies per year (Ci/yr) results in a dose of 9.6 E-03 mrem/yr, which is less than the level established as described in Section 5.3 of this statement of basis of 0.1 mrem/yr.

5.3 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201 ..... Permit to Construct Required

A permit to construct is not required because the increase in fluoride emissions qualifies for an exemption from the requirement to obtain a permit to construct per IDAPA 58.01.01.210.

IDAPA 58.01.01.221.02 ..... Category I Exemptions, Radionuclides

This regulation exempts facilities with radionuclide potential emissions that are less than 1% of the applicable radionuclide standard in 40 CFR 61 subpart H (0.1 mrem/yr). Subpart H applies to Department of Energy facilities only. International Isotopes Inc. is not a Department of Energy facility. Therefore, IDAPA 58.01.01.221.02 does not apply to this facility.

IDAPA 58.01.01.223.02(a)..... Level I Exemption for Toxic Air Pollutants

This regulation allows an exemption if the uncontrolled emission rate for all toxic air pollutants is less than or equal to the applicable screening emission levels listed in Section 585 or 586. For the process at International Isotopes Inc., the uncontrolled emission rate for fluoride is 0.115 lb/hr, which is less than the EL in IDAPA 58.01.01.585 for fluoride of 0.167 lb/hr.

IDAPA 58.01.01.161 ..... Toxic Substances

DEQ has determined that radionuclides are a toxic substance that are regulated for Department of Energy facilities. Although International Isotopes Inc. is not a Department of Energy facility, DEQ used the IDAPA 58.01.01.221.02 exemption level of 0.1 mrem/yr for radionuclides as a guide in determining an acceptable radionuclide emissions amount for an exemption from the requirement to obtain a permit to construct. The facility has demonstrated that the radionuclide emissions from the proposed operation is less than 0.1 mrem/yr, as discussed in Sections 5.1 and 5.2 of this statement of basis.

IDAPA 58.01.01.585 ..... Toxic Air Pollutants, Non-Carcinogenic Increments

This regulation applies to uranium and fluoride emissions from the facility. The facility stated that the uranium is unavailable for release. Testing results provided by the facility indicate that there are no detectable levels of uranium at the release point in the process (the valve for dispensing GeF_4 into containers). Therefore, no permit limits are required to regulate uranium emissions.

There is no specific limit for GeF_4 in the *Rules*. After review of the material safety data sheet and other literature regarding the toxicity of GeF_4, DEQ has determined that the most conservative estimate of toxicity is to assess the toxicity based on the fluoride content. The IDAPA 58.01.01.585 EL for fluoride is 0.167 pounds per hour. The estimated uncontrolled potential to emit of fluoride from this process is 0.115 lb/hr, which is less than the EL.

5.4 Fee Review

No fees for application or processing are required per IDAPA 58.01.01.224 and 225 because this action is an exemption applicability determination.

6. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that International Isotopes Inc. be issued an exemption concurrence letter for the manufacturing of germanium tetrafluoride.

CZ/sd Exemption No. X-040522 G:\Air Quality\Stationary Source\SS Ltd\PTC\International Isotopes X-040522\I3 X-040522 SOB.doc

APPENDIX A

Emission Estimates

REACTION

$$3\,UF_4 + 3\,GeO_2 + O_2 \rightarrow 3\,GeF_4 + U_3O_8$$

COMPONENT	MW
UF_4	314 gm
GeO_2	104.6 gm
O_2	32 gm
GeF_4	148.6 gm
U_3O_8	842.1 gm
U	238 gm

ASSUMPTIONS

1. 15 lbs U ON SITE PER WEEK OR 7.5 lbs/BATCH
2. 2 PRODUCTION BATCHES/WEEK
3. CONVERSION RATE 95% OF UF_4

EQUIVALENT AMOUNT OF UF_4

$$(7.5\,lbU)\left(\frac{454\,gm}{1\,lb}\right)\left(\frac{1\,mole\,U}{238\,gm}\right)\left(\frac{1\,mole\,UF_4}{1\,mole\,U}\right)\left(\frac{314\,gm\,UF_4}{1\,mole\,UF_4}\right) = 4492\,gm$$

AMOUNT OF UF_4 CONSUMED

$$(\text{CONVERSION RATE})(gm\,UF_4) = (.95)(4492\,gm) = 4267.4\,gm$$

AMOUNT OF GeO_2 REQUIRED

$$(4492\,gm\,UF_4)\left(\frac{1\,mole\,UF_4}{314\,gm}\right)\left(\frac{3\,mole\,GeO_2}{3\,mole\,UF_4}\right)\left(\frac{104.6\,gm}{1\,mole\,GeO_2}\right) = 1496.4\,gm$$

AMOUNT OF GeO_2 CONSUMED

$$(4267.4\,gm\,UF_4)\left(\frac{1\,mole\,UF_4}{314\,gm}\right)\left(\frac{3\,mole\,GeO_2}{3\,mole\,UF_4}\right)\left(\frac{104.6\,gm}{1\,mole\,GeO_2}\right) = 1421.6\,gm$$

AMOUNT OF O_2 REQUIRED

$$(4492\,gm\,UF_4)\left(\frac{1\,mole\,UF_4}{314\,gm}\right)\left(\frac{1\,mole\,O_2}{3\,mole\,UF_4}\right)\left(\frac{32\,gm\,O_2}{1\,mole\,O_2}\right) = 152.6\,gm\,O_2$$

AMOUNT OF O_2 CONSUMED

$$(4267.4\,gm\,UF_4)\left(\frac{1\,mole\,UF_4}{314\,gm}\right)\left(\frac{1\,mole\,O_2}{3\,mole\,UF_4}\right)\left(\frac{32\,gm\,O_2}{1\,mole\,O_2}\right) = 145\,gm\,O_2$$

AMOUNT OF GeF_4 PRODUCED

$$(4267.4\text{gm } UF_4)\left(\frac{1\text{MOLE } UF_4}{314\text{gm } UF_4}\right)\left(\frac{3\text{ MOLES } GeF_4}{3\text{MOLES } UF_4}\right)\left(\frac{148.6\text{gm } GeF_4}{1\text{MOLE } GeF_4}\right) = 2019.5\text{gm } GeF_4$$

AMOUNT OF U_3O_8 PRODUCED

$$(4267.4\text{gm } UF_4)\left(\frac{1\text{MOLE } UF_4}{314\text{gm } UF_4}\right)\left(\frac{1\text{MOLE } U_3O_8}{3\text{MOLES } UF_4}\right)\left(\frac{842.1\text{gm}}{1\text{MOLE } U_3O_8}\right) = 3814.8\text{gm } U_3O_8$$

Calculate Equivalent wt of F

Ge = 72.6
F = 18.99

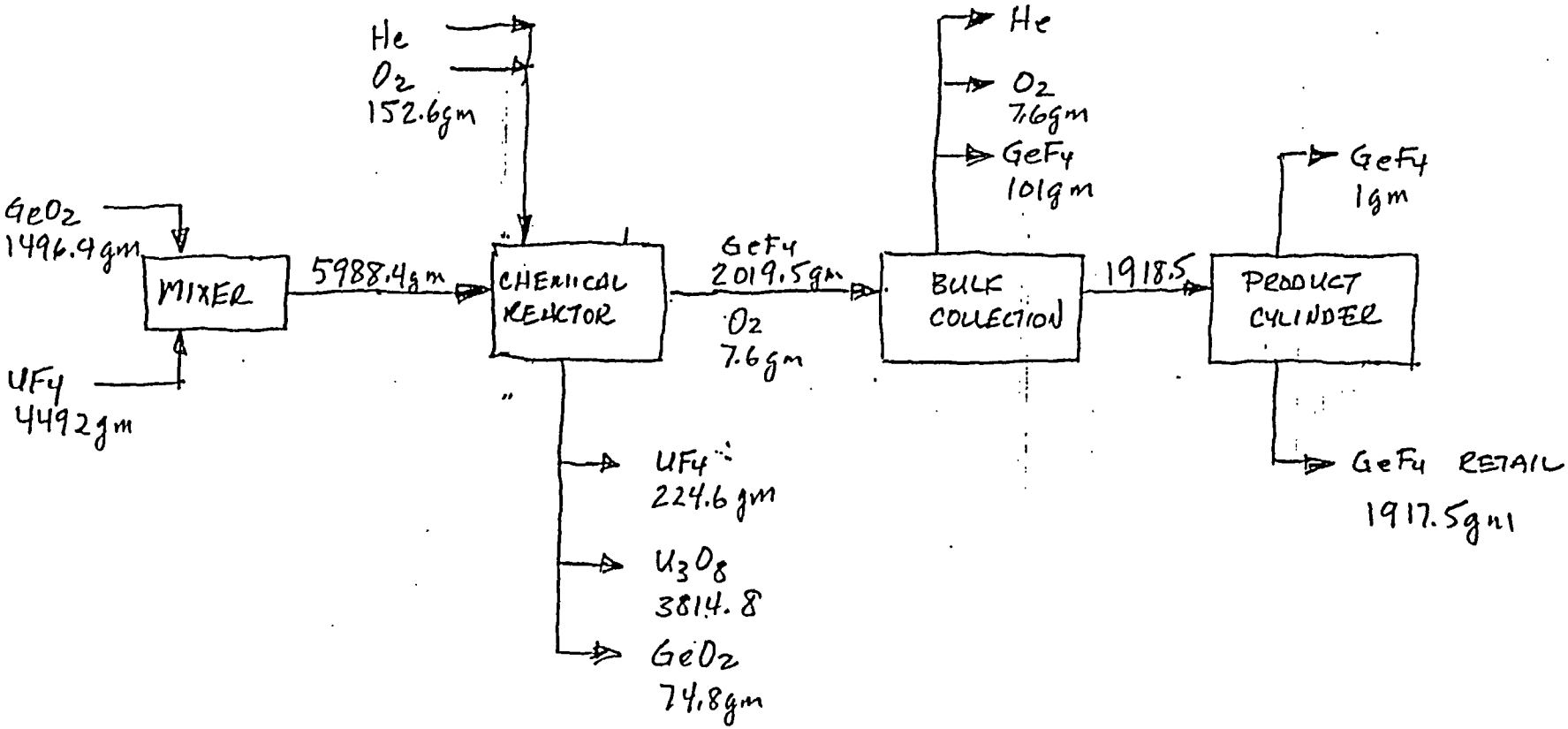
(1 mole GeF_4) = 148.6 gms

(1 mole F) = 19 gms

Therefore

$$(1\text{gm } GeF_4)\left(\frac{1\text{ mole } GeF_4}{148.6\text{gm}}\right)\left(\frac{4\text{ moles F}}{1\text{ mole } GeF_4}\right)\left(\frac{19\text{ gms F}}{1\text{ mole F}}\right) = .51\text{ gm F}$$

MATERIAL BALANCE - 95% CONV/95% COLLECTION



Total GeF4 To Process Vent = 101gm + 1gm = 102gm

Per Hr = 102gm / 8 HR = 12.75 gm/HR

F EQUIVALENT = $\left(12.75\frac{gm}{HR} \times \frac{.51 gm\,F}{1 gm\,GeF_4}\right) = 6.5 gm$

F EQUIVALENT = 0.0143 lb/HR

APPENDIX B

Modeling Review Memo

MEMORANDUM

TO: Carole Zundel, Air Quality Division

FROM: Mary Anderson, Air Quality Division MA

SUBJECT: Review of Results of COMPLY v1.6 for Exemption Review

DATE: October 25, 2004

1. SUMMARY:

I have reviewed the information and modeling analysis submitted by International Isotopes. The facility used the COMPLY v 1.6 model. I have been able to recreate the results submitted by the applicant. I have also performed sensitivity analyses on the distance to closest receptor. The EPA guidance document "A Guide for Determining Compliance with the Clean Air Act Standards for Radionuclide Emissions from NRC-Licensed and Non-DOE Federal Facilities" (EPA 520/1-89-002), states that the dose must be estimated for the nearest receptor (resident, home, school, business, or office). The facility stated, in the application, that this distance is 300 meters. However, in the analysis they submitted, 100 meters was used. I did not find any justification as to why those distances are correct. Therefore, I ran the model to determine at what distance, if any, will the emissions result in a dose equal to 0.1 mrem/yr, assuming all other parameters remain the same. The sensitivity analysis showed that as long as the nearest receptor is more than 30 meters away from the release point, the results are below 0.1 mrem/yr, using Compliance Level 2 in COMPLY.

Table 1 presents the modeling analysis inputs and results submitted by Applicant. Table 2 presents the modeling analysis and sensitivity analysis inputs and results by DEQ. I have attached the modeling analysis submitted by the applicant as well as the verification analysis and sensitivity analysis done by DEQ.

Table 1. Modeling Analysis Inputs and Results Submitted by Applicant.

Parameter	Value
Pollutant	Assume 100% U-238
Emission Rate	9.1E-08 Ci/yr
Compliance Level	2
Release Height	7 m
Building Height	6 m
Distance from source to receptor	100 m
Building Width	30 m
Wind Speed	2 m/s
Results	**9.4E-04 mrem/yr**

Table 2. Modeling Analysis and Sensitivity Analysis Inputs and Results by DEQ.	
Parameter	**Value**
Pollutant	Assume 100% U-238
Emission Rate	9.1E-07 Ci/yr
Compliance Level	2
Release Height	21 ft (6 m)
Building Height	18 ft (5 m)
Distance from source to receptor	300 m
Building Width	30 m
Wind Speed	2 m/s
Results	**9.6E-03 mrem/yr**
Sensitivity Analysis Results (31 m to nearest receptor)	**4.0E-02 mrem/yr**

APPENDIX C

AIRS Form

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: International Isotopes Inc.
Facility Location: 4137 Commerce Circle, Idaho Falls
AIRS Number: 019-00051

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B							U
NO_x	B							U
CO	B							U
PM_{10}	B							U
PT (Particulate)	B							U
VOC	B							
THAP (Total HAPs)	B							
			APPLICABLE SUBPART					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, or each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix K

St. Leon Industrial Park (PWS 7100070) Source Water Assessment Final Report

SAINT LEON INDUSTRIAL PARK (PWS 7100070)
SOURCE WATER ASSESSMENT FINAL REPORT

April 28, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for Saint Leon Industrial Park, Idaho Falls, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Saint Leon Industrial Park (PWS #7100070) drinking water system consists of one well. The well was constructed in 1996 and is the main water supply serving the system's approximately 30 people through 2 connections.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates, arsenic), volatile organic contaminants (VOCs, i.e. petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, the Saint Leon Industrial Park well rated high for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use scores were moderate for IOCs, VOCs, and microbials, and high for SOCs. The largest influences upon overall scores were the amount of agricultural land surrounding the well and within it's delineation, and unknown information from a missing well log. If a well log had been available scores might have been lower.

No SOCs or VOCs, or microbial contaminants have ever been detected in the tested water. Traces of the IOCs fluoride, and nitrate have been detected in the well. Despite existing in a county with high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use, nitrate has only been detected in concentrations less than 2 parts per million (ppm). The maximum contaminant level (MCL) for nitrate is 10 ppm. The well exists within a priority area for the pesticide atrazine.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Saint Leon Industrial Park, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Actions should be taken to keep a 50-foot radius circle around the wellhead clear of potential contaminants. Any contaminant spills within the delineation should be carefully monitored and dealt with. As much of the designated assessment areas are outside the direct jurisdiction of Saint Leon Industrial Park, collaboration and partnerships with state and local agencies should be established and are critical to success.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. Public education topics could include proper farming practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the DEQ or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR SAINT LEON INDUSTRIAL PARK, IDAHO FALLS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Saint Leon Industrial Park (PWS #7100070) is located in Bonneville County, Idaho (Figure 1). The drinking water system consists of one well which was constructed in 1996 and is the main water supply serving the system's approximately 30 people through 2 connections.

No SOCs or VOCs, or microbial contaminants have ever been detected in the tested water. Traces of the IOCs fluoride, and nitrate have been detected in the well. Despite existing in a county with high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use, nitrate has only been detected in concentrations less than 2 ppm. The MCL for nitrate is 10 ppm. The well exists within a priority area for the pesticide atrazine.

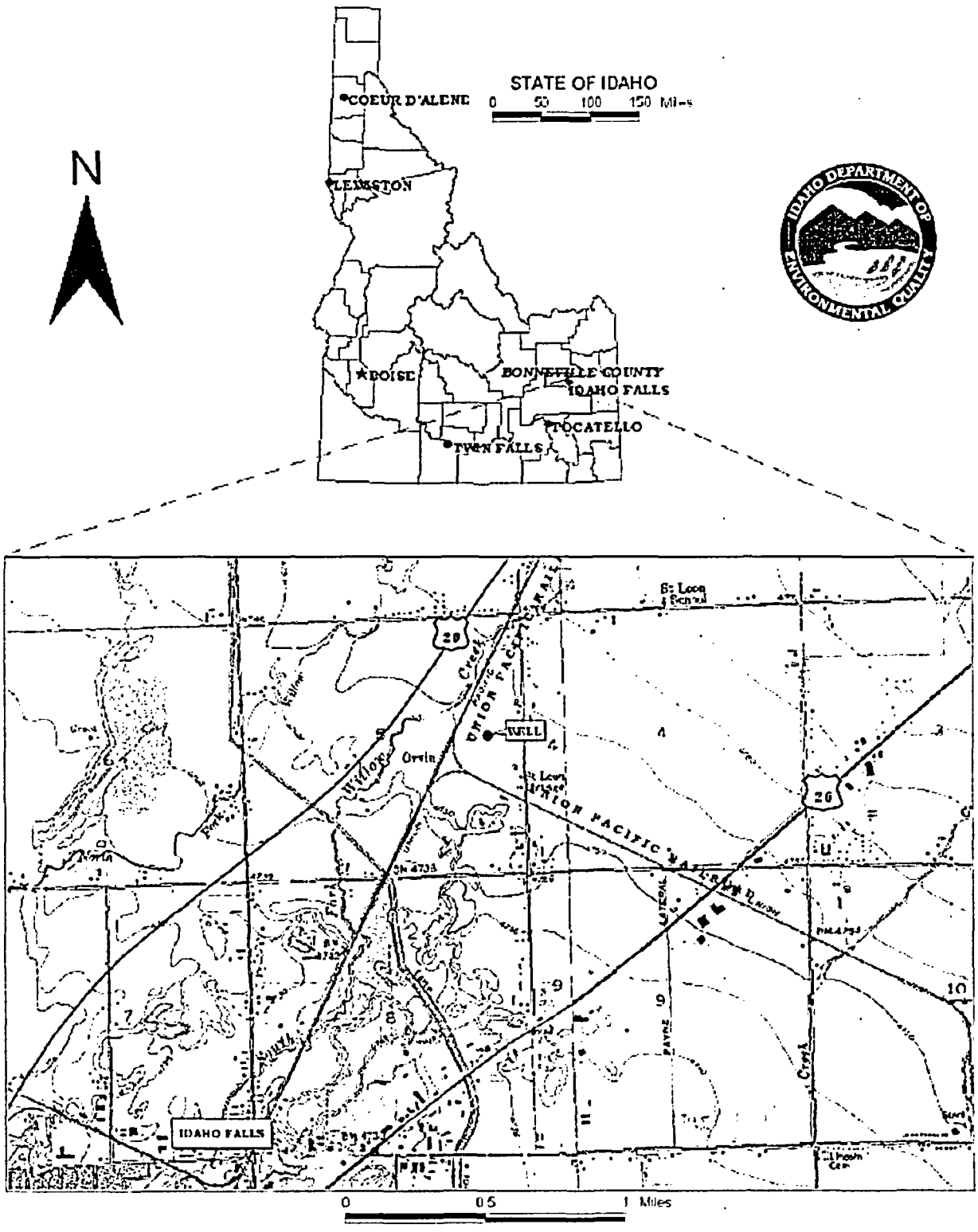
Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. Washington Group International (WGI) performed the delineation using a computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Snake River Plain aquifer in the vicinity of the Saint Leon Industrial Park. The computer model used site specific data, assimilated by WGI from a variety of sources including local area well logs, and hydrogeologic reports (detailed below).

Hydrogeologic Conceptual Model

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary basalt flows of the Snake River Group, which are intercalated with sedimentary rocks along the margins (Garabedian, 1992, p. 5).
Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and fluvial sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest along with sedimentary and metamorphic rocks (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain. However, some reaches are believed to be perched, such as the Lewisville to Shelly reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood Rivers, rivers entering from the north vanish into the highly transmissive basalts of the Snake River Plain aquifer.

FIGURE 1. Geographic Location of St. Leon Ind Park



The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally by interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gal/min are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 ft2/sec to 56 ft2/sec (1.0x104 to 4.8x106 ft2/day; Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center of the plain. Aquifer thickness varies from 200 to 3,000 feet in models of the regional aquifer, depending on location. Regional ground-water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; DeSonneville, 1972, p. 78; Garabedian, 1992, p. 48; Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 ft/mile and average 12 ft/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. Estimated effective porosities range from 0.04 to 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p. 16). The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11). Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River Canyon near Thousand Springs, and near American Falls and Blackfoot. To a lesser degree, discharge also occurs through pumping and underflow (Garabedian, 1992, p. 17).

The Idaho Falls area of the ESRP hydrologic province is located on the northeast margin of the ESRP below the confluence of the Snake and the Henrys Fork rivers. Interpretation of well logs indicates that the basalt and rhyolite of the ESRP is over lain by a 2- to 94-foot-thick layer of sediment. Quaternary basalts are estimated to be 100 to 500 feet thick throughout most of this area (Whitehead, 1992, Plate 3).

Hydraulic conductivity values in the Idaho Falls area are among the highest in the regional aquifer. In a model of the eastern Snake River Plain aquifer, Garabedian (1992, pp. 44-45) used hydraulic conductivity values of 4.4 x 10-2 and 6.1x10-3 ft/sec (3,800 and 527 ft/day) to represent the upper 200 feet of the basalt aquifer in the Idaho Falls area. A value of 7.5 x 10-6 ft/sec (6.5x10-1 ft/day) was used to represent rhyolite. Haskett (1972, p. 11) reports that wells constructed in rhyolite to the north of Idaho Falls have productivities close to those constructed in basalt. This suggests that hydraulic conductivity values higher than those used by Garabedian may be representative of the rhyolite aquifer.

There are no known published water table or flow direction maps specific to the Idaho Falls area. However, flow directions are believed to be similar to those depicted at the regional scale (e.g., Garabedian, 1992, Plate 4). Ground-water flow direction at the local scale is thought to be highly variable because of preferential flow paths through the fractured and layered basalts. The local flow direction is also likely affected by increased ground-water pumping for irrigation west of Idaho Falls (Garabedian, 1992, Plate 9).

Annual average precipitation in the Idaho Falls area is estimated at 10 inches (Kjelstrom, 1995, p. 3). An estimated 2 in./yr enters the aquifer as recharge from precipitation (Garabedian, 1992, p. 20). Garabedian (1992, Plate 8) indicates that the combined areal recharge rate for both irrigation and precipitation is approximately 40 in./yr (0.009 ft/day) in the Idaho Falls area. Seasonal water table fluctuations in excess of 20 feet have been recorded in response to irrigation seepage and canal leakage (see Table 4). Kjelstrom (1995, p. 13) reports river losses of 120,000 acre-feet to the aquifer for the Heise to Lorenzo reach of the Snake River and 280,000 acre-feet for the Lewisville to Shelley reach during the 1980 water year (Figure 2).

River gains of 340,000 acre-feet for the Lorenzo to Lewisville reach are also reported for the same time period. Leakage from the Henrys Fork-Rigby Fan perched aquifer contributes another estimated 588,000 acre-feet/yr to the ESRP north of the Idaho Falls area (IDWR, 1997, p 15).

The analytic element model WhAEM2000 (Kraemer et al., 2000) was used to delineate 3-, 6-, and 10-year capture zones for PWS wells located within the Idaho Falls Area of the ESRP hydrologic province.

The delineated area for the Saint Leon Industrial Park well is a northeast trending sector approximately 0.75 miles wide, which extends from the well to the South Fork Snake River. The actual data used in determining the source water assessment delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the area surrounding the Saint Leon Industrial Park wells is predominately irrigated agriculture. The well exists within a county of high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use. In addition, the well's delineation intersects a priority area for the pesticide atrazine.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in July and August 2002. The first phase involved identifying and documenting potential contaminant sources within the Saint Leon Industrial Park source water assessment area (Figure 2) through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas.

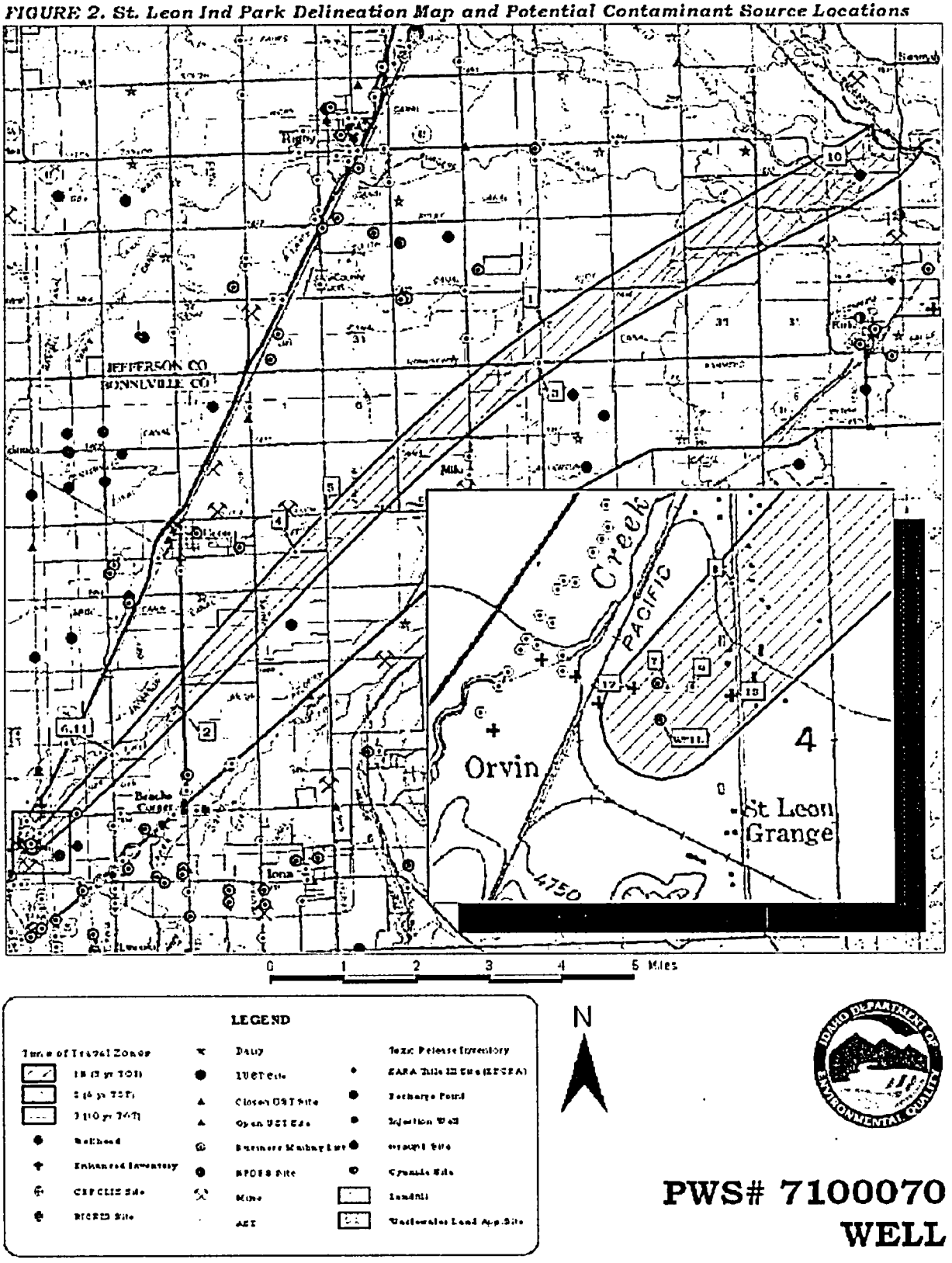
The delineated source water area for the well (Figure 2, Table 1) has its potential contaminants outlined below. Sources include an above ground storage tank (AST), two dairies, and ten service and industrial businesses. In addition, the canal system and South Fork Snake River were considered sources of potential contaminants due their transporting abilities.

Table 1. Saint Leon Industrial Park, Well #1, Potential Contaminant Inventory

SITE	Source Description[1]	TOT[2] ZONE	Source of Information	Potential Contaminants[3]
1	Dairy <= 200 cows	0-3 YR	Database Search	IOC, Microbials
2	Dairy <= 200 cows	0-3 YR	Database Search	IOC, Microbials
3	Janitorial Service	0-3 YR	Database Search	IOC, VOC, SOC
4	Excavating Contractors	0-3 YR	Database Search	IOC, VOC, SOC
5	Paper Label Manufacturers	0-3 YR	Database Search	IOC, VOC
6, 11	Oil/Lubricating Wholesaler; AST	0-3 YR	Database Search	VOC, SOC
7	Storage Unit	0-3 YR	Database Search	IOC, VOC, SOC
8	Lawn Maintenance Company	0-3 YR	Database Search	IOC
9	Printing Company	0-3 YR	Database Search	IOC, VOC
10	Recharge Point	0-3 YR	Database Search	IOC, SOC
12	Building Products	0-3 YR	Database Search	IOC, VOC, SOC
13	Lawn Maintenance Company	0-3 YR	Database Search	IOC
	Canal System	0-3 YR	GIS Map	IOC, VOC, SOC, Microbials
	South Fork Snake River	0-3 YR	GIS Map	IOC, VOC, SOC, Microbials

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, SOC = synthetic organic chemical, VOC = volatile organic chemical
AST = aboveground storage tank

FIGURE 2. St. Leon Ind Park Delineation Map and Potential Contaminant Source Locations



PWS# 7100070
WELL

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources (Table 2). The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The Saint Leon Industrial Park well rated high for hydrologic sensitivity. The Natural Resource Conservation Service characterized areas soils as moderately- to well-drained and missing information from the well log was given the most conservative, highest score. The well log would contain the thickness of each lithology the drilling rig drilled through, so the vadose zone composition, water table depth, and aquitard thickness could be determined. Since the information was unknown, a worst-case scenario was assumed and the higher score was given.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Saint Leon Industrial Park's well rated moderate for system construction. The well is located outside of a 100-year floodplain, and according to the 1999 Sanitary Survey for the system, the wellhead and surface seal are maintained. Because of a missing well log, it is unknown if the casing and annular seal extend into low permeability units, or if the highest production comes from more than 100 feet below static water levels.

Current PWS well construction standards are sometimes more stringent than when the wells were constructed. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, use of a downturned casing vent, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Because it is unknown if the well's construction meets all current standards, the well was assessed an additional system construction point.

Potential Contaminant Source and Land Use

The well rated moderate for IOCs, VOCs, microbials, and high for SOCs. The high percentage of irrigated agricultural land within the delineation, and it's location within a county of high fertilizer use, high herbicide use, and high agricultural chemical use contributed the highest amount to the ratings. The well's delineation intersects a priority area for the pesticide atrazine.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Table 2. Summary of Saint Leon Industrial Park Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well	H	M	M	H	M	M	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the Saint Leon Industrial Park well rated high for IOCs, VOCs, SOCs, and microbials. System construction rated moderate and hydrologic sensitivity rated high for the well. Land use scores were moderate for IOCs, VOCs, and microbials, and high for SOCs. The largest influences upon overall scores were the amount of agricultural land surrounding the well and within it's delineation, and unknown information from a missing well log. If a well log had been available scores might have been lower.

No SOCs or VOCs, or microbial contaminants have ever been detected in the tested water. Traces of the IOCs fluoride, and nitrate have been detected in the well. Despite existing in a county with high nitrogen fertilizer use, high herbicide use, and high agricultural chemical use, nitrate has only been detected in concentrations less than 2 ppm. The MCL for nitrate is 10 ppm. The well exists within a priority area for the pesticide atrazine.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For Saint Leon Industrial Park, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. Actions should be taken to keep a 50-foot radius circle clear around the wellheads. Any spills within the delineation should be carefully monitored and dealt with. As much of the designated protection area is outside the direct jurisdiction Saint Leon Industrial Park, making collaboration and partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A public education program should be a primary focus of any drinking water protection plan as the delineation is near residential land uses areas. Public education topics could include proper household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Idaho Falls Regional DEQ Office	(208) 528-2650
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under Resource Conservation Recovery Act (RCRA). RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Attachment A

Saint Leon Industrial Park Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : ST LEON IND PARK Well# : WELL
Public Water System Number 7100070 11/14/2002 9:22:06 AM

1. System Construction		SCORE			
Drill Date	1996				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	1999			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
	Total System Construction Score	4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
	Total Hydrologic Score	6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	13	8	8	4
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	6	4	4	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Land Use Zone II		0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		20	18	22	14
4. Final Susceptibility Source Score		14	14	14	15
5. Final Well Ranking		High	High	High	High