Project Number:

Determining Significant Swiss Industrial Sites

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Abstract

Which historic industrial sites best exemplify the evolution of Switzerland's distinct industrial heritage? We carefully defined a set of historic, economic, and architectural criteria as well as a screening process to select such sites. We also designed and implemented an interactive web site to display information about the sites to foster appreciation and preservation by the Swiss people. The sites displayed at http://www.industrial-heritage.ch were selected by applying this process to an exhaustive database of Swiss industrial sites.

Introduction

The noise was deafening. The roaring water and grinding machines echoed off the walls of the cave making a sound so loud it was almost unbearable. The water had worked its way through the rock many years ago creating a network of caverns that have been transformed by man into a series of six working mills. Men and children labored away in temperatures of five degrees Celsius to provide the materials needed by the town to survive the winter months. Eventually, the underground mills were abandoned in favor of above ground factories. The cave became part of a slaughterhouse and was used as a waste area for years; what was once an engineering marvel was reduced to a landfill. However, it was not lost. Thanks to the work of dedicated preservationists, the mill was completely cleaned out and restored. It can be visited today. A site that was almost buried under modern industry has been resurrected, and now the underground mills of Le Col-des-Roches can be appreciated by its visitors for generations to come.

Some industrial sites were not as lucky as the mills of Le Col-des-Roches. Just outside the city of Zürich stands a modern industrial park along the banks of the Limmat River. Car dealerships, loading docks, and modern factories now exist where one of the most important industrial sites in Zürich's history once stood. The Zürich City Gas Works was built on this very same site in 1898 and served as the main source of natural gas for the canton of Zürich. The largest gas works in Switzerland was an immense complex. It housed a giant furnace which burned coal to produce the gas, as well as four giant tanks to store the gas. This gas was used to heat homes, power factories, and light the streets of Zürich. However, time soon took its toll on the complex. A new gas works that did not burn coal was built nearby to replace the plant. The site fell into disrepair and slowly deteriorated. The space that was once the source of gas for Zürich began to be used for modern factories and warehouses. Today, only the skeleton of one of the giant tanks remains as evidence of this important chapter in Swiss history. The plant that lit the streets of Zürich for over half a century is now lost forever.

Many aspects of the past such as the ones above have been buried under today's new technology and innovations. We are planning to reveal some of these hidden treasures to the Swiss people in hopes that these portions of the past will not be lost forever. Through this unveiling, the Swiss people will be able to learn some of the most interesting industrial facts about their country. As more people become aware of the unique qualities these industrial structures possess, more people may be willing to help preserve these special structures.

The purposes of this study were to develop a process to identify important archeological structures and to apply this selection process to the Swiss industrial landscape in order to identify significant Swiss industrial sites. The three qualities we developed that a significant industrial site should posses are economic significance, historical significance, and integrity of the structure. We developed criteria for these qualities by conducting interviews with experts in Swiss economic history, industrial history, and architecture. As a result, our economic criteria consist of: the industry was or is a leading provider of employment, the industry was or is a leading contributor to the national revenue, the industry pioneered technological or managerial changes, and the industry allowed the country to be self-sufficient when foreign resources were unavailable. The historical criteria include first of its kind,

rarity in that it was the only site of its kind still in existence or it is particularly uncommon, and the involvement of the site in a major social event in history. Integrity is shown through evidence of original construction and workmanship, whether the structure exits in its original location, and the structure's surrounding environment or setting.

We developed an order for applying this process to Swiss industrial structures. First, we examined the economic significance of all the different industries within Switzerland. The industries we found to be economically significant we studied even further to determine if individual sites within these industries possessed historical significance as well. Finally, for those that have both economic and historical significance, we examined them to determine if they retained integrity. Through this process of elimination, we reduced the large list of industrial sites in Switzerland to the most significant industrial sites in Switzerland based upon our criteria.

We have developed a process for assessing the economic significance of industries, the historical significance of sites, and the integrity of structures. The implementation of our selection process, using the most exhaustive database of industrial sites in Switzerland as a source, resulted in eleven significant industrial sites. In order to present our findings and reach the greatest number of people in Switzerland, we have created a web-based catalog that features each significant industrial site with a brief history and other factual information.

A Brief History of Swiss Industry

Although Switzerland is a small, landlocked country, it has made its mark on the world through its economic and foreign policies as well as through its industries. "Swiss industry is counted among the most productive in the world because since its very beginning it has needed to service worldwide export markets" (Kieser & Spillmann, 1996). Currently, Switzerland ranks number 16 among the world's biggest trading nations, and is the 8th biggest foreign investor (Lehmann, 1998). "Cheese, chocolate, mountains, cowbells, alphorns, and of course, watches first come to people's minds when they think of Switzerland. But here as elsewhere, clichés do not fit with reality" (Lehmann, 1998). It is true that watches, chocolate, and the other Swiss clichés play a substantial role in Swiss industry, however, Swiss industrial history encompasses a much wider spectrum. Machinery, for example, "has become the biggest branch of all industries in the course of the last few years, and makes up 36 percent, the greatest part, of all exports" (Lehmann, 1998). This small mountain country was able to become the important, global player it is today through the industrial developments made throughout its history. By examining this history, we saw how Switzerland's industrial development transformed the country into what it is today.

Major industrial expansions started in the 1700s. Between 1700 and 1800, the population rose from 1.2 million to 1.6 million, mainly in the rural regions (Augustini, 1999). During this time, textile production, especially cotton weaving, printing cloth, and fine embroidery flourished in the northern and eastern parts of Switzerland (Augustini, 1999). In Geneva, Neuchatel and Jura, the watch and clock making industry developed (Fahrni, 1994). Industries here, however, developed quite differently than elsewhere in the world. An important aspect of Swiss industry was the small-scale in-home mindset that had been prevalent throughout Switzerland's history. As opposed to having hundreds of people work together in huge factories, most commercial production was done by the family in their own homes (Steinberg, 1996). Even though the workers may not have been wealthy, they usually owned their own machinery, and took pride in the work they did. One of the main factors behind this mindset was the mountainous geography (Steinberg, 1996). This type of geography led to high transportation costs and scattered clusters of people, making it more sensible to work in smaller units. Developments made in these small units have contributed to the expansion of Swiss industry.

The 19th century was also full of major economic expansion. During the early to middle 1800s, the textile industry, with emphasis on the spinning and weaving of cotton, was growing larger and was the most important industry in Switzerland (Fahrni, 1994). The workers would receive their raw materials from merchants in Zurich or St. Gallen, and would produce their cloth in their own homes.

Textile spinning factories started to take over in the 1830s. In the 1850s, major banks began to spring up. In this decade alone, six large commercial banks with very large capital investments were established (Fahrni, 1994). Major railway construction was also taking place at this time. "Prior to 1848 the only railway line on Swiss territory was a short one between Zurich and Basel," (Fahrni, 1994) but during the late 1800s, railway systems sprang up connecting every part of Switzerland. This allowed Switzerland to obtain more raw materials, and sell their goods abroad (Fahrni, 1994).

World War I plunged many Swiss export-related industries into crisis. Exports shrank to one-third of their former level, and masses of employees were laid off (Fahrni, 1994). The machining industry was still going strong with railway improvements such as electrifying the railroads in the 1920s, but banking and other industries suffered heavy losses due to lack of foreign investments. Many banks went bankrupt (Fahrni, 1994).

Switzerland was better prepared for World War II. In 1938, a shadow organization was set up to work out wartime economic control measures, and in 1939, legislation was passed to ensure that employees would not suffer cuts to salaries when called into the army (Fahrni, 1994). Prices were kept low and production was rationalized, resulting in the rate of inflation being less than half what it had been during the First World War (Fahrni, 1994).

After World War II, many people feared that the country would slide into crisis, but the opposite actually occurred. Switzerland experienced a substantial period of growth, mostly due to the fact that Switzerland was spared from the war, and their production facilities and capital were both intact (Fahrni, 1994). A great number of foreign workers came into Switzerland at this time which further boosted industry. Jobs shifted very quickly away from agriculture, and into machining and chemicals. "In 1941 the agriculture sector had provided jobs for approximately 21% of the workforce, by 1970 it was only 8% and by 1990 a mere 4.2%" (Fahrni, 1994). Major companies started to emerge in chemicals, machining, and metalworking. Today many of these companies only establish their main headquarters in Switzerland while their production sites are located abroad.

Modern Switzerland is more nationalized than early Switzerland. To remain profitable industries needed to consolidate in order to compete with foreign markets. A prime example of Switzerland becoming more centralized is the watch industry. Swiss history contains the roots of the watch industry. When early watches were developed, they were made by master engineers and craftsmen and always involved fine gems and metals (Bouquet, 1999). However, as other countries began mass-producing watches and using new quartz technology to lower manufacturing costs, Switzerland began to lose its dominance of the global watch industry. The Swiss watch industry survived by merging many of the small watch companies together into one large, national unit.

Process Development

Approaches for Assessing Archeological Significance

EMonument, a Belgian institution, is involved in various projects ranging from researching cleaner air and water to increasing knowledge of environmental heritage. It has developed a set of standards and guidelines for archeological and historical preservation. "The Guidelines are intended to assist in applying the Standards to projects generally; consequently, they are not meant to give case-specific advice" (http://www.environmonument.com). EMonument does not dictate the criteria of what is important to preserve for any particular site. Instead, Emonument has set up these guidelines to aid others in this process. Their goal is to create "a model process for owners, developers, and State agency managers to follow in order to identify, retain and preserve sites" (http://www.environmonument.com). The guidelines are very general, as they are designed to be shaped differently with every application. Some examples of the guidelines are, "evaluation should not be undertaken using documentation that may be out of date" and "criteria should be appropriate in scale to the purpose of the evaluation" (http://www.environmonument.com). These guidelines are not an actual selection process, but are standards to follow when creating one. We made our process to be used specifically on industrial sites, which gives our process a more specific definition than the EMonument guidelines. Our process and

criteria will be much more rigorously and clearly defined than what the EMonument guidelines call for.

Our goals are similar to those of the Geological Conservation Review (GCR). The GCR is a British organization whose aim is to identify and preserve sites that make a unique contribution to Britain's geology. "From the outset the Geological Conservation Review used the highest scientific standards to identify systematically the key Earth sites in Britain" (http://www.jncc.gov.uk/gcr/gcrweb/gcrselec.htm). They wanted the sites to reflect the diversity of British geology. To do this, the GCR first created a list of all known geological sites, determined which sites had significant research potential, and finally conducted fieldwork. The criteria used in this selection process emphasize sites that have been extensively researched. The site must have been studied in detail and have a long history of research and reinterpretation, have potential for future study and show an extended, or relatively complete, record of the feature of interest (http://www.jncc.gov.uk/gcr/gcrweb/gcrselec.htm). These criteria develop a different, more research oriented result than what we are interested in. Our process is different because we will be examining the importance of a site, not how much research has been done on it or how much research potential it has. We are not concerned with potential future study of a site, only with what is known and how significant that information is. Our process requires fieldwork similar to the GCR, but they are not explicit with what exactly they examine at a site. We will define explicit characteristics to examine when we do fieldwork at a site in order to obtain accurate results.

The United States' National Register of Historic Places published a bulletin entitled "Guide to Evaluating Historic Mining Sites in the United States" which is documents a process to measure the historical significance of mines in the United States. Many of the larger and better-known mining operations have already been documented, so this bulletin's goal is to find the small, yet important, elements of historic mining activity such as ditches, roads, or prospect pits and then document and evaluate them. Their evaluation criteria are very general, as their goal is to be very exhaustive and document every relevant site. A site must "be significant in American history, architecture, engineering or culture" (http://www.nps.gov) to be included in their study. Their criteria that define significance are vague. In order to be considered significant, a site must "be associated with the lives of persons significant in our past" or "have yielded, or may be likely to yield, information important in prehistory or history." (http://www.nps.gov) Though these criteria are useful for an ongoing national project to obtain an exhaustive list of all historic mining locations, they are too general for our purposes. Our project will define specific criteria that state exactly what a site must display to meet the criteria. By doing this, we will have a much less arbitrary process, since the more specific the criteria are, the less room there is for debate about whether a site meets the criteria. We will also be considering economic factors, which this bulletin does not do. This brings an added perspective to our analysis that will give our results added depth and precision.

Another selection process that deals with preservation worthy sites belongs to the Inventory of Significant Industrial sites in Switzerland (ISIS). Their objective was to create an inventory of all industrial sites in Switzerland that should be preserved. The selection process involves a list of over two hundred criteria in which a site must display at least one criterion to be selected. The results so far have produced a list of over three thousand sites worth protecting. (http://www.industrie-kultur.ch) Upon completion, the result will be the most exhaustive list of industrial sites in Switzerland. For our study we are interested in the most significant sites, not just an exhaustive list. Our process will do this by having fewer criteria and evaluating sites using comparative analysis, so that we will only be selecting sites that meet all of our criteria the best, not just ones that meet any one of the criteria.

The process that we developed and implemented for this project applies the concepts of the other selection processes and builds upon them by defining criteria more specifically and clearly. The idea of using criteria was effective for us because we were able to define specific traits that we were analyzing about each site. By having the ability to define our own criteria, we had control over what type of site we selected with the process. This gave us flexibility in researching and defining our criteria since our process does not change even if the criteria change. It also allowed us to select qualities that each of our sites must have, and then create criteria that would reflect these qualities.

Through the analysis of these selection methods and our thoughts, we developed a list of qualities relevant to our theme and purposes. We chose economic significance, historical significance, and integrity. The concepts of historical significance criteria and integrity criteria were taken from the NPS bulletin, but refined to be much more particular. We chose economic significance was chosen because Switzerland is a wealthy country and its economy has contributed greatly to its identity. If we select sites that are economically important to Switzerland, we will be selecting sites that reflect the identity of Switzerland. We chose the second quality, historical significance, because we wanted sites that contributed to the development of industry and have helped shape Switzerland into what it is today. We included the last quality of integrity because our study is preservation orientated. If a site no longer exists or is in ruins then it is hard to preserve. Also, a site with high integrity has lasted throughout the ages, demonstrating remarkable construction. We researched each of these fields and interviewed experts in each field to develop and refine our criteria.

Interviews

Before we interviewed the experts, we designed an interview approach (Appendix A) that we could use with professionals in the areas of architecture, economics, and Swiss history. At the completion of each interview, we used the interview analysis worksheet (Appendix B) to organize the information we gathered. This sheet assisted us in compiling the important points made in each interview and helped us form common themes present in the interviews. By analyzing each interview, we found errors in our logic and made refinements to the appropriate criteria. By conducting these interviews, we added the authority of specialized, professional opinions to our selection criteria.

We interviewed a total of four experts in various fields related to our study. We interviewed two experts in the fields of Swiss economic and industrial history. The first, Dr. Margrit Müller, is an economic historian at the University of Zürich who provided support for our economic significance criteria of being a leading income provider, a leading provider of jobs, and being innovation oriented. The second expert we interviewed was Dr. Hans-Peter Bärtschi, an expert in Swiss industrial history, who also verified our economic criteria and offered more ideas for our historical criteria. He suggested we consider the importance of the rarity of industrial sites, as well as whether or not the site was important in Swiss social history. We added these suggestions to our criteria for historical significance. In addition to defining the characteristics of economic and historical significance, we used interviews to help define the characteristics of site integrity. We interviewed two specialists at the Swiss Federal Institute of Technology, V. Lampugnani and Michael Hanak. V. Lampugnani focuses his studies in the area of architecture of urban design and provided ideas concerning the importance of an appropriate setting. Michael Hanak works with the history of architecture and provided insight regarding site construction. We were able to apply these ideas to the creation and development of our integrity criteria. The details of all interviews can be found in Appendix C.

We recorded all of the criteria in a document called "Application Guide for Selection Process." We used this document to analyze all aspects of a site pertaining to the criteria and to maintain consistency across all members of our project team. This document can be found in Appendix D.

Site Selection Criteria

A preliminary concept to our study was the idea of using pass/fail filters to determine if a site was significant. The idea of filters is a binary method of evaluating criteria for each site. We would have used this concept if each of our criteria could be realized as pass/fail, but this was impossible because the analysis is not straightforward. We developed an alternate model of examining sites through a more subjective approach based upon how sites relate to each other. This model doesn't examine whether or not a site passes or fails criteria, but rather how well each fits the criteria. This results in sites that are the "best-fit" for our criteria.

<u>Economic Significance</u> – Three different ways to consider economic significance are from a cultural standpoint, from a statistical volume standpoint, and from an innovation standpoint. A cultural view of economic significance deals with the factors that affect social aspects of the country, while a view

based on volume focuses on the numerical values like the amount of revenue or employment. The innovation aspect concentrates on an industry's technological or managerial developments that have been important to the industry and its economic success. We considered ideas from all three perspectives when we developed the economic significance criteria in order to identify sites that possess different types of economic value. The four criteria that we believe validate the economic significance of an industry are listed below.

1. The industry allowed the country to be self-sufficient when foreign resources were unavailable.
2. The industry was or is a leading contributor to the national revenue
3. The industry was or is a leading provider of employment
4. The industry pioneered technological or managerial changes

The first of the economic significance criteria that we examined was economic independence. Economic independence can be defined in a variety of ways. Using the strict definition of independence as being totally self-reliant, an industry would have to depend on its nation alone. Therefore, an industry in Switzerland must obtain all its raw materials from Switzerland as well as distribute goods only to the domestic market. This idea when being applied to Switzerland was not feasible. Switzerland has always been dependent on other countries due to its small domestic market and its lack of natural resources. It exports a majority of its products and imports many raw materials; therefore we chose to define economic independence as an industry that allowed the Swiss to be self-sufficient when outside resources were unavailable. We arrived at this definition through the story of the development of Swiss salt mines that enabled the Swiss to limit its reliance on France. We learned about this concept from Peter Egli, a representative of the Swiss Heritage Society. He stated that Switzerland had always been very dependent on other countries for natural resources (personal communication, October 24, 2002). When salt mines developed in Switzerland, they allowed Switzerland to break away from one of their foreign dependencies. During the World Wars when Switzerland was completely cut off from the outside world, their mines allowed their economy to continue to develop and survive.

Industries that bring significant income to a country help fuel employment, entrepreneurship, and technological advancement. In our discussion with Dr. Margrit Müller, an economic historian, we learned that Switzerland relies heavily on its exports and must import almost everything. Therefore, according to Dr. Müller the most important industries are the ones that export the most since they bring money into the country and contribute the most to the wealth (personal communication, November 7, 2002). Therefore, the second criterion of economic significance deals with the industry being a leading provider of income to a nation. We first considered selecting a specific amount of money that would act as a cut off point. Any industry that brought in more money than this number we set would be deemed a leading provider of income. While trying to determine the appropriate number we realized that we had no basis to justify choosing any number. Also, over the years the amount of money that signifies wealth changes due to inflation and changes in living standards. We then decided that evaluating each industry's contribution to the economy based on percentages might better suit our needs. However, we ran into the same problem of being unable to justify choosing a percentage without appearing arbitrary. We decided that the best method would be a comparison between industries. We had a set number of industries to examine so through comparative analysis we would be able to distinguish which of the group made the most significant contributions to the wealth of Switzerland.

Employment is an important aspect of economic significance because the industries that employ the most people are the industries that contribute the most to Switzerland's economic stability. Both Dr. Müller and Dr. Bärtschi believe the number of jobs an industry provides is an important part of economical significance (personal communication, November 7, 2002; personal communication, November 20, 2002). Similarly to our income criterion, we originally tried to establish a specific number of employees that must be working in the industry in order for it to be considered significant. This was again a problem because we could not justify a specific number of jobs. Choosing a percentage system would not work in this case for the same reasons. Our decision was to directly

compare each industry to one another, and select the industries that provided the most employment relative to one another.

The fourth of the economic criteria for the economic significance quality is the concept of innovation. Innovations were very important to the development of the Swiss economy (personal communication, Dr. M. Müller, November 7, 2002). We realized that there are many ways to examine innovation. One of the key decisions we made was to decide which quality we should include innovation under. We were unsure as to whether this criterion should be included under the economic quality or under the historical quality. We included it in the economic quality, since we could examine innovation from a macroeconomic standpoint. It made the most sense to apply this criterion to whole industries. One way to view innovation was to consider an industry's adaptation to market changes. We concluded that all industries in Switzerland had undergone some form of adaptation, because otherwise, the industry would not have survived. This consideration was discarded because adapting to changing markets does not make an industry noteworthy. Another potential view of this criterion was to examine how each industry brings recognition to the country. We concluded that every country sees Switzerland from a different perspective, making this concept difficult to analyze since we can only present an American view. The consideration of innovation that made the most sense to us was to examine how industries pioneered technological innovation and made radical changes to business practices. These innovations will have implications all throughout the world, and certainly work to make an industry noteworthy.

Historical Significance - Historical analysis involved the examination of each site rather than the industry. There were various factors that could be used to determine if a site was historically significant in the context of Swiss industrial history. We assembled a list of possible criteria and went through them to determine which ones would work best in our study.

Our first source of ideas for criteria was the NPS Bulletin on mining sites. This bulletin listed the four main criteria that are used by the NPS to determine if a mining site is historically significant. These criteria are:

A. The site is associated with events that have made significant contribution to the broad patterns of history
B. The site is associated with the lives of persons significant in the past
C. The site yields distinctive characteristics of a particular period of history
D. The site yielded, or may be likely to yield, information important in prehistory or history.

We considered these criteria too vague and indefinable for our study. The first criterion does not specifically say what a significant contribution is or define any specific trait that a site needs to have to display this criterion. We liked the concept of the second criterion, but it requires a very in depth knowledge of Swiss history. We would have had to study all well-known Swiss persons in order to determine which could be considered significant enough to include. This research was not feasible in our allotted amount of time. We liked the concept of the third criterion as well, but it was still too vague to be applied in our study. Almost every historical site would display some type of characteristic that displays the period of time in which it was built. We would need to study all periods of time and their distinctive characteristics to decide which characteristics are the most significant, which once again would not be practical. It was not feasible to define what important information to prehistory or history would be for the fourth criterion. Once again, we would need to have an in-depth knowledge of Swiss history, which was not possible.

These criteria contained good ideas but were not specific enough for our study. We needed criteria that defined specific traits that we could research and apply to our sites. We developed a list of three criteria that met these needs. These three criteria are:

1. The site had a characteristic or property that was the first or originator of its type
2. The site was uncommon in some aspect or was one of the last remaining of its kind
3. The site was involved in a major social event in history

The first criterion of historical significance encompasses any site that exhibited a trait that was the first of its kind. The first time something is done or created, it was significant to history because the

results of the innovation can affect the future and radically change the course of history. The first water mills affected history by beginning the industrial revolution, which dramatically changed the world. Several men walked on the moon, but most people remember only the ones who were first in 1969 because they did what no one else had ever done. Events like these have never taken place before, rendering them important historical occurrences. For Swiss industrial history, we defined these 'firsts' as something that happened for the first time in Swiss history relating to its industrial development.

The second criterion is the rarity of the site. We defined rarity as unique or as the last of its kind. Unique means that the site possessed some quality that no other site had such as being the oldest or the only site that performed a certain operation. It could also have a physical characteristic that made it unique such as it was the largest of its type. A site that was the last of its kind could be a site that was not extraordinary when it was made, but is now the last remaining of those structures. A textile mill that ran on a water wheel may not have been rare when it was built, but the only one still standing today would be considered rare.

We obtained this idea from our interview with Dr. H-P Bärtschi. Dr. Bärtschi uses these criteria when evaluating historical sites to determine which sites are the rarest, and thus the ones that need to be preserved the most. We felt this idea was very good for our project because it could be defined and applied to sites, and also works toward our theme of preservation. The GRC also adds support this idea in its selection process described earlier in this study. Their article states, "…the scientific case for conserving a given site is stronger if it is the only one of its kind…" (http://www.jncc.gov.uk/gcr/gcrweb/gcrselec.htm) This agrees with the concept that rare sites are the ones that need to be protected the most. Our goal is to help preserve these sites, so by including rare sites, we will have sites that need to be preserved the most.

The third criterion is the involvement of the site in a major social event in history. This could either be an industrial event, or one that is completely unrelated to industry. Some of these events would be strikes, sit-ins, protests, wartime rallying, an important political meeting, or any other social event that could happen at a site. A natural disaster or industrial accident would also be considered a social event since the incident would have affected the community around the site. Take for example an ordinary steel mill that is not considered historically significant since it neither is the first of its kind, nor is it rare. However, if an industrial accident happened there that had an effect on the surrounding community, the mill would be significant because the event took place there. Dr. Bärtschi suggested this concept to us as well. We decided to include the idea because it was definable and added another dimension to our selection process since we are not just considering industrial or technological aspects of history. By also analyzing social aspects of history, our process bridges the gap between technology and society.

Integrity - Along with the historical aspects of the sites, we investigated the integrity of the structures as well. According to the "Guidelines for Applying the National Register Criteria for Evaluation" contained in *National Register Bulletin 15*, integrity is "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period." The architectural structures with the highest integrity will exhibit the characteristics of the definition above.

The NPS Bulletin on evaluating mining sites describes seven criteria that were used to determine the integrity of the sites. The seven criteria are location, setting, design, materials, workmanship, feeling, and association. We chose to use only three of these criteria for our study. The feeling and association criteria both pertained to the feeling that a person gets when s/he observes a particular site. It would not be possible to rigorously define a feeling, which is what we would need to do for it to be a criterion in our study. It would also introduce a lot of validity threats since the same site can evoke different feelings for different people. For these reasons, we decided not to include the feeling or association criteria. We worked the materials criterion into the workmanship criterion we chose to use. We have defined workmanship to take original materials into account. We did not use the design criterion because it involves identifying what type of design the building is and what role that

design had in Swiss history. This would require knowledge of Swiss architectural history that we do not possess. This left us with the following three criteria we used in our study:

1. Integrity of setting
2. Integrity of workmanship
3. Integrity of location

Setting is how a site fits into its surrounding environment (Noble and Spude, 2000). Modern day developments that surround the architectural sites as well as modern attempts to restore the setting may compromise actual integrity of the setting, rendering it less authentic (Noble and Spude, 2000). Another characteristic that may diminish integrity of setting is the cleanup and disposal of abandoned machinery and dilapidated buildings and structures (Noble and Spude, 2000). The setting of the site should be as close to its original setting as possible. A site that has been maintained and taken care of has a higher integrity than sites that have become dilapidated. Along these lines, V. Lumpagnani, a professor of architecture at ETH in Zurich, confirmed that the maintenance of setting is a key aspect of integrity.

To possess integrity of workmanship, a site should have evidence of its original construction materials, show high-quality characteristics, and lack any substantial modern changes or renovations. According to Michael Hanak, an architecture expert at ETH, "good workmanship of the architecture is one of the most integral aspects of integrity."

The existence of original building materials is important to the integrity of the structure since their existence shows that the site has not been modified, and evidence of their survival portrays a high quality construction. Modifications and major reconstructions take away from the integrity of a structure because the structure is no longer in its original form. Professor Lumpagnani stated that no building should ever be reconstructed, as the reconstruction will never do justice to the original site. For this reason, the evidence of original construction is important to the workmanship of the site.

The integrity of location is based on whether the structure or artifacts inside the structure have been moved from their original location. Moving a structure or artifact from its original location takes away from its integrity. A turbine gear on display in a building lobby has less integrity than one that is still in its original turbine at the power plant it was constructed for. Items that are in their original sites have higher integrity because they reside where they were originally meant to be.

Implementation

We decided that it would not be rigorous to simply choose sites as we found them and include them in our study. During our initial research, we found a list of industrial sites in Switzerland that came from the work of the ISIS project. Our interview with Michael Hank and our discussion with Peter Egli confirmed that this list was the most exhaustive list of industrial sites in Switzerland. Therefore, we used the ISIS site list for our master-list of sites to evaluate with our selection process.

We developed an order to apply each of the qualities to our site list in a fashion that we felt would be most effective. We chose to apply economic significance to all industries first. Our economic significance quality examines macro-economic aspects of industrial development, so it was most logical to apply this quality first, and isolate only the industries that we considered economically significant. The second quality in our chosen order is historical significance. Historical significance could be evaluated through desktop work, whereas integrity relies on fieldwork. In order to reduce our fieldwork to a smaller number of sites, we decided to apply our analysis of our historical significance next. We applied our assessment of integrity last.

For our economic criteria, we categorized all the sites by industry so we could examine them on a macro level. We then researched each industry for data about each criterion and put this data into a matrix to see how well each industry met each criterion. After researching how each industry met each criterion, we worked as a team to decide which industries were most economically important based on the data.

We only evaluated sites for historical significance if the industry they were part of was considered economically significant. We then performed extensive World Wide Web research on each of these sites to find out how well each site met our criteria for historical significance. Some sites were eliminated because there was no historical data available. We selected the sites that best fit our historical criteria based on the data we collected.

The final step of analysis was to determine the integrity of the structures of each of the remaining sites. We traveled in teams of two for eight days to assess the integrity of the sites. At each site we observed and documented the location, setting and workmanship of the structure. The sites that best met these criteria were the final sites to be documented in our final catalog.

After confirming that a site had met all of our qualities for selection, we placed information about the site onto a website. This website features general information about each of our sites and explains about its contribution to the development of Swiss Industry. Each webpage also includes pictures taken from the site to give the web visitor a visual representation of the site.

Results and Analysis

Economic Significance

The evaluation of economic significance was research oriented. We examined how much revenue each industry brought into Switzerland. We researched the number of people employed by each industry to determine if the industry provided a significant number of jobs when compared to other industries at any point in history. To assess innovation, we examined the new developments made within each industry. We considered innovations that were either in business practice or technology. For the last criterion, independence, we examined whether or not an industry allowed Switzerland to be domestically self-sufficient when foreign resources were unavailable.

We researched each of the eighteen major industries we found in Switzerland. We considered the industries that met the criteria to be the most economically significant.

Mining - The mining industry is very small, as there are few raw materials to be mined in Switzerland. The amount of revenue and the number of job are small in the context of Swiss industry. There have been no major innovations in the mining industry that we have found in our research. However, what makes the mining industry economically significant is the economic independence it offered Switzerland. The mines allowed salt and iron ore to be obtained directly in the country, so during important periods in Swiss history, the country did not have to import these important industrial inputs. This helped sustain the Swiss economy when other countries cut off their trade, which occurred during the two world wars (http://www.switzerland.isyours.com/e/guide/valais/bex.html).

Power - In Switzerland waterpower is the oldest and most important domestic source of energy. It has contributed to more efficient production in many industries that required large amounts of manual labor (Swiss Credit Bank, 1975). Without this available source of power within Switzerland, many industries would not have had the resources that they have needed to grow and develop. Switzerland has always been at the forefront of the hydropower industry and is globally known for its premier hydro engineering and technology. The power industry has helped create immeasurable amounts of jobs and income for other industries throughout history, and has also been a leader in innovation and technology. For these reasons, the power industry is considered economically significant.

Textiles - The oldest of all of Switzerland's major industries is the textile industry. It was at one time the biggest export industry in Switzerland, producing over half of all exports. This is not surprising since Switzerland produced every type of textile available. Eventually, the machining and chemical industries surpassed the textile industry in terms of exports. However, the textile industry is still a very big contributor, and in 1996, it was reported that the textile industry was the number two contributor to national revenue (Lehmann, 1996). Another aspect of the textile industry that makes it economically significant is its role in the formation of the chemical and machining industries. Through developments made within the textile industries, these two major industries evolved (Swiss Credit Bank, 1975). The

machining industry in Switzerland arose from the need to make machines for the textile industry, while the chemical industry had its beginnings in the dyestuffs.

Transportation - The transportation industry is unique in Switzerland because of Switzerland's central location in Europe. This means that many products cross over Switzerland's borders in terms of exports and imports from surrounding countries. Thus, it is important that Switzerland has good transportation so that they can easily keep up with the flow of export/import traffic due to their location directly at the crossroads of the Alps. Important innovations have also occurred in this field in Switzerland. Switzerland is the only country whose railways are completely electric powered (H. Bärtschi, personal communication, November 20, 2002). Switzerland also has numerous cog railways and cable car systems for navigating through the Alps that are models for others around the world. It is this type of leading edge transportation technology that makes this industry economically significant.

Chemicals - With multinational companies such as Hoffman-La Roche and Ciba-Geigy, the chemical industry is one of the biggest parts of the Swiss economy. It was the number one contributor to national income in 1996 (Lehmann, 1998) and also made up 21.6% of exports in 1973 (Swiss Credit Bank, 1975). The chemical industry makes up the largest part of income to Switzerland, which makes it economically important. It also employs a substantial number of workers, 8% of the workforce in 1975 (Swiss Credit Bank, 1975). The other main reason for considering the chemical industry is that the Swiss chemical industry has been a leader in global innovation. The Swiss chemical industry is known for its pioneering work in reactive dyes and pigment-based products, and their pharmaceutical products are known throughout the world for their service of medicine (Swiss Credit Bank, 1975). This industry is very significant to the economy of Switzerland.

Watch Industry - One of Switzerland's most well known industries is the watch industry. People from almost every part of the world associate Switzerland with high quality watches. The value of watch exports is very large, as Switzerland is one of the largest watch producers in the world in terms of value. In 2000, the value of watch exports broke the 10 billion CHF mark (http://www.swiss-watchmaking-year.com/statistics/). Because the watch industry generates such a large amount of income, it is very significant to the economy of Switzerland. The watch industry has also experienced radical business innovations that allowed it to continue competing in the world market. The consolidation it went through in the early 1980s saved the industry from competition from other companies in the USA and Japan. By adapting and finding a new niche in the new world market of cheaper watches, the Swiss watch industry survived and is once again thriving today.

Machining - The machining industry is a not well known powerhouse in the Swiss economy. Machining has emerged as one of Switzerland's biggest exporters in recent years. In 1998, it made up the greatest part of all Swiss exports, making up 36% (Lehmann, 1998). It also employs a large number of workers, about 245,000 in 1973 that made up about 30% of the Swiss work force (Swiss Credit Bank, 1975). The high export value and large work force makes machining economically significant. Small firms spread throughout the country allowed for easy specialization and adaptation to customer demand, which in turn led to a multitude of innovations since firms worked in specialized areas. The industry also had over 80 breakthrough inventions such as the first turbine pump (Swiss Credit Bank, 1975).

The Food Industry - The innovations that have taken place in the food industry contribute the most to its economic significance. Chocolate was first industrially produced in Switzerland (Swiss Credit Bank, 1975). In addition, soluble coffee powder and powdered milk were first produced by Swiss firms (Swiss Credit Bank, 1975). The food industry also forms a considerable portion of Swiss exports. In 1973, exports reached 1,308 million francs which counted for 5% of the country's exports (Swiss Credit Bank, 1975), and in 1996 the food industry accounted for 6.5% of all industrial jobs (Lehmann, 1998). The high volume of income and high number of jobs add to the importance of this industry and help make it economically significant.

Leather and Shoe - Although the leather and shoe industry was once one of the leading exporters, currently it does not make up a significant portion of the Swiss economy. It neither brings in

substantial revenue, nor does it account for a considerable percentage of jobs. We have found no information regarding important innovations (Swiss Credit Bank, 1975).

Paper and Printing - Paper and printing are very small industries in Switzerland. Since production is mostly for the small domestic market, it does not bring a substantial amount of income to the economy (Swiss Credit Bank, 1975). Both industries rely on important raw materials to function. The costs of raw materials are increasing which is reducing the already small number of people employed in this industry. No major innovations in paper and printing have been made in Switzerland. Due to the lack of volume and innovations, this industry is not economically significant in Switzerland.

Construction - In 1973, about 250,000 people were working in the construction industry, which was a significant amount at the time (Swiss Credit Bank, 1975). However, this industry brings little revenue into the economy. Also, Switzerland is not known for any innovations in the construction industry. Construction produces a multitude of jobs, but besides that, it does not make a significant contribution to the Swiss economy. Thus, in comparison to the other industries examined, the construction industry was not considered significant enough to include in our study.

Industries we have found no information regarding their contribution to Swiss economic independence, export statistics, job statistics, or innovations are:

- Commercial Buildings
- Communication
- Nonmetal Manufacturing
- Processing
- Public Archives
- Public Works
- Woodworking

Out of the original eighteen industries, we considered eight to be economically significant enough to be included in our study. These eight industries are as follows: mining, power, textiles, transportation, chemicals, watch, machining and food. By isolating just these eight industries, we reduced our list of 370 industrial sites to 274 sites.

Historical Significance

We researched the remaining 274 sites for information pertaining to these selection criteria. We considered the following 19 sites historically significant enough to be included in our catalog. The sites are described below in short paragraphs that describe the important historical facts about each site. The sites are grouped by the historical criteria they met.

Historical Firsts – The following sites are either the location where an idea originated, or exhibit characteristics that had not been seen before.

Bau 15 Roche-Areal: Hoffmann-La Roche is an internationally recognized chemical company that has made many new contributions to the pharmaceutical industry. They synthesized vitamin A for large-scale production in 1947 (Roche Magazine, 1996). Another development was Rimifon, which was a new treatment for tuberculosis. This product was launched worldwide and led to their recognition as an international leader in chemotherapy (Roche Magazine, 1996).

Tramdepot Wiesenstrasse: Basel was the first Swiss city to have a public streetcar enterprise. In 1907, this Tram depot was made to accommodate a Tram Museum (Bärtschi, 1998).

Fabrique de Cigarettes: The owners of this cigarette factory were the founders of the first Swiss Federation of the manufacturers of tobacco. In addition, this company was one of the first companies to introduce a family benefits and health insurance package (http://www.zopfi.ch/Schiefer.html).

Greuterhof: Greuterhof is a large textile factory built in 1777. Within the Greuterhof in 1802 the first operational health insurance system in Switzerland was implemented (http://www.greuterhof.ch/).

Chemische Fabrik: The Uetikon chemical factory was the first chemical company to produce sulfur from low-priced pyrite. They grew to be the largest sulfur producer in Switzerland (http://www.snl.ch/dhs/externe/protect/textes/D41788.html).

Rarity – The following sites are one of the last of their kind, or display a characteristic that makes them unique from other sites of their type such as oldest or largest.

Brienz-Rothorn-Bahn BRB: Brienz-Rothorn-Bahn BRB is important in that it is the only locomotive company that has used steam locomotives all through the 20th century, and still uses them today. All of the other Swiss train lines have been electrified in the 40's and 50's (http://www.rail-info.ch/BRB/index.de.html).

Usine de Forces-Motrices: Built between 1883 and 1892, Usine de Forces-Motrices was at the time of its construction the largest hydraulic factory in Switzerland. It was used to control the water level in the lake, pump drinking water to the city, and provide power to surrounding factories (http://www.geneve.ch/journees-du-patrimoine/1999/4_fiche5.html).

Alpine Mühle: Alpine Mühle is the oldest functioning alpine mill in Switzerland, and is over 400 years old (http://mypage.bluewin.ch/beaklaus/ardez/bikhik/hikeftan.htm).

Dampfschiffe SGV: This is the largest shipping enterprise in Switzerland, having manufactured 5 wheel steamers and 15 motor ships. Dampfschiffe SGV manufactures the fastest steamships in Switzerland (http://www.dampfschiff.ch/gallia_aktion.htm).

Hammetschwandlift: This is the highest free-air elevator in Switzerland. It stands at a record 153 meters high (http://de.myswitzerland.com/de/navpageresults_top5.cfm?item=Record&start=11).

Lokremise (St. Gallen): The St. Gallen Lokremise was built in 1911 and contains the largest ring depot in Switzerland (http://www.lokremise.ch/DEU/LOKREMISE/lokremise_frame.html).

Pilatusbahn: The Pilatusbahn is the steepest rack railway in the world. It opened for operation in 1889 and was also the first railway system to have a double rack (http://www.asme.org/history/roster/H220.html).

Moulins souterrains du Col-des-Roches: The mills of Col-de-Roches were built into a pre-existing cave that had an underground river flowing through it. Five waterwheels were built into the limestone and used the power of the water to make flour, crush flax and hemp, cut wood, and eventually produce electricity. This is the only mill that was successfully operated in a cave in all of Europe (http://www.grotte.ch/MOU/; http://www.skene.be/RW/RWECHO37/rwecho37131.html).

Geigenmuhle, Neerach: Geigenmühle is the oldest stone mill that is still producing flour today (http://www.ausflugsziele.ch/uebersicht/default.asp?CatID=157&Page=2).

Gaswerk der Stadt Zürich: The Gas Works for the City of Zürich created natural gas from the burning of coal. It is the largest gas works plant in all of Switzerland (http://www.tgvzu.ch/publikationen/Zeitung%2018/Gaswerkareal.htm).

Schraubendampfer "Greif": The oldest and only original Screw Steamer in Switzerland that is used for public transportation today (http://www.dyco.ch/ch/de/jenny/video/dampfschiff.htm).

Kohlenbergwerk Käpfnach: The coal mine at Käpfnach opened in 1785 and was the largest coal mine in Switzerland. This mine flourished in the 19th century and was very important during both World Wars. After World War Two the mine shut down for good and is now a museum (Bärtschi, 1994; http://www.sgtk.ethz.ch/100jahresgtk/meilensteine/6_historische_nutzung.html).

Lokremise (Uster): This locomotive housing station is located in Uster, and houses the oldest roundhouse in Switzerland, built around a circle segment turntable (http://www.industrieensemble.ch/industrielehrpfad.html).

Social History – The following sites are related to a major event in social history.

Schiefer-Bearbeitungsmaschinen: The slate mine in Elm that began operation in 1861. It was the site of a large industrial accident Sept 11, 1881 where 114 people were killed in a landslide caused by unsafe mining practices. The landslide also buried 83 houses and covered 90 hectares (222.4 acres) of countryside (http://www.zopfi.ch/Schiefer.html).

Site Integrity

We measured the integrity of each industrial site that we considered historically significant. We visited each of the previous twenty industrial sites in order to observe the site and surrounding area, as

well as to gather more information about each specific site. The following paragraphs give a description of the integrity of each site we visited.

Greuterhof: The building stands in its original location, and is located in Zurich canton, which is where the textile industry originated and flourished. There is a newer apartment building across the street, but this building fits in with its rural environment. The surrounding buildings are very old as well, but kept in good condition. There was a building being constructed next to it. There have been no major modifications to the Greuterhof that invalidated its integrity. The doors, floors, ceilings, and pillars are all original, and in good working order, which combine with its setting to give this site good integrity. The building has been renovated starting in 1979, but this entailed general upkeep and preservation of the site, as opposed to modern additions.

Lokremise (St. Gallen): The Lokremise in St. Gallen failed to demonstrate adequate site integrity. Although the workmanship may have once been exceptional, the state the building lies in today proves otherwise. The building was originally built with brick and then cement was laid down over the bricks to create a smooth finish. Today the cement has fallen away revealing brick in many places. The inside of the Lokremise appeared to have been gutted and new walls were being constructed for an exhibit to be held there. Nothing was inside that related to its former function or appearance except the round table. The surrounding area was under heavy construction of office buildings. However, the building was in its original location.

Fabrique de Cigarettes: The Fabrique de Cigarettes building is in a worn-down state and looked as if it was an abandoned warehouse. The building was simply a long metal rectangle with few windows and doors. Most of the outside walls had either rust or mildew covering them. There was moss and graffiti on the lower concrete areas of the structure as well. There was a giant structure on the roof of 2 cigarette packs which was the only distinguishing feature of the building. It was bordered on one side by the railroad tracks and a nearby loading dock and on the other sides by streets and family homes, which gave the factory a good surrounding environment. However, the poor state of the building itself gives this site low integrity.

Tramdepot Wiesenstrasse: The building that houses the antique trams is in excellent shape, as it is still in use today as a functioning tram depot. The surrounding area is well suited to the tram museum as well. There are no major nearby construction sites, and the surrounding buildings do not appear out of place. There are several large rooms where modern trams are stored, and one room where the antique trams are located. The trams are still in good working order and are cosmetically in very good shape. The depot building itself and the antique trams inside both combine to display high integrity.

Pilatusbahn: The Pilatusbahn displayed site integrity very well. The train station at the start of the track retains much of its original character. The surrounding environment consists of small town shops and restraints that fit the setting of the Pilatusbahn. Nothing seemed out of place in its location. The Pilatusbahn was originally constructed to allow as many people to view the mountain and is still a tourist attraction today.

Brienz-Rothorn-Bahn BRB: The Brienz-Rothorn-Bahn demonstrated excellent site integrity. The train station at the start of the track was in good order and no modern additions appeared to be present. The locomotives as well as the storage houses appeared to be in good condition. The setting was fitting to the location and the atmosphere the BRB provoked. The BRB is operating today as a tourist attraction.

Geigenmühle: The mill was in complete working condition and still processes all kinds of grain. Renovations have been made to many of the working mechanisms, but the original look had been retained. The current waterwheel is about 200 years old and was a replacement for the original wheel that was much smaller. The belts that ran throughout the mill were made of leather and the mill itself was made of wood and stone. The family currently living in the mill has lived there for the past fifteen years. The surrounding area is covered with fields as well as small cottage houses. This site displayed excellent integrity.

Gaswerk der Stadt Zürich: A desolate industrial park is the current home of the Gaswerk der Stadt Zürich (City of Zürich Gasworks). The gas works have been completely modernized with new storage

tanks, and new buildings. The surroundings are filled with small stores and large industrial buildings that are not related to the gas works, which gives the site very poor integrity. The complex is very industrial and modern with little left of the old gas works. There was only one surviving original tank, and it is falling down and dilapidated.

Usine de Forces-Motrices: The Usine de Forces-Motrices is an old hydraulic power plant that sits in the middle of the river in Genève. It is surrounded on all sides by modern buildings. The building itself displays good workmanship as the building is well built and maintained. There are four plaques on the outside walls that give information and credit to the building's original owners. The building looks like a peninsula sticking into the river which allows the water to flow beneath it and be used for creating hydraulic power, and later electric power. The building is no longer a functioning power plant, but is now a theater for concert performances and plays. Some original machinery is left, but most has been removed and the interior has been changed into a theater. This major change in the building diminishes the integrity of the site. Also, the surrounding environment being so modern and poorly maintained further reduces the site's integrity. The integrity of location for the plant is good since the site has not been moved, but this site does not meet our criteria for site integrity.

Moulins souterrains du Col-des-Roches: The underground mills of Col-des-Roches are a site unique in Europe. The entire mill is located inside a cave that had an underground river flowing through it. The river has since been diverted to serve other power needs, so the mill is no longer operational, but the cave still remains with some of the machinery left intact. One can still see the old staircases carved in the stone and the tunnels through the cave walls as well as some of the surviving machinery. There are modern lighting and stairs inside as well, but these are needed in order to show people the entire complex. The surrounding environment had little evidence of new construction. There are no modern buildings or structures in the immediate area of the cave. There is a museum at the entrance to the cave where information is displayed, and the courtyard in front of the museum showcases some machinery similar to what would have been used in the mill. This site meets our criteria for site integrity because it meets the criteria of workmanship and setting.

Kohlenbergwerk Käpfnach: The coal mine that was once the largest in Switzerland is located on the main street in Horgen. The entrance to the mine is a small house surrounded by old mining cars, which is located right on the street. The house itself is not maintained well and is in a shoddy state. A staircase leads down behind the house to where the actual entrance to the mine is located, and two sets of tracks lead into the mine. Further down the hillside is another street and several suburban homes that are no more than fifty feet from the mine. The surrounding environment gives the mine very poor integrity since there were no main streets or homes located close to the original mine.

Schiefer-Bearbeitungsmaschinen: The slate mine in Elm is located in the foothills of the Alps. The mine itself does not exist because of the landslide, but evidence of the mine still remains on the mountain. However, due to severe weather conditions, we were unable to view these remains and thus have no data on the integrity of the mine. Since we have no information, we have not included this site.

Alpine Mühle: On the mountain slopes of the mountain village of Ftan is where this ancient alpine mill lies. The mill sits on a steep slope with a majestic view of the Alps and valley below. The surrounding environment is all snowy meadows with the exception of a nearby hotel. The mill itself is a small wooden house with a water chute coming into it from the slope above. The water chute was fed by a small stream that runs down the mountain and supplies the mill with power. The workmanship of the house was excellent. The wood showed no signs of rotting or wear which, combined with the setting, gave the mill excellent integrity. We were unable to see the inside of the mill due to the season, so we have no information about the machinery inside the mill.

Conclusions and Implications

There are two final products that result from our study - a webpage showing our catalog of significant sites, as well as the selection process used to obtain the industrial sites displayed on the webpage. Both outcomes will have different impacts. The website will help bring some of

Switzerland's most fascinating aspects of industrial history to the Swiss peoples' attention. Also, the webpage will offer motivation to preserve these industrial sites. The other product is the selection process that made the final catalog possible. This process can be applied to a variety of research fields within archeology and can be expanded into other selection processes. In the same way we found ideas in other processes, other researchers could use our process as a source for ideas and concepts. The long-term effects and implications of this project will aid future researching processes as well as generate more enthusiasm for Swiss industrial heritage.

There is currently no centralized organization concerned with the preservation of industrial sites in the Swiss federal government. Because of this, the preservation of sites is the responsibility of private organizations such as ARIAS Winterthur, the SGTI, and Swiss Heritage Society. This project can help fill this void by exposing people to Swiss industrial heritage and bringing more recognition to these private organizations. By working in conjunction with Dr. Hans-Peter Bärtschi of ISIS, we can directly help them receive more donations and support so they can continue their preservation work. Through the awareness generated by our web site, we will stimulate more interest in the preservation of Swiss industrial sites.

The development of our site selection process has some aspects that will be helpful to other research. It takes what has already been done with identifying and evaluating archeological sites and builds on this by providing rigorous, specific, and well-defined selection criteria. This is different from some other processes that use criteria that are not defined clearly or are too general for selecting only the most significant sites. The process also uses both macro and micro perspectives when evaluating criteria. This makes the process more efficient since sites can be evaluated in groups according to type, which eliminates the need to research every criterion for each individual site. We also evaluated economic significance by combining three different perspectives. We used criteria that involved examining economics from a numerical standpoint, an innovation standpoint, and a cultural standpoint. By combining all three aspects, we get a more thorough evaluation of the economy of Switzerland. This makes our project more complete and gives more accurate results.

Our process is the integration of varying perspectives. It is the result of input from electrical engineers, a computer scientist, a chemical engineer, a mathematician, and an economist. With this kind of variety, we will have a different final product then if this was done by a group of all experts in Swiss history. We have different opinions on what is important in a site and have combined all these opinions into our process. Because of all these different inputs, we have ideas and concepts that an expert in history might not have thought of, since they might not have a background in a particular area of study. Having contributors from all these perspectives provides a multi-disciplinary final result.

Our contribution is the compilation of historic significance, economic significance, and integrity of structures into a selection process, using this process to select the most exemplary sites from a given set of sites, and displaying these results in a web-based catalog. Refinements to the criteria and the sources used throughout our project can be made in the future to augment the list of sites that passed our criteria. The process can also be extended to feature more aspects such as the service and agriculture sectors of economy, or other geographical regions. This process can be applied to a broader range of topics which makes it a versatile and important contribution to the field of archeology.

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Appendix A

Interview Questions for Experts

Explanation of Interview: We are a U.S. Project Team researching the process of screening industrial sites that have historical significance, economic significance and integrity. The definition of "integrity" in this context is "the ability of an industrial site to convey its significance." Upon development of our process, we will begin to compile a catalog of sites throughout Switzerland that meet each of our selection criteria. We are speaking with you for two reasons today: first to gain a better understanding of what is important to Swiss people so it can be reflected in the criteria of our selection process, and secondly, to obtain ideas for sites that you feel have this integrity.

Starting Point: What is your background in relation to industrial architecture?

Why we are asking this question: Provide validity for our interview.

What factors do you feel make a site historically significant?

Why we are asking this question: To establish credibility of our filters.

What factors do you feel make a site economically significant?

Why we are asking this question: To establish credibility of our filters.

Integrity is defined as is "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period." What makes an industrial site have a high level of integrity?

Why we are asking this question: To establish credibility of our filters.

What are signs of good workmanship?

Why we are asking this question: To build authority of the Workmanship Filter

Are there any trends or ideas specific to Swiss industrial architecture? If so, what are they?

Why we are asking this question: Distinguishing common themes or ideas between sites.

How have historical events affected industrial architecture in Switzerland?

Why we are asking this question: Gain more authority on Historical Significance Filter.

What sites do you think we should consider and why?

Why we are asking this question: To make additions to our master site list.

For each of the sites you mentioned earlier, will you explain the economic contribution to the development of Switzerland?

Why we are asking this question: Gain more authority on Economic Significance Filter.

Appendix B

Interview Analysis Worksheet

Interviewee Name: _____

Date: _____

List any common themes that this person noted:

List anything that the interviewee **repetitively** or **strongly** spoke about:

List any subtle points that the interviewee tried to make:

Explain any suggestions that this person made to the filters, context, or locations:

Important Comments:

Appendix C

Interview Analyses

Interview 1: V. Lampugnani

Lampugnani works in the architectural area of urban design. His main interest is creating designs such as city layouts. These layouts are mainly buildings that include some form of public space such as malls or apartment complexes. Currently, Lampugnani is working on a master plan in Basel, which provides design specifications for every new building in a business complex. When considering an architectural design, Lampugnani believes that the materials used for construction should be displayed. Materials used for decoration or to create a fake façade are not architecturally appealing. He does not believe in reconstruction, since it is fake, and completely discredits the original work. He stated that in order to have a worthwhile construction, you need to preserve a building and work with the skeleton of the preserved building, or tear it down and restart the design process. Lumpugnani commented that a well-designed site adds historical value to any area. He stated that high integrity contributes to its overall economic significance since more people will be attracted to the site.

Lampugnani examined our parameters for integrity and said that they are good and can be used for our type of project. He said that maintenance of setting and workmanship are key factors in integrity. He stated that an important factor for the workmanship parameter is that the structure should reflect its functional purpose in the architecture. Cosmetics are definitely not as important as functionality in terms of industrial architecture.

Interview 2: Michael Hanak

Michael Hanak is a professional specializing in history of art and industrial architecture at ETH in Zurich. The ideas that he shared during the interview were definitely from an architecture-oriented mindset. When asked what he felt makes a site historically significant, he replied "the architecture" and gave us some aspects that make Swiss industrial architecture historically important. He mentioned that the first buildings which had "Swiss style" are of historical importance. He sketched a couple of examples of "Swiss style" and explained that it involves a very simple design, no decorations, and that the construction was very functional. He also listed a couple important Swiss architects such as Escher and Honegger.

The answers we were getting became a little more relevant when we arrived at the integrity portion of the interview. He confirmed that we were on the right track with the parameters we have defined for this filter, and got in depth with the workmanship parameter, as this is his area of expertise. He gave us some things to look for when we examine workmanship such as window quality, pillar and support structure, and observing that the building was used for its original purpose. An example that he gave us was a factory called Schiffsbauholle which is a factory that was designed to manufacture large ship parts. This building was converted to a theater, so it would not possess high integrity of workmanship. M. Hanak also drew some pictures of both good and bad workmanship, and we'll be able to consult these drawings when we examine constructions.

In essence, what we really obtained from this interview is authority from an architectural expert for the design of our integrity filter, particularly the workmanship parameter. It was confirmed that all of the parameters, location, setting and workmanship, are very applicable in examining the integrity of an architectural site.

Interview 3: Dr. Margrit Müller

Dr. Margrit Müller works in the Institute for Empirical Research in Economics, Department of Economic History. She currently teaches at the University of Zürich and has published numerous articles on her research in economics. Her main areas of research are Business History (19^{th} and 20^{th} century), economic development and organizational change, and internationalization.

This interview ended up being quite different then we thought it would be. From the background on Dr. Müller we had read, we thought that this interview would help us with our historical criteria since she was a professor of history. However, once we got to the interview and

started going over her background and some of our initial questions, we realized her area of expertise and knowledge was business and economic history, not Swiss history directly. We changed our interview plan to focus more on economic criteria rather than historical since she did not know much about historical factors. This plan worked well, and we obtained good information on our economic criteria.

When asked what factors can be used to determine what industries are more important to the Swiss economy than others, Dr. Müller replied that an industry's contribution to GDP (Gross Domestic Product) and the number of workers that it employs were the two main factors. Dr. Müller was very strong on her stance that the most important aspect of the Swiss economy was its imports and exports. She said this was because Switzerland is too small to rely on its domestic market and so in order for it to survive, it must export and import almost everything. Therefore, the most important industries are the ones that export the most since they bring money into the country and contribute the most to the wealth (GDP). She also strongly supported the idea that companies who provided many jobs contributed greatly to Swiss economy. This agrees completely with the criteria we had already developed for our economic processing. We had been considering employment and GDP as criteria to compare industries which is exactly what Dr. Müller said were good factors.

She also stated that innovations were very important to the Swiss economy. Innovation, according to Dr. Müller, could be in either business practice or technology. She talked about innovations that specific firms had made, and which industries had gone through innovations. She mentioned the pharmaceutical industry as a major innovator specifically. This also backed up our criteria of examining industries that made specific innovations in their industry.

She did not think highly of economic independence as criteria for determining economic significance. She said that independence does not exist in Switzerland as we define it. There are no industries in Switzerland that only rely on the domestic market to survive because the domestic market is too small to support any. The only exception would be power since power generation does not need any imports, and provides power to the domestic country. However, when hydroelectric power was beginning it was focused more on exporting than serving the domestic market, so even power does not totally fit this criteria. Her overall impression was that this concept was not a good measure of the economic importance of an industry.

Interview 4: Hans-Peter Bärtschi

Dr. Hans-Peter Bärtschi works for the private organization ARIAS, which is a Swiss organization dedicated to industrial culture and preserving historic industrial sites. He is currently working on project ISIS (Inventory of Significant Industrial sites in Switzerland) which is a project on creating an inventory of all industrial sites in Switzerland that need to be preserved as part of industrial culture. Project ISIS currently has an online database of 370 sites which we are using as the source of sites for our selection process. Dr. Bärtschi has written several books on the industrial history of Switzerland and has been working in this area for over 20 years.

The meeting with Dr. Bärtschi gave us the chance to gather more resources for our project. He had books that he suggested we get, and sold us some right on the spot. He also gave us materials regarding project ISIS and the preservation work that he has done up till now. He also had information about sites that we had not previously known that helped us when evaluating these sites for historical significance.

We asked Dr. Bärtschi what were some factors that would make a site historically significant, and he had some new ideas. He said that the rarity of a site makes it significant, since if there are no others like it or if it's one of the only ones of its type left, that would make it special. Sites that are rare are ones that he would want to preserve the most since if they become decrepit or destroyed, then something unique to Swiss industrial culture has been lost. He also suggested that an event in social history would make a site historically significant. For example, a factory could just be a normal, insignificant steel factory, but if a riot happened there or a strike that played a major role in social history, that would make this once insignificant site now very significant.

Appendix D

Application Guide for Selection Process

Note: The order below is the specific order in which the sites should be passed through the filters.

Economic Significance:

1. The industry allowed the country to be self-sufficient when foreign resources were unavailable.
2. The industry was or is a leading contributor to the national revenue.
3. The industry was or is a leading provider of employment.
4. The industry pioneered technological or managerial changes.

Historical Significance:

1. The site exhibited a new invention and used it in its production process, or was a prototype for a new design.
2. The site is the only one of its kind still remaining or is unique such as being the oldest or largest.
3. The site was involved in a major social event in history such as a riot or natural catastrophe.

Site Integrity:

1. The site's surrounding environment was not altered to a great extent.
2. The site had evidence of original construction existed and no substantial modern additions have been made.
3. The site was not moved for any reason and still resides on its original foundation.

Appendix E

Sites Analyzed

Key	Data
0	Structures passing Economic, Historical, and Integrity
1	Sites passing Economic and Historical
2	Sites that passed Economic with historical information available
3	Sites passing Economic by industry
4	Sites not meeting any criteria

Site Name	City	Industrial Category	Key	Criteria
Brienz-Rothorn-Bahn BRB	Brienz, BE	Transportation	0	rarity
Bau 15 Roche-Areal	Basel, BS	Chemicals	0	1st
Tramdepot Wiesenstrasse	Basel, BS	Transportation	0	1st
Alpine Mühle	Ftan, GR	Food Industry	0	rarity
Dampfschiffe SGV	Luzern, LU	Machining	0	rarity
Moulins souterrains du Col-des-Roches	Le Locle, NE	Food Industry	0	rarity
Pilatusbahn	Alpnachstad, OW	Transportation	0	rarity
Greuterhof	Islikon, TG	Textiles	0	1st
Geigenmühle	Neerach, ZH	Food Industry	0	rarity
Chemische Fabrik	Uetikon, ZH	Chemicals	0	1st
Lokremise	Uster, ZH	Transportation	0	rarity
Usine de Forces-Motrices	Genève, GE	Power	1	rarity
Schiefer-Bearbeitungsmaschinen	Elm, GL	Mining	1	social
Fabrique de cigarettes	Boncourt, JU	Food Industry	1	1st
Hammetschwandlift	Luzern, LU	Transportation	1	rarity
Lokremise	St. Gallen, SG	Transportation	1	rarity
Kohlenbergwerk Käpfnach	Horgen, ZH	Mining	1	rarity
Schraubendampfer" Greif"	Maur, ZH	Machining	1	rarity
Gaswerk der Stadt Zürich	Schlieren, ZH	Machining	1	rarity
Kraftwerk Rheinfelden	Zweidlen, ZH	Power	2	
Mühle	Balzers, FL	Food Industry	2	
Villa Boveri	Baden, AG	Machining	2	
Gaswerk	Brugg, AG	Power	2	
Elektrizitätswerk Wettingen	Wettington, AG	Power	2	
Spinnerei Kunz Windisch	Windisch, AG	Textiles	2	
Fabrik am Rotbach	Bühler, AR	Textiles	2	
Schokoladefabrik Tobler	Bern, BE	Food Industry	2	
Werkstattgebäude Gaswerk Bern	Bern, BE	Power	2	
Wäscherei Papritz	Bern, BE	Textiles	2	
Kabine Wetterhorn-Aufzug	Grindelwald, BE	Transportation	2	
Jungfraubahn	Kleine Scheidegg, BE	Transportation	2	
Bergwerk Trachsellauenen	Stechelberg, BE	Mining	2	
Fabrikbauten 47, 43, 34, 31 Roche-Areal	Basel, BS	Chemicals	2	
Weberei Spoerry	Triesen, FL	Textiles	2	
Spinnerei Spoerry	Vaduz, FL	Textiles	2	
Centrale hydroélectrique de Chancy-Pougny	Chancy, GE	Power	2	
Gare des Eaux-Vives: anc. Remise des locomotives	Genève, GE	Transportation	2	
Ensemble de manufactures horlogères	Genève, GE	Watch Industry	2	
Ancienne distillerie de Kirsch d'Ami Argand	Versoix, GE	Food Industry	2	

Usine de Pompage des Eaux-d'Arve	Vessy, GE	Power	2	
Fabrikareal Jenny & Co	Ennenda, GL	Textiles	2	
Kolben-Dampfmaschine Jenny & Co.	Haslen, GL	Machining	2	
Niederdruckturbine Fa. Jenny & Co.	Haslen, GL	Power	2	
Braunwaldbahn	Linthal, GL	Transportation	2	
Museum des Landes Glarus	Näfels, GL	Textiles	2	
Spinnerei Jenny & Co.	Ziegelbrücke, GL	Textiles	2	
Silberbergwerk Schmelzboden	Davos Monstein, GR	Mining	2	
Zentrale Küblis	Küblis, GR	Power	2	
Bergbaumuseum Schmelzra	Scuol/S-Charl, GR	Mining	2	
Fabrique d'horlogerie	Lajoux, JU	Watch Industry	2	
Sonnenbergbahn	Kriens, LU	Transportation	2	
Bourbaki-Panorama	Luzern, LU	Transportation	2	
Fabrique de montres "Phare"	Le Locle, NE	Watch Industry	2	
Weberei Dietfurt	Bütschwil, SG	Textiles	2	
Weberei Schafbüchel	Ebnat-Kappel, SG	Textiles	2	
Brauerei	Gossau, SG	Food Industry	2	
Weberei Trempel	Krummenau, SG	Textiles	2	
Elektromotorenfabrik	Schänis, SG	Watch Industry	2	
Broderbrunnen	St. Gallen, SG	Power	2	
Tröckneturm	St. Gallen, SG	Textiles	2	
Wasserturm	St. Gallen, SG	Transportation	2	
Spinnerei Uznaberg	Uznach, SG	Textiles	2	
Stahlwerke Georg Fischer +GF+ / Werk I	Schaffhausen, SH	Machining	2	
Trinkwasser-Reservoir Breite	Schaffhausen, SH	Power	2	
Uhrenfabrik IWC	Schaffhausen, SH	Watch Industry	2	
Nudelfabrik	Stein am Rhein, SH	Food Industry	2	
Museum Oldtimer Club Saurer	Arbon, TG	Transportation	2	
Museo del San Gottardo	Airolo, TI	Transportation	2	
Tremola	Airolo, TI	Transportation	2	
Drahtseilbahn San Salvatore	Lugano, TI	Transportation	2	
Chemin de fer musée Blonay - Chamby	Blonay, VD	Transportation	2	
Usine électrique SEIC	Gland, VD	Power	2	
Bateaux (Musée du Léman)	Nyon, VD	Transportation	2	
Musée du fer et du chemin de fer	Vallorbe, VD	Power	2	
Simplonstrasse	Gondo, VS	Transportation	2	
Spinnerei an der Lorze	Baar, ZG	Textiles	2	
Museums-Spinnerei Neuthal	Bäretswil, ZH	Textiles	2	
Spinnerei Neuthal	Bäretswil, ZH	Textiles	2	
Dampfbahnverein Zürcher Oberland	Bauma, ZH	Machining	2	
Dampfbahn-Verein Zürcher Oberland	Bauma, ZH	Transportation	2	
Bergbaumaschinen Käpfnach	Horgen, ZH	Mining	2	
Spinnerei Bühler	Kollbrunn, ZH	Textiles	2	
Spinnerei Straub	Langnau a. Albis, ZH	Textiles	2	
Maggi-Fabrik Kemptthal	Lindau, ZH	Food Industry	2	
Turbinenanlage Weberei Haas	Ottenbach, ZH	Power	2	
Gaswerk der Stadt Zürich	Schlieren, ZH	Power	2	
Weberei/Spinnerei Honegger	Wald, ZH	Textiles	2	
Wespi-Mühle Wülflingen	Winterthur, ZH	Power	2	
Maschinenfabrik Escher Wyss	Zürich, ZH	Machining	2	
Mühle Hirslanden	Zürich, ZH	Food Industry	2	
Mühle Hirslanden	Zürich, ZH	Food Industry	2	
Mühle Tiefenbrunnen	Zürich, ZH	Food Industry	2	
Mühle Tiefenbrunnen	Zürich, ZH	Food Industry	2	

Salondampfer "Stadt Zürich"	Zürich, ZH	Machining	2	
Kraftwerk "am Giessen"	Zürich, ZH	Power	2	
Unterwerk EWZ Selnau	Zürich, ZH	Power	2	
"Rote Fabrik"	Zürich, ZH	Textiles	2	
Tram-Museum Zürich	Zürich, ZH	Transportation	2	
Tram-Museum Zürich	Zürich, ZH	Transportation	2	
Alte Schmiede BBC	Baden, AG	Machining	3	
Portierhaus ABB	Baden, AG	Machining	3	
Kraftwerkmuseum Kappelerhof	Baden, AG	Power	3	
Brauerei Feldschlösschen	Rheinfelden, AG	Food Industry	3	
Spinnerei und Weberei	Wettington, AG	Textiles	3	
Bahnhof Wetttingen	Wettington, AG	Transportation	3	
Manufakturgebäude Laué	Wildegg, AG	Textiles	3	
Bleicherei Rotbach	Bühler, AR	Textiles	3	
Bleicherei Strahlholz	Gais, AR	Textiles	3	
Plattstichweberei Hinterwies	Speicher, AR	Textiles	3	
Stickerei Gütle	Valzenhause, AR	Textiles	3	
Matterschwelle von 1360	Bern, BE	Power	3	
Wasserwerk	Bern, BE	Power	3	
Ehem. Kraftwerkgebäude	Bern, BE	Power	3	
Gaskessel	Bern, BE	Power	3	
Spinnerei Felsenau	Bern, BE	Textiles	3	
Ryff-Fabrik	Bern, BE	Textiles	3	
Kleiderfabrik Schild	Bern, BE	Textiles	3	
Altes Tramdepot (Druckluft-Tram)	Bern, BE	Transportation	3	
Elektrizitätswerk Augst	Augst, BL	Power	3	
Elektrizitätswerk Birsfelden	Birsfelden, BL	Power	3	
Brauerei Ziegelhof	Liestal, BL	Food Industry	3	
Zentralgebäude SBB-Rangierbahnhof	Muttenz, BL	Transportation	3	
Mahlmühle	Oberdorf, BL	Food Industry	3	
Bandweberei Senn AG	Ziefen, BL	Textiles	3	
Büro- und Werkstattbau 49, Roche	Basel, BS	Chemicals	3	
Verwaltungsbau 21, Roche-Areal	Basel, BS	Chemicals	3	
Bauten 60, 61, 62, 64, 72, 73 Roche-Areal	Basel, BS	Chemicals	3	
Verwaltungsbau 71, Roche-Areal	Basel, BS	Chemicals	3	
Hochhaus Bau 52, Roche-Areal	Basel, BS	Chemicals	3	
Personalhaus Bau 67, Roche-Areal	Basel, BS	Chemicals	3	
Bau 9, Roche-Areal	Basel, BS	Chemicals	3	
Untergeschossbauten Roche-Areal	Basel, BS	Chemicals	3	
Chemieproduktion Bau 29, Roche Areal	Basel, BS	Chemicals	3	
Rheinfront-Bauten 71, 70, 69, 68, 48 Roche-Areal	Basel, BS	Chemicals	3	
Bau 15 Roche-Areal	Basel, BS	Chemicals	3	
Lagerbau 41 Roche-Areal	Basel, BS	Chemicals	3	
Maschinenhalle Bau 57 Roche-Areal	Basel, BS	Chemicals	3	
Kesselhaus Bau 35 Roche-Areal	Basel, BS	Chemicals	3	
Chemieproduktion Bau 50 Roche-Areal	Basel, BS	Chemicals	3	
Destiliernalage für Methyl	Basel, BS	Chemicals	3	
Wasserkraftanlage Mühleholz	Vaduz, FL	Power	3	
Mühleholz (Arbeiterwohnhäuser)	Vaduz, FL	Textiles	3	
Usine électrique	Broc, FR	Power	3	
Ritter-Kraftwerk, Transmission	Fribourg, FR	Power	3	
Ancienne Minoterie Sylvant	Carouge, GE	Food Industry	3	
Halle 8 de Sécheron SA (ex Ateliers de Sécheron)	Genéve, GE	Machining	3	
Ancien bâtiment de montage de l'usine Tavaro	Genève, GE	Machining	3	

Société genevois des instruments de physique (SIP)	Genève, GE	Machining	3	
Moulin de La Plaine	La Plaine, GE	Food Industry	3	
Wagenremise und Drehscheibe Bahnhof Glarus	Glarus, GL	Transportation	3	
Hänggitürme im Löntschen	Netstal, GL	Textiles	3	
Areal Therma AG	Schwanden, GL	Watch Industry	3	
Rhätische Aktienbrauerei (Calanda-Bräu)	Chur, GR	Food Industry	3	
Schaltstation Pulvermühle	Chur, GR	Power	3	
Bahnhof Chur	Chur, GR	Transportation	3	
Parsennbahn Davos	Davos Dorf, GR	Transportation	3	
Aufnahmegebäude	Davos Platz, GR	Transportation	3	
Hauptwerkstätte Landquart, Lokomotivremise	Landquart, GR	Transportation	3	
Hauptwerkstätte Landquart, Kesselschmiede	Landquart, GR	Transportation	3	
Kraftwerk Lüen	Lüen, GR	Power	3	
Stationsgebäude	Maienfeld, GR	Transportation	3	
Gewerbekomplex Poschiavo	Poschiavo, GR	Food Industry	3	
Mühle Salouf	Salouf, GR	Food Industry	3	
Kraftwerk Sils, Zentrale	Sils i.D, GR	Power	3	
Mühle Tamins	Tamins, GR	Food Industry	3	
Kraftwerk Trin Mulin	Trin Mulin, GR	Power	3	
Seewerk Zervreila	Vals, GR	Power	3	
Usine	Alle, JU	Watch Industry	3	
Moulin de Paplemont	Courgenay, JU	Food Industry	3	
Rotonde pour locomotives	Delémont, JU	Transportation	3	
Ancienne brasserie	Porrentruy, JU	Food Industry	3	
Moulin	Soulce, JU	Food Industry	3	
Usines Thécla	St-Ursanne, JU	Machining	3	
Steinermühle	Alberswil, LU	Food Industry	3	
Kanal	Alberswil, LU	Power	3	
Schiff-Landungssteg 2	Luzern, LU	Transportation	3	
Fabrique-Neuve 1765	Cortaillod, NE	Textiles	3	
Asphaltfabrik La Presta	Travers, NE	Mining	3	
Kraftwerk Lungerersee, Nebenwerk Kaiserstuhl	Bürglen, OW	Power	3	
Kraftwerk Obermatt	Grafenort, OW	Power	3	
Elektrizitätswerk Obwalden, Unterwerk Sarnen	Sarnen, OW	Power	3	
Zwirnerei und Weberei	Bazenheid, SG	Textiles	3	
Stickerei Degersheim	Degersheim, SG	Textiles	3	
Weberei Roos	Ebnat-Kappel, SG	Textiles	3	
Stickerei	Gossau, SG	Textiles	3	
Spinnerei	Jona, SG	Textiles	3	
Weberei	Krinau, SG	Textiles	3	
Spinnerei	Lichtensteig, SG	Textiles	3	
Stickerei Rebstein	Rebstein, SG	Textiles	3	
Seidengazefabrik	Rheineck, SG	Textiles	3	
Ehem. Zweibruggenmühle	St. Gallen, SG	Food Industry	3	
Ehem. Umformerstation Geltenwilen	St. Gallen, SG	Power	3	
Stickerei Muser	St. Gallen, SG	Textiles	3	
Färberei Sittertal	St.Gallen, SG	Textiles	3	
Stickerei Iklé	St.Gallen, SG	Textiles	3	
Stickerei	Trübbach, SG	Textiles	3	
Seidenweberei	Uznach, SG	Textiles	3	
Weberei	Walenstadt, SG	Textiles	3	
Weberei und Färberei Heberlein	Wattwil, SG	Textiles	3	
Kraftwerk SIG	Neuhausen, SH	Power	3	
Ehem. Maschinenfabrik Rauschenbach	Schaffhausen, SH	Machining	3	

Grundwasser-Pumpwerk Engestieg	Schaffhausen, SH	Power	3	
Wasserwerk und EW am Rhein	Schaffhausen, SH	Power	3	
Ehem. Fabrikkomplex Baumwollzwirnerei	Schaffhausen, SH	Textiles	3	
Ehem. Kammgarnspinnerei	Schaffhausen, SH	Textiles	3	
Kammwollspinnerei Schöller, Chessex & Cie.	Schaffhausen, SH	Textiles	3	
Güterhof	Schaffhausen, SH	Transportation	3	
Bahnhof	Schaffhausen, SH	Transportation	3	
Arbeitersiedlung "Elsässli"	Derendingen, SO	Textiles	3	
Dieselmotor der Kammgarnspinnerei	Luterbach, SO	Machining	3	
Wasserkraftwerk Emmekanal	Luterbach, SO	Power	3	
Haus Gutenberg	Einsiedeln, SZ	Textiles	3	
Spinnerei Siebnen	Siebnen, SZ	Textiles	3	
Krafterzeugungsmaschinen der Papierfabrik	Bischofszell, TG	Power	3	
Färberei	Bürglen, TG	Textiles	3	
Thärris-Turm	Diessenhofen, TG	Textiles	3	
Walzmühle	Frauenfeld, TG	Food Industry	3	
Postgebäude	Frauenfeld, TG	Transportation	3	
Färberei von 1735	Hauptwil, TG	Textiles	3	
Arbeiterhäuser von 1670	Hauptwil, TG	Textiles	3	
Fabrikgebäude Stromeyer	Kreuzlingen, TG	Textiles	3	
Weberei Grüneck	Müllheim, TG	Textiles	3	
Baumwollspinnerei	Pfyn, TG	Textiles	3	
Bahnhof und Hafenanlagen	Romanshorn, TG	Transportation	3	
Seidenstoffweberei	Schönenberg an der Thur, TG	Textiles	3	
Mühle	Weinfelden, TG	Food Industry	3	
Deposito FFS	Bellinzona, TI	Transportation	3	
Chemiewerk Lonza / Stahlwerk Monteforno	Bodio, TI	Chemicals	3	
Elektrizitätswerk 1911	Bodio, TI	Power	3	
Ferrovia Monte Generoso	Capolago, TI	Transportation	3	
Stazione FFS	Lugano, TI	Transportation	3	
Drahtseilbahn Monte Bré	Lugano, TI	Transportation	3	
Piotta-Ritom	Quinto, TI	Power	3	
Standseilbahn Ambri-Piotta	Quinto, TI	Power	3	
Eidg. Getreidemagazin	Altdorf, UR	Food Industry	3	
Kraftwerk Amsteg	Amsteg, UR	Power	3	
Bahnhof	Flüelen, UR	Transportation	3	
Grabmal Louis Favre	Göschenen, UR	Transportation	3	
Gotthardbahn Erstfeld - Göschenen	Göschenen (höchster Punkt), UR	Transportation	3	
ehem. Karbidfabrik	Gurtnellen, UR	Chemicals	3	
Moulin/Scierie	St-George, VD	Food Industry	3	
Chemiefabrik Lonza	Visp, VS	Chemicals	3	
Neumühle, Silos	Baar, ZG	Food Industry	3	
Kolonialstilhäuser	Cham, ZG	Food Industry	3	
Arbeitersiedlung Spinnerei Hagendorn	Hagendorn, ZG	Textiles	3	
Pumpe Kohlboden	Neuheim, ZG	Power	3	
Turbine/Schacht Innere Spinnerei	Unterägeri, ZG	Power	3	
Fabrikgebäude Innere Spinnerei	Unterägeri, ZG	Textiles	3	
Wasserkraftanlage Untere Spinnerei Streiff	Aathal-Seegräben, ZH	Power	3	
Untere Spinnerei Streiff	Aathal-Seegräben, ZH	Textiles	3	
Weberei Grünthal, Juckeren	Bauma, ZH	Textiles	3	
Ehem. Montagehalle, Militärflugplatz Dübendorf	Dübendorf, ZH	Transportation	3	
Arova	Flurlingen, ZH	Textiles	3	
Spinnerei Kennelwies	Freienstein, ZH	Textiles	3	

Tröckneturm	Greifensee, ZH	Textiles	3	
Schokoladenfabrik Lindt & Sprüngli	Kilchberg, ZH	Food Industry	3	
Flughafen Zürich, Werft 1	Kloten, ZH	Transportation	3	
Spinnerei Bühler, Wasserkraftanlage	Kollbrunn, ZH	Power	3	
Bahnhof Richterswil	Richterswil, ZH	Transportation	3	
Seidenweberei Rüti	Rüti, ZH	Textiles	3	
Weberei Steg	Steg, ZH	Textiles	3	
Reservoir Burghalden	Unterstammheim, ZH	Power	3	
Arbeitersiedlung "Eisenbahnzug"	Uster, ZH	Textiles	3	
Trafo-Turm Schlipfstrasse	Wald, ZH	Power	3	
IDeWe, Wasserkraftanlage	Wetzikon, ZH	Power	3	
Spinnerei Schönau, Wasserkraftanlage	Wetzikon, ZH	Power	3	
Baumwollspinnerei Streiff, Floos	Wetzikon, ZH	Textiles	3	
Brauerei Haldengut	Winterthur, ZH	Food Industry	3	
Sulzer-Gründerareal	Winterthur, ZH	Machining	3	
Schlachthof	Zürich, ZH	Food Industry	3	
Wasserwerk der Stadt Zürich	Zürich, ZH	Power	3	
Fernheizkraftwerk ETH	Zürich, ZH	Power	3	
Manufaktur Hofmeister	Zürich, ZH	Textiles	3	
Spinnerei auf der Werdinsel	Zürich, ZH	Textiles	3	
Historisches Museum Baden	Baden, AG	Public Archives	4	
Salzbohrtürme	Zurzach, AG	Nonmetal Manufacturing	4	
Kabelwerk Huber & Suhner	Herisau, AR	Metal Industry	4	
Grubenmann-Sammlung Teufen	Teufen, AR	Construction	4	
Eidg. Waffenfabrik	Bern, BE	Public Works	4	
Säge mit Wasserradantrieb	Innertkirchen, BE	Woodworking Industry	4	
Musée du Tour Automatique et d'Histoire du Moutier	Moutier, BE	Metal Industry	4	
Ziegelei	Laufen, BL	Nonmetal Manufacturing	4	
Papiermühle	Lausen, BL	Paper and Printing	4	
Gasthaus "Zur Sonne"	Reigoldswil, BL	Tourism	4	
Warenhaus "Cheesmeyer"	Sissach, BL	Commercial Buildings	4	
Barrage de Montsalvens	Châtel-sur-Montsalvens, FR	Construction	4	
Collection de machines d'imprimerie de l'API	Genève, GE	Paper and Printing	4	
Garage Bosch	Genève, GE	Commercial Buildings	4	
Rade de Genève	Genève, GE	Construction	4	
Canal des Usiniers	Versoix, GE	Construction	4	
Schiefertafelfabrik	Elm, GL	Nonmetal Manufacturing	4	
Schiefer-Bearbeitungsmaschinen	Linthal, GL	Construction	4	
Kalkfabrik Netstal AG	Netstal, GL	Nonmetal Manufacturing	4	
Dorfbach Netstal	Netstal, GL	Construction	4	
Papierfabrik Netstal AG	Netstal, GL	Paper and Printing	4	
Kraftwerkanlagen F.+C. Jenny AG	Ziegelbrücke, GL	Construction	4	
Solis-Brücke	Alvaschein, GR	Construction	4	
Kreisviadukt	Brusio, GR	Construction	4	
Kaserne	Chur, GR	Public Works	4	
Landwasserviadukt Filisur	Filisur, GR	Construction	4	
Sunnibergbrücke	Klosters, GR	Construction	4	
Langwieser Viadukt	Langwies, GR	Construction	4	
Eggatobel-Brücke	Malix, GR	Construction	4	
Gemeindesäge	Masein, GR	Woodworking Industry	4	
Staumauer Lago Bianco (Südliche Mauer)	Poschiavo, GR	Construction	4	
Salginatobelbrücke	Schiers, GR	Construction	4	
Gemeindesäge	Schmitten, GR	Woodworking Industry	4	
Valar-Säge	Seewis im Prättigau, GR	Woodworking Industry	4	

Hinterrhein-Brücke RhB	Tamins, GR	Construction	4	
Rheinbrücke Reichenau	Tamins, GR	Construction	4	
Landwasserviadukt Wiesen	Wiesen, GR	Construction	4	
Maillart-Brücke	Zuoz, GR	Construction	4	
Usines Von Roll, Tuyaux pression SA	Choindez, JU	Metal Industry	4	
Usines "Les Rondez"	Delémont, LU	Metal Industry	4	
Landessender Beromünster	Gunzwil, LU	Communication	4	
Familistère "Manège"	La Chaux-de-Fonds, NE	Construction	4	
Mittelwellen-Antennenanlage Schwendi	Sarnen, OW	Communication	4	
Sitterviadukt BT	St. Gallen, SG	Construction	4	
Ehem. Lagerhaus	St. Gallen, SG	Commercial Buildings	4	
Zieglersche Tonwarenfabrik	Neuhausen, SH	Nonmetal Manufacturing	4	
Stahlwerke Georg Fischer +GF+ / Werk III	Schaffhausen, SH	Metal Industry	4	
Stahlwerke Georg Fischer +GF+ / Verwaltungsgebäude	Schaffhausen, SH	Metal Industry	4	
Stahlwerke Georg Fischer, Logierhaus Birch	Schaffhausen, SH	Metal Industry	4	
Silberwarenfabrik Jezler & Cie.	Schaffhausen, SH	Processing	4	
Arbeiterkolonie Stahlwerkstrasse	Schaffhausen, SH	Metal Industry	4	
Arbeiterkolonie Schwarzadlergüetli	Schaffhausen, SH	Metal Industry	4	
Zellulosefabrik Attisholz	Attisholz, SO	Woodworking Industry	4	
Ehem. Von Roll-Wwerkstatt IV	Balsthal, SO	Metal Industry	4	
Kalkbrennofen Stritteren	Bärschwil, SO	Nonmetal Manufacturing	4	
Portlandzementwerk	Olten, SO	Nonmetal Manufacturing	4	
Säureturm der Cellulose Attisholz AG	Riedholz, SO	Woodworking Industry	4	
Ehem. Stanzerei Bally	Schönenwerd, SO	Leather and Shoe Industry	4	
Kosthaus Bally	Schönenwerd, SO	Leather and Shoe Industry	4	
Bally-Schuhfabriken	Schönenwerd, SO	Leather and Shoe Industry	4	
Wylerbrücke	Brunnen, SZ	Construction	4	
Teufelsbrücke	Einsiedeln, SZ	Construction	4	
Alte Säge Schindellegi	Schindellegi, SZ	Woodworking Industry	4	
Suworowbrücke	Schwyz, SZ	Construction	4	
Jessenenbrücke	Unteriberg, SZ	Construction	4	
Schädler-Turm	Arbon, TG	Metal Industry	4	
Ziegelei	Berg, TG	Nonmetal Manufacturing	4	
Papierfabrik	Bischofszell, TG	Paper and Printing	4	
Papiermaschine 1	Bischofszell, TG	Paper and Printing	4	
Eisenwerk	Frauenfeld, TG	Metal Industry	4	
Weiher von 1430	Hauptwil, TG	Construction	4	
Kartonfabrik Model	Weinfelden, TG	Nonmetal Manufacturing	4	
Gallerie elicoidali del Piottino	Prato (Leventina), TI	Construction	4	
Fabrikgebäude Dätwyler AG	Altdorf, UR	Metal Industry	4	
Ziegelhütte Seematten	Flüelen, UR	Nonmetal Manufacturing	4	
Bielensäge	Unterschächen, UR	Woodworking Industry	4	
Mines de sel	Bex, VD	Nonmetal Manufacturing	4	
Viaduc chemin de fer	Givrins, VD	Construction	4	
Atelier de tournage sur bois	L'Auberson, VD	Woodworking Industry	4	
Canal	Orbe, VD	Construction	4	
Atelier pour la fabrication de boîtes à musique	Ste-Croix, VD	none	4	
Aluminiumwerk Chippis	Chippis,VS	Metal Industry	4	
Elektrolysehalle Chippis	Chippis, VS	Metal Industry	4	
Kraftwerk Chippis	Chippis, VS	Metal Industry	4	
Scierie	Grône, VS	Woodworking Industry	4	
Bietschtalviadukt	Raron, VS	Construction	4	
alte Steinbogenbrücke	Baar, ZG	Construction	4	

Papierfabrik	Cham, ZG	Paper and Printing	4	
Wehr der Spinnerei Hagendorn	Hagendorn, ZG	Construction	4	
Eisenbahnbrücke Eglisau	Eglisau, ZH	Construction	4	
Archiv Kohlenbergwerk Käpfnach	Horgen, ZH	Public Archives	4	
Eisenbrücke Au	Kollbrunn, ZH	Construction	4	
Eisenbahnbrücke Thur	Ossingen, ZH	Construction	4	
Drechslerei Steg	Steg, ZH	Woodworking Industry	4	
Lagerhaus Giesshübel	Zürich, ZH	Commercial Buildings	4	

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