European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: Photographic Studios and Processing

PROCESS DESCRIPTION

In the context of these guidelines, photographic studios are taken to be small to medium sized enterprises that have the capacity to take and produce various photographs as a service to industry and households alike. These services could include still and video photography, photographic booths, and digital photo-processing. Medical photographic facilities are not covered in this description.

More recently, modern forms of digital photography have eliminated many of the environmental and social hazards associated with traditional film processing and related chemical use and wastewater treatment. However, while the use of digital photography has developed rapidly, traditional photographic techniques, associated with the photosensitive chemical compound silver-halide, continue to be used for better quality. As chemical hazards do remain pertinent in traditional photographic processing, this brief gives emphasis to those risks.

Modern Digital Photographic Processing

Digital photo processing can involve a number of different techniques, all of which minimise the amount of water and eliminate required chemicals:

- Laser – Initially designed as black and white printing devices, colour applications now exist. The process is one by which toner is attracted to a charged image and is transferred onto paper.

- Thermal Wax Transfer – this process works by heating a coloured wax sheet and applying it to a paper surface.

- Inkjet – This process uses cartridges containing liquid ink which is then applied to paper by either heat or pressure.

Traditional Photographic Processing

This process is defined as a set of procedures by which a latent, or invisible, image produced when photographic film is exposed to light is transformed into permanent visible images.

- Creating (step 1) - Creating a latent image on film requires the use of silver halides, the grains of which are destabilised when exposed to light through the camera lens.

- Processing (step 2) - Processing of the negative uses a succession of chemical baths to expose and fix the image.

- Producing (step 3) - Production of the print uses the negative to produce a positive image on photosensitive paper.

The general procedures involved in steps two and three, processing the negative and producing the print, require use of chemicals which can be defined as hazardous. Generally, the process is as follows: (1) a developer agent is used to convert any silver halides in the film into visible black metallic silver, (2) a bleach solution is required to stop development, and (3) an ammonium thiosulphate fixing solution is used to dissolve the remaining silver halide from the film. Finally, (4) the film is rinsed with a chemical stabiliser which protects the dyes against ageing and fading.

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KEY ENVIRONMENTAL, HEALTH AND SAFETY RISKS/LIABILITY FACTORS

Dry processing techniques, as used in digital photography, do not use chemicals and do not require water for rinsing. This eliminates wastewater and most indoor contaminants (aside from inks and waste ink cartridges), as well as the use or need for silver recovery techniques associated with traditional processing techniques. The process therefore greatly minimises negative environmental and social impacts which may pose risks. As photographic studios may have a mix of both modern and traditional processing services, the below information describes the environmental and social threats associated with traditional processing techniques.

Water Usage and Effluents in Traditional Processing

Small to medium-sized studios involved in traditional photo processing will require potable water and processing chemicals, which may be discharged into wastewater streams. The principal contaminant of concern in relation to photographic development is silver which can be highly toxic to water-based organisms.

Waste developing fluids (fixers, bleaches and developers) can contain concentrations of silver up to 1,000 times higher than would typically be acceptable for discharge to municipal sewage treatment systems. Other characteristics of effluents may also render them unacceptable for discharge through normal methods. Such effluents therefore tend to require either on-site treatment, specialist disposal methodologies or preferably, recovery.

As a result of its high intrinsic value, the recovery of silver (and silver solutions) may represent a financial benefit to film processing facilities where traditional processing is done in significant volumes.

Environmental Impacts

Losses of photo-processing chemicals or wastes to the environment may have direct impacts. This is of most concern when chemicals are introduced to rivers, lakes, and other water bodies. Spillages to soil, whilst not benign, are likely to have a more minor impact unless migration of the spilled material into neighbouring water bodies occurs. Regardless of the immediate impact, remedial measures may be necessary to address contamination of soil and/or groundwater.

Occupational Health and Safety Impacts

Occupational health and safety impacts relate most significantly to chemical and physical hazards. Common chemical impacts are associated with potential solvents and their associated volatile organic compounds (VOCs), which can pose health hazards if ingested.

- **Inhalation hazards**- These can occur at different stages of photo processing and cleaning when alcohols and solvents evaporate into the work environment. These risks can be minimised through the selection of less hazardous processing and cleaning solutions. Equally, VOC dispersion can be minimised with the installation of extraction fans and other ventilation outlets.

- **Skin contact hazards** – Direct skin contact with chemicals can be readily mitigated through the use of gloves, eye protection and protective clothing to keep chemicals off the skin.

- **Physical hazards** – These are associated with injury through the use of folding, cutting (scissors, wire cutters, knives) or binding equipment used in pre or post-photo processing activities. More common, and less serious hazards, can include falls due to slippery services.

Waste management

Film processing facilities have the potential to generate substantial quantities of waste. Such waste typically takes the following forms:

- Photosensitive scrap (films, negatives and photographic paper);
- Film packaging;
- Disposable cameras;
- Modern ink cartridges;
- Packaging materials and paper;
- Waste chemicals; and
- Chemical containers.

In addition, recovered chemicals may be defined in local or national regulations as waste even if they are collected for recycling.

Whilst the majority of these materials (apart from waste chemicals) can be considered to be inert, photosensitive wastes contain high concentrations of silver and silver salts and may therefore be considered hazardous. Again, it should be noted that automated processing facilities and photo booths produce a reduction in the types and volume of wastes.

Materials Storage and Handling

The principal issues in relation to materials storage at photographic studios where traditional techniques are used, relate to liquid chemical solutions. Though these may be minor with regard to small and medium-sized enterprises, the risk exists for spillages to enter into storm water drains or municipal sewer systems.

KEY SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

Labour standards

Labour standards are rules that govern working conditions and industrial relations. They may be formal, such as national level regulation and international agreements, or informal, expressed through norms and values. In general, developed countries have more robust labour standards than developing countries where the associated risks are higher. The commonly accepted rights and principles enshrined in the International Labour Organization conventions are the right to collective bargaining, elimination of forced or compulsory labour, abolition of child labour and elimination of all forms of discrimination. In addition fair wages and working hours and acceptable working conditions should be expected.

Labour standards should apply to the company's own employees as well as to all contractors and sub-contractors engaged. In addition, labour standards should be expected to be enforced by key suppliers.

Community Risks

Neighbouring community land and water resources may be at risk of contamination if the business inappropriately disposes of photo-processing solutions and spent rinse water containing silver sulphide. This can have a negative impact on the health of local members of the community. This in turn may expose the company to significant liability risk.

FINANCIAL IMPLICATIONS

The principal financial implications of environmental and social issues at photographic studios are noted below. These are more present where traditional processing techniques are practiced.

- Requirement for permits for chemical storage;
- Requirements for permits and charges for wastewater discharge and waste disposal;
- Fines and prohibitions arising from failure to meet the conditions imposed under the permits; and
- Remedial costs associated with environmental impacts such as soil contamination or unplanned discharge of silver rich materials into water bodies.

If a chemical spill affects the local environment and/or public health, this could result in civil liabilities and damage to public perception of the operating company with potentially serious financial implications.

IMPROVEMENTS

Related to photographic studios, a number of improvement opportunities exist in shifting the balance between traditional and modern digital processing techniques. Assuming that both techniques are practices, companies can implement changes across the following areas:

Water Minimisation

Conversion of older wash based processing procedures with newer washless methods (such as those used in automated development) will substantially reduce the volumes of water required and therefore the quantities of waste water which may be generated. The concentrations of contaminants within the effluent streams created by washless processing are, however, typically much higher than those found in wastewater generated by wash based processing. Increased expenditure in relation to effluent treatment and disposal may therefore be required for modern digital processing facilities.

Effluent Treatment

Silver-laden wastewater presents the most significant opportunity for improved environmental management. This assumes that the photographic studio uses traditional techniques and processes larger volumes of photos. Common approaches to better managing this and other highly contaminated effluents from film processing include:

- **Silver recovery** – There are multiple techniques to silver recovery, which can achieve recovery rates of up to 99% (see the EPA link on Photo Processing under References & Additional Sources).

- **Replacement of silver** – Equally active chemical agents, though with less toxicity, can be used in photo processing.

- **Effluent Volume reduction** – This is in the form of evaporation or distillation. These processes can reduce the effluent volume by up to 90% but may have an impact on local air quality.

- **Off-site disposal** - Processing materials include waste slurry generated by evaporation/distillation, spent silver recovery cartridges and waste chemicals. In some cases it may be economically advantageous for the entire volume of effluent to be removed from site for treatment and disposal elsewhere.

Other Environmental Issues

- Reduction in the generation of hazardous and non-hazardous wastes can be achieved through increased use of automated print-processing machines where the level of material and chemical use can be computer controlled.

- Waste material can also be minimised through greater adoption of digital photo processing techniques. However, proper disposal of ink cartridges, containers, and related automated equipment is a consideration in modern processing techniques.

Health and Safety

- Provide adequate ventilation (e.g. for print rooms where solvents evaporate into the local work environment);

- Reduce risks of skin hazards by providing warning posters, as well as hand cream, gloves and training on proper chemical use.

- Reduce injuries due to slips and falls through training on proper maintenance of photo processing rooms;

- Communicate to all employees that eating, drinking and smoking are not permitted in areas where chemicals are used;

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

The issues and risks associated with a site will vary depending on factors including the type and size of the operation, site location, and the quality of management. However, due diligence visits should consist of a tour of the entire site.

When visiting the sites of existing or potential borrowers, financial intermediaries may wish to use the following suggestions to guide the initial due diligence process. However, note that this does not represent an exhaustive list of issues for consideration.

During the initial site visit, it will be important to assess the following:

Environmental, Health and Safety

- Assess the photo development method in place and determine whether the company uses traditional or modern photo processing techniques.

- If traditional techniques are employed, determine the volumes of water used in processing;

- Determine whether a silver recovery treatment method is used and, if so, what level of hazardous material is generated, and how recovered silver is properly disposed of or recycled;

- Determine how wastes, including photosensitive scrap, film packaging, packaging materials, and chemical or automated inkjet containers, among others, are disposed of or recycled;

- Check whether the site has any outstanding fines, or a record of poor relationships with environmental regulators or the community in which it operates;

- Check for signs of ground contamination from chemicals used in traditional photo processing;

- What is the standard of housekeeping on site? Look for evidence that the walking and working surfaces are kept clean and dry;

- Check whether general health and safety precautions are being followed. Do staff where protective equipment in handling chemicals? Is there appropriate signage and instruction regarding chemical use and disposal? Have employees been trained in chemical use and photo processing operations?

Labour issues

Generally photographic studios employ a limited number of staff, so a detailed labour due diligence review may be excessive. Nevertheless, it remains important to consider the issues below;

- Check that labour standards, contracting and remuneration are in line with national law and are consistent with the average for the sector;

- Check that hours worked, including overtime, are recorded and that staff receive written details of hours worked and payment received;

- Has the Company received inspections from the local labour inspectorate in the previous three years? Have these resulted in any penalties, fines, major recommendations or corrective action plans?

- Does the organization have a grievance mechanism which allows employees to raise workplace concerns?

- Are employees free to form, or join, a workers' organization of their choosing?

ACTION PLANS

Any lending or investment should take place within the context of Environmental and Social Action Plans, which should have clear timescales and roles and responsibilities established for each action point. Typically, plans may include:

Environment

- Implement a programme to monitor and reduce environmental impacts associated with odour, water and chemical use;
- Implement a plan to manage solid waste generation, waste disposal, materials storage, materials handling and emergency response procedures;
- Develop a training plan for company staff to ensure proper chemical handling, storage, and disposal; and
- Establish a schedule and procedure for review and updating of the environmental action plan.

Health and Safety

- Develop a formal Health and Safety policy;

- Maintain a schedule to track training given to workers and managers on safety policy and procedures;

- Encourage a culture of 'safety first' through communication from the top.

Social, Labour and Community

- Implement a formal code of business conduct, which outlines the principles by which individual employees and the organization must conduct themselves;
- Ensure fair wages, fair working hours, and minimum age of workers in line with national law and sector norms.
- Implement best-practice labour standards (in line with ILO principles).

REFERENCES AND ADDITIONAL SOURCES

Issue	Link
Labour standards	International Labour Organization declaration [http://www.ilo.org/declaration/thedeclaration/lang--en/index.htm]
Photo Processing Guidance	US EPA - [http://www.epa.gov/osw/inforesources/pubs/infocus/photofin.pdf]
Silvery Recovery Methods	The Silver Council – Industry Guidance on Silvery Recovery and Effluent Minimization – [http://www.silvercouncil.org/html/index.htm]